SOVIET LIFE

WORLD PEACE CONGRESS

FUEL AND ENERGY: PROBLEMS AND PROSPECTS

SIBERIA'S NEW FRONTIER

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WORLD CONGRESS OF PEACE FORCES

The development of relations of peaceful cooperation between the Soviet Union and the United States of America is an important factor in solving the problems vitally important for the peoples of the Earth of averting another world war and ensuring universal peace.

In the past two years the development of these relations has been marked by the conclusion of a number of important treaties and agreements, such as the Basic Principles of Relations Between the Union of Soviet Socialist Republics and the United States of America, the treaty and agreement on the limitation of the anti-ballistic missile systems and of strategic offensive arms, and the agreement between the USSR and the USA on the prevention of nuclear war. We are faithfully fulfilling our obligations under these treaties and agreements and intend to continue to do so in the future. Naturally, we expect the other side to do likewise.

From Leonid I. Brezhnev's speech
at the World Congress of Peace Forces
on October 26, 1973.

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SOVIET LIFE

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LETTERS TO THE EDITOR

As a teacher I am interested in gathering material and information in the field of ecology for a course we are offering in our school. In my visit to the Soviet Union this past summer I wos impressed by the clear skies and apparently clean water in the rivers, even flowing through industrial centers. I especially recall Kiev, with the bathing beach and people fishing in the Dnieper within the city limits.

As a subscriber to SOVIET LIFE magazine for many years, I would like to congratulate you again for the excellent job you are doing. I would like to add that my visit ta your country was ane of the travel highlights of my life. I am deeply impressed with your people and your nation's accomplishments.

G. Holding
Anaheim, California

As you will note from the letterhead, I am principal of an elementary school. In our sixth grade we do study about the USSR, but the information and resources available are rather sterile ond certainly present a one-sided view of the USSR. Until very recently, the USA-USSR relations were rather frigid; with the thaw in relations and the inability of the publishing houses to catch up, there is a definite lack of current information that elementory school children can handle.

If the youth can develop an understanding of each other's points of view and feelings, perhaps the next 30 years can be more fruitful than the past 30 years.

John Hogan
Watertown, New York

Congratulations to all involved in production of the November issue of SOVIET LIFE. It's more than the many smiling faces that made it for me an exceptionally fine issue, but being a lawyer unfamiliar with the jargon of the publishing business I can only say that every aspect of the issue blends together to make the whole a candidate for honors.

Julian Imbrie Richards
McLean, Virginia

Mr. Moore, my principal, knowing of my interest in the Soviet Union, turned over to me the invitation to subscribe which he had just received. If I am not entitled to the special rate for the new subscription I am hereby sending, I'm quite willing to pay the extra dollar or whatever. I am entering a subscription for Lea Whiteside and enclosing my personal check for the subscription.

Would you be interested to knaw why? Our art teacher's son acquired a stack of SOVIET LIFE during a paper drive for his group of Boy Scouts. She nabbed on to them for me because she knew that I taught about the Soviet Union in my sixth grade Social Studies, and, more importantly, that Mr. and Mrs. Whiteside and I spent five weeks last summer in the Soviet Union (NEA Tour), going from Leningrad in the north to Odessa, Baku and Bukhara in the south and as far east as Irkutsk. It was unbelievable!

This winter Mr. Whiteside (a retired elementary principal) has perused the magazines we have and found many references and pictures of ploces we visited. It has been a source of unlimited pleasure and interest.

Helen Skaggs
Kettering, Ohio

Happy New Year, Dear Readers

FOR 17 years now, since its first issue, SOVIET LIFE has been bringing its readers a variety of articles and pictures about our country and the Soviet way of life, with particular emphasis on Soviet women and men—their activities, ideals and aspirations. We believe that our magazine has served mutual understanding, brought our two peoples a little closer, helped find common interests, especially such significant common interests as the maintenance and preservation of global peace.

All of us are witness to deepgoing changes in the modern world. A détente is accompanied by constructive measures directed at normalizing relations between states with differing social systems. The principles of peaceful coexistence, providing vast opportunities for cooperation of nations, are being increasingly recognized and applied.

In recent years a historic turn has taken place in relations between our two countries, too. As a result of the summit talks during the visit of President of the United States Richard Nixon to the Soviet Union in May 1972 and the visit of General Secretary of the CPSU Central Committee Leonid Brezhnev to the United States in June 1973, a solid foundation has been laid for cooperation. Agreements in different fields have been reached. At present active work is being done by both sides to implement these agreements.

All this naturally gives our magazine new impetus. At the same time, the favorable climate that stimulates many and varied Soviet-American contacts heightens the responsibility of our magazine. Members of our editorial board are very conscious of this responsibility, and in the new year of 1974 we shall do our best to meet the expressed wishes of readers regarding the content and format of SOVIET LIFE. More particularly, we shall be running articles on topics that, judging from readers' letters, are of special interest to Americans, for instance, material on regions of the Soviet Union we have not yet comprehensively covered, major economic and social problems, current trends in the life of Soviet youth. Space will be given to various aspects of environmental protection. All issues will include articles about Soviet-American contacts, which are widening in scope.

We have begun to implement our plans in this first issue for 1974 and shall welcome your comments.

Our thanks to all of our readers for their interest—their letters, recommendations, proposals and critical remarks. We hope that this very helpful and active interest will continue.

Happy New Year, dear readers.

We wholeheartedly wish you and yours good health, success and happiness.

The Editorial Board

Fifty years ago, on January 21, 1924, Vladimir Ilyich Lenin died. SOVIET LIFE marked the centennial of his birth, April 22, 1870, with a series of articles culminating in the April 1970 issue. They dealt with Lenin as the founder of the Marxist party in Russia, the leader of the Great October Socialist Revolution, and the founder of the Soviet state. This article is on the international significance of Lenin's teachings and his work.

LENIN: TRAITS

ON THE FIFTIETH ANNIVERSARY O

How did Lenin win such an unprecedented following in the working-class movement, the affection and trust of the Communists of so many countries and nations?

He was the founder of the world's first socialist state and of the first Marxist party, which built that state. He was the greatest theoretician of the world communist movement after Marx and Engels. The policy he offered the movement was invariably justified by history. Leninism has never been a purely "Russian" national phenomenon, it has and continues to have worldwide relevance.

LENIN'S APPROACH when he conferred, consulted or argued with Communists from other countries or thought of their problems was always international. His arguments, conclusions and suggestions evolved from that first principle. A consideration of the interests and strivings of the entire international working-class movement, the solution of national problems within the framework of international problems—this was Lenin's approach and one he demanded from every Communist, from every proletarian revolutionary.

> A class-conscious worker feels and realizes himself to be not only a member of the Russian Marxist family—he is aware that he is also a member of the *international* family of Marxists.[1]

This was invariably his guiding concept: that every Communist Party, regardless of its status in world terms, must be aware of its obligations to every other Communist Party and to all of them collectively. In 1920 he wrote:

> . . . We are proud that we settle the great problems of the workers' struggle for their emancipation by submitting to the international discipline of the revolutionary proletariat, with due account of the experience of the workers in different countries, reckoning with their knowledge and their will. . . .[2]

He gave priority to the common interests of the working people. Internationalism became part and parcel of the thought of the faithful and lifelong followers of Lenin; more than that, it became an integral part of their characters.

Paul Vaillant-Couturier, a French Communist, wrote in 1925: . . ."For us Lenin was a prototype of the perfect man of the future."

This was how Lenin was regarded by thousands of members of Communist Parties in other countries who had seen or heard him. For them he was like a member of their own party organization.

There is another aspect of Lenin's party ethics. While he was tactful and courteous to those he differed with, he never gave way on questions of principle. He was an implacable adversary of anyone who departed from internationalism or surrendered to some form of nationalism. In his comments on the suggestions on the national and colonial questions made by Paul Levi, leader of the right-wing opportunists in the Communist Party of Germany, Lenin said flatly that Levi had lapsed into "national-bolshevism," regarding Germany as the only nation in the world.

Lenin had astonishing political intuition. Not once or twice but dozens of times he made accurate forecasts of historical events, prepared the working-class movement for them and won a victory at the decisive moment. We know that he foresaw the First World War long before it broke out, foresaw the downfall of czarism and the establishment of the first socialist state in Russia, foresaw the collapse of the Kaiser's Germany (during discussions on the Brest peace), the beginning of the collapse of the colonial system of imperialism, the emergence of the national-liberation movement on the world arena and many other such events.

Lenin's analysis helped the Communist Parties to evaluate an event accurately and in time, to plan a proper program of action and to avoid a defeat. The key was, first of all, Lenin's profoundly scientific analysis

[1] V. I. Lenin, *Collected Works,* English edition (Moscow: Progress Publishers, 1966), vol. 41, p. 303.

[2] *Ibid.*, vol. 31, p. 269.

OF A GENIUS

LADIMIR LENIN'S DEATH

By Ernst Henry

of any problem facing the international working-class movement. He was not only a great revolutionary with practical experience but a great revolutionary theoretician. An exact analysis of events, the daily study of reality, the close observation of developments helped him apply the teachings of Marx and Engels to new conditions, to raise and solve cardinal problems of present-day Marxist theory, among them the nature of imperialism, the possibility of the victory of socialism in one or several countries, the evolution of a bourgeois revolution into a socialist revolution, the proletarian party of a new type, the construction of socialism in one country, an alliance of the victorious proletariat with the national liberation movement.

Politics was science for Lenin. He studied every major problem in depth. Hence the unshakable logic and immense persuasive powers that so impressed prominent people from other countries who met him.

The American journalist John Reed described Lenin as an unusual popular leader—a leader by pure virtue of intellect, a man without pretensions, not given to moodiness, firm and uncompromising. A man without picturesque idiosyncrasies, but with the power of explaining complex ideas in simple terms, of analyzing profoundly a concrete situation. And that combined with sagacious flexibility and great intellectual courage.

Lenin knew Marxist theory, the problems of the world working-class movement, international politics.

He was familiar with the developments in every more or less big country; he knew about its politics, economics, its parties and leading public figures.

The scope of his knowledge and range of interests was almost unbelievably wide. This is what Laszlo Rudas, one of the founders of the Communist Party of Hungary, wrote about his meeting with Lenin in the spring of 1919:

" 'How many agricultural workers and poor peasants are there in Hungary?' he suddenly asked me.

On the basis of the figures of prewar Hungary I said there were about four million.

" 'As many as that?' asked Lenin in astonishment. 'Look here. You must be very careful about such things. Yesterday I spoke to one of the leaders of the Communist Party of your neighbor country, and when I asked him the same question, he couldn't answer it. What sort of Communist is he if he does not know the correlation of the class forces in his own country and, what's more, does not know how many agricultural proletarians and semiproletarians there are in his country?' "

Here is what S. Ruthgers, a Dutch Communist, who at that time came from America, said about his meeting with Lenin in 1918:

"He showed such a wonderful knowledge of the situation in the United States and of its leaders that I could not answer all his questions. Noticing that I was having difficulty, he unostentatiously moved on to another question and managed to fish out of me quite a few concrete facts and information."

No matter what country was being discussed, Lenin was indefatigable in pulling out of the speaker the most detailed information he had about it—and this when he was up to his neck in Soviet affairs. He needed facts about life abroad the way a mathematician needs figures for equations or a physicist needs instruments for his experiments. From day to day he had the barometer of world politics before his eyes. He knew and understood so much that it astonished even the most experienced and well-informed leaders of Marxist parties in other countries. But he always wanted to know more and to know only the complete and naked truth.

The same holds for his polemics with opponents. He was always scrupulously exact.

Lenin would accept no substitutes for information nor tolerate any coloring of the facts. He always insisted that facts compiled for the solution of a problem be complete and authentic.

In relations with foreign Communists Lenin showed the same qualities as in relations with people in his own country. This was emphasized by everyone who met him.

Sir William Goode, a progressive British public figure who visited Lenin in 1919, wrote in his reminiscences: "What he had to say he said outright, clearly and without any vague words. In conversation with Lenin there could be no misunderstanding and nobody could gather a false impression."

And here is what J. Walher, a German Communist, said about Lenin: "Lenin's manner of speech can be defined exhaustively in three words: simple, truthful and clear. He tried to expound the essence of the matter so as to be understood by the most ordinary people. When he saw that he was not understood by everyone, he did not show any irritation but repeated his ideas once again in another and also simple way."

When he gave instructions, Lenin did not overlook any detail, tried to foresee even the small things. In the revolutionary cause he believed that everything was important, that nothing should be done negligently.

One other trait of Lenin's, his democratic nature, unquestionably played a large role in the formation of the communist movement.

Consider the times in which Communists in various countries began to set up their organizations. In those years the Communist Parties were just getting their bearings. For many of their members and for quite a number of their leaders the party's tasks, its program and even its tactics were hardly crystal clear. More often than not party organizations were joined by people who had only a vague understanding of Marxism, by people with petty-bourgeois or semianarchist views who introduced confusion and sowed the seeds of dissension within the party. In some Communist Parties the leftists were particularly active, in others the right-wing opportunists. There was constant danger of a split. Heated arguments and rancorous discussions were continuous.

For Communists in various countries Lenin in that period was not only the great ideologist and strategist but a close comrade. He was modest, simple, respected the experience and knowledge of others. Like Marx, he would tolerate no cult of personality and always opposed most categorically any such attitude toward him. Clara Zetkin wrote:

"He completely merged in the mass of the comrades, was of the same stuff as they, was just one of the many. Unlike so-called 'leading personages,' he never wanted to exert pressure, and never did so by a single gesture or facial expression. Such ways were contrary to his nature, and he really was a striking personality. . . . Lenin always conducted himself as an equal among equals. There was not a trace of the potentate in him. The authority he enjoyed in the party was due to prestige as an ideal leader and comrade, to whose superiority one bends one's knee, fully aware that he will always understand and wants to be understood in turn. . . ."

The great revolutionary was a great democrat. He not only knew politics, he knew people. That is why he was so warmly respected by all Communist Parties.

There is still another trait of Lenin's which, like electricity, "charged" his other traits: the dynamic force of his personality. Without that, we would find it difficult to see Lenin as the leader of the world working class and communist movement.

Almost all foreign Communists and progressive leaders spoke of his buoyancy, his ever-present cheerfulness (even when he was gravely ill), his unbending will, his rare capacity for work and his sense of humor. He sparkled with life. Arthur Mitchell Ransome of Britain wrote that he had never met a man of his caliber who had so lively a temperament. "I can think of no one else," he wrote. Isaac McBride of the United States noted that without a sense of humor he would not have been able to do what he did. D. Varga of Hungary recalled that the more difficult the situation was, the more he joked and the more exuberant he became. This was how he inspired confidence in those who were listening to him. Fredrick Ström of Sweden said that Lenin reminded him of a locomotive: so much wonderful force in that modest man.

Lenin the scholar, Lenin the strategist, Lenin the organizer, Lenin the man. . . . By each of these qualities Lenin helped the world liberation movement on a scale which is not easy to encompass even today.

FOR A JUST, DE
FOR THE SECURITY OF NATIONS

Excerpts from the speech by Leonid I. Brezhnev, General Secretary of the CPSU Central Committee, at the World Congress of Peace Forces on October 26, 1973

REVERSAL FROM COLD WAR TO DÉTENTE

ONE of the key factors of the current international development is the active participation of the broad public and their organizations and political parties in the settlement of issues of war and peace. This is, of course, the result of the historical experience accumulated by mankind. The memory of the bitter lessons of the First and Second World Wars and knowledge of the terrible consequences that would ensue from the use of nuclear weapons imperatively demand that the people of our planet take vigorous action to prevent a tragedy unprecedented in the annals of mankind.

In this nuclear age the peoples are showing a new and deeper sense of solidarity in the struggle for peace and, at the same time, a keener sense of their common responsibility for the future of the world. This sense serves as a powerful stimulus in the mounting struggle for the consolidation of peace, for reliable international security.

One can say with confidence that the present changes in the world situation are largely the result of the activities of public forces, of the hitherto unparalleled activity of the people, who are displaying sharp intolerance of arbitrary rule and aggression and an unbending will for peace.

Through the concerted efforts of all the peace forces the international climate has grown, on the whole, healthier in recent years, and the policy of peaceful coexistence, of peaceful cooperation between countries is yielding tangible results.

However, this is obviously only the beginning of the advance toward an objective. We are only building up the conditions for the attainment of that objective. Our common duty is to move tirelessly forward along the chosen path. As we in the Soviet Union see it, the task is to make the détente achieved in the decisive areas of international relations stable, durable and, what is more, irreversible.

PRINCIPLES OF PEACEFUL COEXISTENCE IN EUROPE

And in this respect, of course, much can be done, above all, in Europe.

I have in mind, for instance, such principles as the territorial integrity of all the European states, the inviolability of their frontiers, the renunciation of the use or threat of force in relations between countries, noninterference in each other's internal affairs and the promotion, on such a basis, of mutually beneficial cooperation in diverse fields.

We should like these principles to become accepted as a sacred and indisputable part of the day-to-day fabric of European life and of the psychology of the European peoples and to be adopted by the governments and the peoples in order to become reality.

We should like to see a dense all-European network of economic, scientific and cultural cooperation between states flourishing on the basis of these principles.

Trade has linked peoples and countries from time immemorial. The same is true of our day. But today it is disadvantageous and unreasonable to confine economic cooperation solely to trade. Broad international division of labor is the only basis for keeping pace with the times and being abreast of the requirements and potentialities of the scientific and technological revolution. This, I should say, is now axiomatic. Hence the need for mutually beneficial, long-term and large-scale economic cooperation, both bilateral and multilateral. Of course, this applies not only to Europe, but also to all continents, to the entire system of present-day international economic relations. Another reason why we advocate such cooperation is that we regard it as a reliable means of materially consolidating peaceful relations among states.

We hope and believe that the political foundation worked out at the European Conference and the day-to-day peaceful cooperation will be supplemented and reinforced with measures aimed at achieving a military détente on the continent.

USSR-USA RELATIONS

The development of relations of peaceful cooperation between the Soviet Union and the United States of America is an important factor in solving the problems vitally important for the peoples of the earth of averting another world war and ensuring universal peace.

In the past two years these relations have been marked by the conclusion of a number of important treaties and agreements. We are faithfully fulfilling our obligations under these treaties and agreements and intend to continue to do so in the future. Naturally, we expect the other side to do likewise.

In our view, the prospects for the development of peaceful, mutually beneficial cooperation between the Soviet Union and the United States in various spheres are good, provided, of course, that this question is approached with a sense of responsibility and in good faith, that the principles of mutual benefit and mutual respect are applied in practice, and that no attempt is made to distort them and to interfere in the internal affairs of the other side dictating one's own terms, the way some irresponsible politicians in the United States are trying to do, in spite of the official policy of their own government.

As for the Soviet Union, we are convinced that the documents adopted in 1972 and 1973 have created a good basis for mutually advantageous cooperation which greatly benefits the cause of peace.

In 1974, the President of the United States, as you know, is to pay an official visit to the Soviet Union. We should like it to be marked by fresh major steps in the development of peaceful relations between our two states and the improvement of the international situation.

Successful completion of the new phase of negotiations between the USSR and the USA on the further limitation and possible reduction of strategic armaments can have a considerable role to play. You will appreciate that this is no simple task, but we have agreed to do our utmost to carry it out.

THE NECESSITY OF DISARMAMENT

Nor must we forget that in an atmosphere marked by a relaxation of international tension, the process which does in fact constitute a material preparation for world war is continuing and, in fact, quickening.

It goes without saying that the further extension of the arms race by the aggressive circles of imperialism, on the one hand, and the relaxation of international tension that has set in, on the other, are two processes running in opposite directions. The two cannot develop endlessly along what might be called parallel lines. If we want the détente and peace to be sound, the arms race must be stopped.

That is precisely the idea behind the numerous initiatives of the Soviet Union and other socialist states, aimed at implementing the UN-approved program of general and complete disarmament. The same purposes are served by the proposals for partial steps along this way, including the Soviet proposal, now under consideration by the UN General Assembly, for a reduction of the military budgets of the states, permanent members of the UN Security Council, by 10 per cent and for the use of a part of the funds so saved for assistance to developing countries.

I should like to draw your attention to yet another point. The Soviet Union and the United States have been taking definite agreed measures to limit what government documents describe as strategic arms. But we live in a world in which everything is closely interconnected. Clearly, the struggle to avert nuclear war cannot long be confined to the efforts of only two states, especially if in the meantime other states—and in particular the nuclear powers—continue to build up their armaments.

We believe that like the process of détente, the process of limiting and arresting the arms race should spread ever wider, involving new states and areas of the globe. Equally, there should be more and more states acceding to existing international agreements, such as the convention on the prohibition of bacteriological weapons, and the treaties on the nonproliferation of nuclear weapons and the prohibition of nuclear weapons tests.

:RATIC PEACE,
INTERNATIONAL COOPERATION

NONINTERFERENCE IN THE INTERNAL AFFAIRS OF OTHER COUNTRIES

By promoting the principles of peaceful coexistence, we are working for something which billions of people all over the world cherish most of all: the right to life itself, and deliverance from the danger of its destruction in the flames of war. At the same time, we are thereby also working to ensure favorable international conditions for the social progress of all countries and peoples. This means recognition of each people's right to choose the social system it wants. This means simple and clear rules of intercourse between states. Breaches of these rules tend not only to undermine equality in relations between countries, but also to produce armed conflicts, for nowadays the peoples of the world refuse to tolerate any diktat. And they are perfectly within their rights in rebuffing aggression. With the world split into two systems, the only basis for international security is full and scrupulous observance of the principles of peaceful coexistence, and, in particular, noninterference in the internal affairs of states.

In this connection one cannot help noting that in the recent period some Western circles have, in effect, been trying to circumvent these principles by proposing something like a new edition of the "cold" or, if you prefer, "psychological" war. I am referring to the campaign conducted under the hypocritical slogan of "defending human rights" in the socialist countries.

Some of those who have initiated this campaign claim that détente is impossible unless some changes are effected in the internal order of the socialist countries. Others leave the impression of not actually opposing the détente, but declare with amazing frankness their intention to use the process of détente to weaken the socialist system, and, ultimately, to secure its destruction. For the public at large this tactic is presented as concern for human rights or for a so-called "liberalization" of our system.

Let us call a spade a spade, dear friends. They talk of "liberalization," but what they mean is elimination of socialism's real gains and erosion of the sociopolitical rights of the peoples of the socialist countries.

We have no reason to shun any serious discussion of human rights. Our Revolution, the victory of socialism in this country have not only proclaimed but have secured in reality the rights of the worker of any nationality, the rights of millions of working people, in a way capitalism has been unable to do in any country in the world.

From the bourgeois standpoint, such human rights as the right to work, education, social security, free medical aid, rest and leisure, and the like may be something secondary or even unacceptable. Just one figure: Nearly a hundred million people are at present unemployed in the nonsocialist countries. Many capitalist states violate the rights of national minorities and foreign workers, and the right of women to equal pay for equal work. This is probably why many Western powers have not yet subscribed to international covenants establishing social and political rights.

Soviet people will not tolerate any encroachment on the sovereignty of our state, the protector of their sociopolitical gains. This sovereignty is not an obstacle to contacts and exchanges: it is a reliable guarantee of the rights and freedoms hard-won by our people.

Soviet laws afford our citizens broad political freedoms. At the same time, they protect our system and the interests of the Soviet people from any attempts to abuse these freedoms. And this is in full conformity with the International Covenants on Human Rights ratified by the Soviet Union, which say that the rights they enumerate "shall not be subject to any restrictions except those which are provided by law, are necessary to protect national security, public order, public health or morals or the rights and freedoms of others. . . ." We subscribed to this.

And what kind of freedoms are those who are attacking us talking about?

For example, we have a law banning the propaganda of war in any form. There is legislation prohibiting the dissemination of the ideas of racial or national strife and hatred, and of those which degrade the national dignity of any people. There are laws combating immoral behavior, laws against the moral corruption of society. Are we expected, perhaps, to repudiate these laws in the name of free exchange of ideas and information? Or are we to be prevailed upon that this would serve the cause of détente and closer international ties?

We are being told: "Either change your way of life or be prepared for cold war." But what if we should reciprocate? What if we should demand modification of bourgeois laws and usages that go against our ideas of justice and democracy as a condition for normal inter-state relations? Such a demand, I expect, would not improve the outlook for sound development in interstate relations.

It is impossible to fight for peace while impinging on the sovereign rights of other peoples. It is impossible to champion human rights, while torpedoing the principles of peaceful coexistence.

VITAL TASKS

Dear friends, humanity is in need of a durable peace. But when it will come and what it will be like depend on how fully all the peace-loving forces use the already available opportunities.

I do not think that any of us would be satisfied with a peace that is based, as before, on a "balance of fear." That kind of peace would differ but little from the cold war. It would be a "cold peace" that could easily revert to a situation of tense confrontation oppressive to the consciousness and life of the peoples, and fraught with the danger of a worldwide conflict.

The peoples want a dependable and irreversible peace based, if one may say so, on a balance of security and mutual trust, a peace that opens up possibilities for broad international cooperation in the name of progress.

But peace is not only a matter of security. It is also the most important prerequisite for solving the most crucial problems of modern civilization. And here the very future of humanity is involved—yes, the future of the entire world, which it is no longer possible to ignore when tackling the problems of the present day, no matter how complicated and difficult they may be. You, who represent the world public in all its variety, must feel this keenly.

Here it will be sufficient to mention but a few of the problems that are beginning to cause many people concern: energy supply, environmental protection, elimination of such blights as mass hunger and dangerous diseases, and development of the resources of the world ocean.

Solution of these problems requires comprehensive, sincere and effective cooperation among governments, representatives of economic and scientific circles, and, of course, the most diverse political, professional and cultural organizations. The peoples must come to know one another, and there must therefore be a lively and varied exchange between many of their representatives.

Clearly, peace is the most important condition for such cooperation. It is impossible to make a good start in resolving the problems that affect the future of all mankind or to fulfill the many urgent tasks of today without a system of international relations based on peaceful coexistence.

The concrete directions of further advance toward the kind of peace we all want are clear.

This means, above all, taking steps to settle, on a fair and just basis, the armed conflicts that are still taking place.

This means creating a system of collective security in Europe, and then also in Asia; this would enable us gradually to eliminate the present division of the world into political-military blocs.

This means ending the race of nuclear and other armaments through faithful observance by states of the commitments which they have voluntarily accepted, and—this is especially important—involvement of the world's major powers in this process. This would mark the beginning of a gradual reduction in the material basis for a military confrontation.

This means development of economic, scientific, technical and cultural cooperation based on complete equality, mutual advantage, without any discrimination and without attempts at interference in each other's internal affairs.

These we regard as the main objectives in the struggle for peace in present-day conditions.

INTERNATIONAL FORUM OF PEACE FORCES

By Spartak Beglov
Political Analyst
Novosti Press Agency

THE SPEECHES and reports have come to an end in the huge hall of the Kremlin Palace of Congresses, where more than 3,000 participants met for the World Congress of Peace Forces at the end of October. The sessions are also over in the 14 committees of the congress where 970 delegates—a record number—took part in discussions, another confirmation of the unprecedented nature of the Moscow forum.

But the voice of the congress will be heard throughout the world for a long time to come in the words of the address and the other final documents. It will reach millions of people in dispatches and the impressions of delegates as they return to the 143 countries from which they had been sent by different public and nongovernmental organizations.

Finally, the work of the congress, its ideas and decisions, will find expression in action. In the final analysis, the main reason for holding the congress was to unite the efforts of everyone who supports the aim of ensuring a just and lasting peace for every country.

The program of this action does not boil down merely to protesting war. Just as today's world is varied and different, so is the struggle for peace. Peace is threatened not only by the expansionist claims of those fond of grabbing others' lands and riches, but also by the saber rattling of the hawks of the military-industrial complex. The concept of lasting peace consists of many ingredients.

In the committee that dealt with cooperation in the field of education and culture there was a discussion on school textbooks. What is the connection between textbooks and peace? It appears to be a rather direct one, centering around the interpretation of the facts of history taught children, the characterization of the way of life, public institutions and national traits of other peoples and countries. The seemingly harmless textbook may sow seeds of prejudice and produce a harvest of chauvinism, racism, revanchism and enmity toward other peoples. That is why it is so important to raise this question for international discussion and exchange ideas on how to correct study programs so that they present the facts of history objectively, and thus foster mutual understanding. The same committee also discussed in an equally heated fashion the problem of so-called cultural fascism and the task of barring misanthropic ideas from modern art.

The discussion on environmental protection in the corresponding committee was similar. The more the crux of the problem was revealed in delegates' speeches, the clearer it became that it hinges not only and not so much on industrial equipment and domestic legislation as on problems of a social character (public control over the means of production or unbridled private enterprise), on forging broad international cooperation in the protection of the planet's natural resources.

This indivisibility of peace—not only geographically but also in terms of "problems"—became increasingly apparent in the committee discussions on how to eliminate the hotbeds of war, racism, colonialism and neocolonialism, on how to help the developing countries solve their problems. Here the conclusions are definite and clear: There can be no lasting peace so long as colonialism exists, so long as fascist and racial regimes exist, so long as multinational corporations threaten the economic independence of weaker states, so long as 40 per cent of the world's population is doomed to an existence of near-starvation and economic degradation.

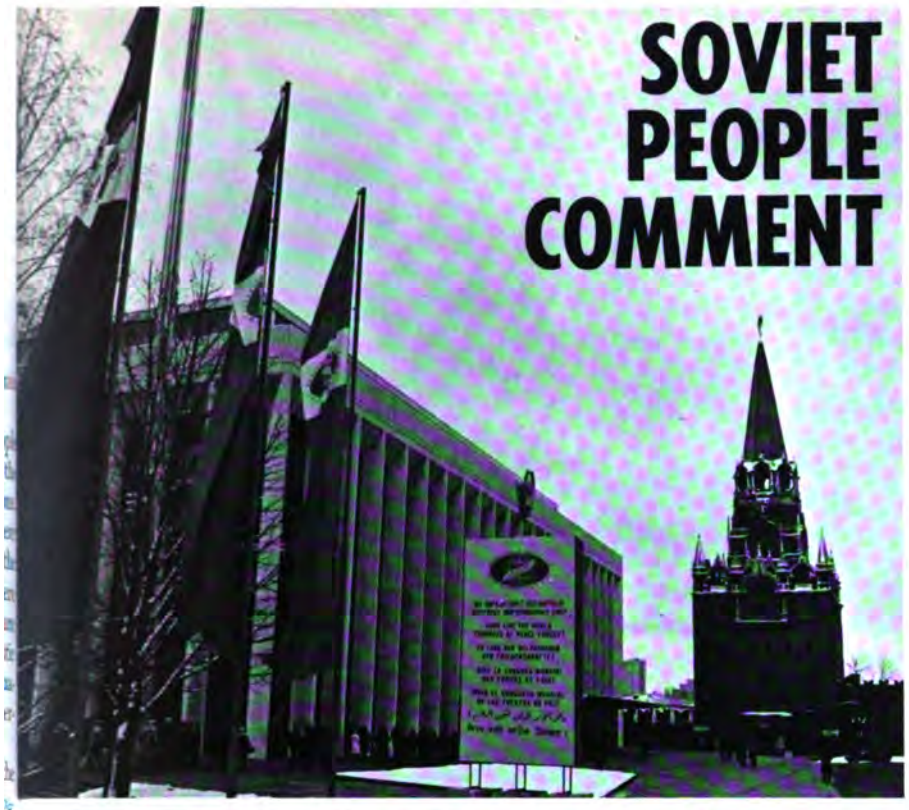
The delegates concurred that the people of the entire world helped achieve the present relaxation of international tensions. But it would be wrong to think that there was an atmosphere of complacency at the congress—the events outside the hall were not conducive to complacency. There are still forces crushing the people's democratic gains and creating new hostilities, a situation approaching the brink of grave international complications.

The consistent and firm position of the Soviet Union during the recent exacerbation of the Middle East crisis was highly praised. In the opinion of the delegates, it differed favorably from the ambiguous maneuvers of some other countries.

On the whole, the congress participants felt that the détente, including the process of normalization of Soviet-American relations, was largely responsible for the adoption by the Security Council of a series of new decisions for a peaceful settlement of the Middle East conflict. Individual voices

Continued on page 13

Hortensia Bussi de Allende (right), wife of the late Chilean President Salvador Allende Gossens, addressed the congress. Here she meets with cosmonaut Valentina Nikolayeva-Tereshkova, chairman of the Soviet Women's Committee.



SOVIET PEOPLE COMMENT

VLADIMIR MALYAROV, 59, professor at Odessa State University, the Ukraine

Although the congress delegates differed widely in political outlook, they were unanimous in their conviction that we must work together to put an end to war. The peace movement is worldwide. People are confident they can surmount the differences between them when the future of the Earth is at stake.

Today the universal indignation, protest and resistance evoked by acts of aggression are forces to be reckoned with. The movement in support of détente and world security is growing stronger every day. Thanks to the efforts of people everywhere, the policy of peaceful coexistence is succeeding.

This congress is a reminder that peace can be achieved, not through the activities of individuals or even of separate states, but only through the constant effort of all peoples.

YELENA SHEREBYATEVA, 18, hairdresser, Moscow

While the congress was in session, the streets of Moscow were decorated with blue emblems showing a palm branch against the background of the Earth. The blue signified a clear sky and the palm branch, peace.

People came to our city from all parts of the world. They spoke various languages and differed in skin color, traditions, opinions, clothing. What had brought them together was a single goal—that there always be a blue sky above our planet and that it never be obscured by the clouds of war.

While war does not spare anybody, it is particularly cruel to the young. That's why we young people must answer with a resounding "No!" anyone who proposes war as a means of settling international differences.

STANISLAV VILIZHANSKY, 52, taxi driver, Moscow

My current profession is a peaceful one, and I hope I will never again have to carry a rifle as I did from the beginning of the war to the very end. Now that the principle of peaceful coexistence is spreading throughout the world, I am convinced that this hope will be realized. As Leonid Brezhnev pointed out in his speech to the congress, the working people—factory and office workers, farmers, intellectuals—who make up the vast majority of the world's population, are the most potent forces for peace.

I consider it highly appropriate that our country, which has borne most of the burden of a devastating war, helped initiate this congress. The selection of Moscow as a meeting site is a recognition of our country's services in the effort to achieve universal security.

OLGA LIVANOVA, 38, engineer, Moscow

I found it very exciting to participate in the congress and to see how much can be accomplished in an atmosphere of mutual cooperation. Peaceful coexistence is essential for solving such pressing international problems as the energy shortage, the environment, the elimination of hunger and disease, and utilization of the resources of the world ocean.

Peace is precious to every human being, and particularly to parents. I told my 15-year-old son about the suffering I saw as a child during World War II. I want him to remember the millions of people who gave their lives then so that we might live.

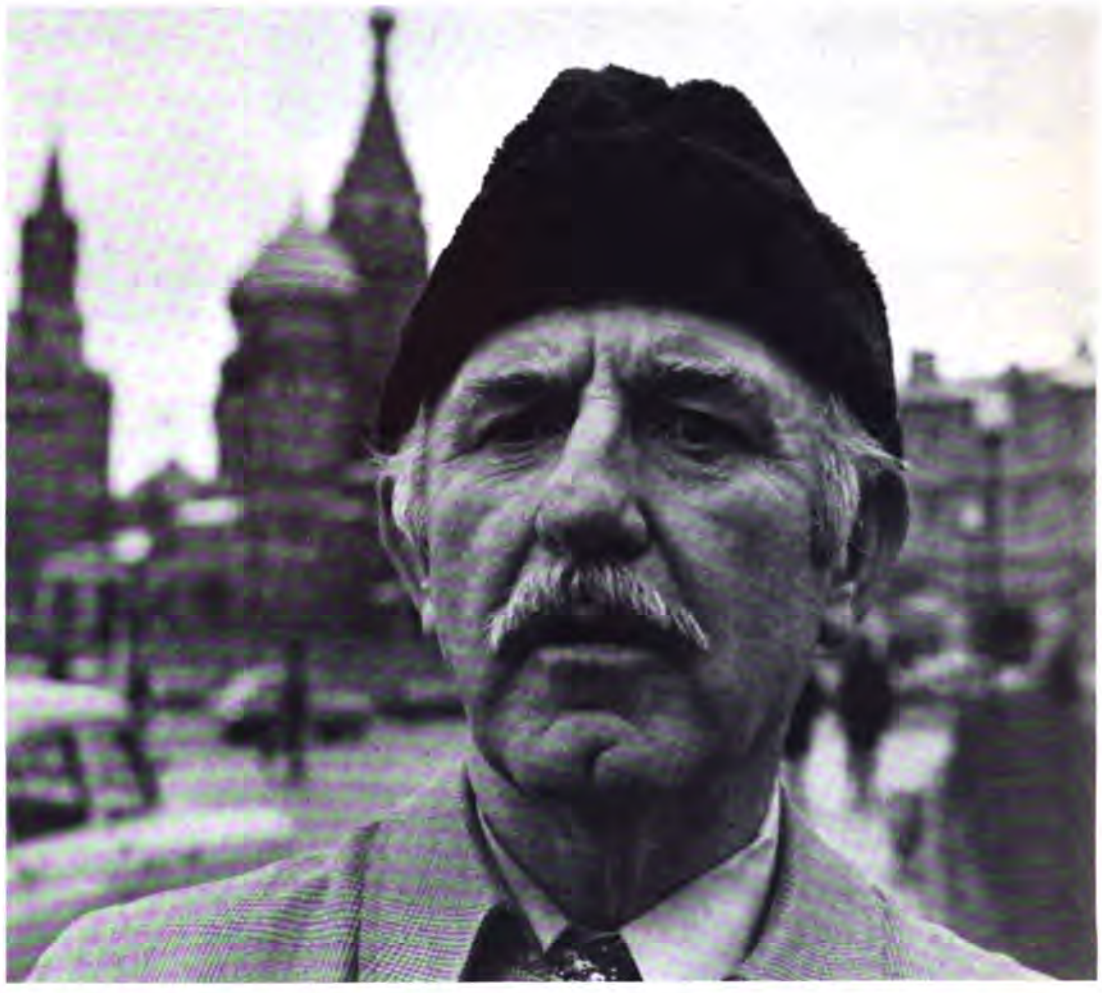
NIKOLAI TRUBILKO, 44, economist and computer specialist, Minsk, Byelorussia

The Congress demonstrated once again that people of good will everywhere are concerned about the future of our planet. No one can be complacent as long as there are forces in the world capable of unleashing a new war.

I think there are numerous possibilities today for increased cooperation between countries with different socioeconomic systems. As an economist, I am well aware of the role that trade plays in this respect; since ancient times it has helped unite peoples and countries. People are tired of war; they want the idea of universal peace to become a reality.

Byelorussians feel especially strongly about this because of the suffering our people experienced in the war against nazi Germany. We cannot afford another holocaust.

THE ROAD TO PEACE



Interview with Ernest De Maio,
General Vice President, United Electrical, Radio and Machine Workers of America, U.S. delegate to the World Congress of Peace Forces

What were your impressions of the congress?

It was perhaps the largest gathering of its kind in history. People came from all over the world to seek a path to peace and justice, to mutually beneficial relations. I think this proves that the search for peace is universal—it's the most compelling motive in the world today because it's linked with human survival. The alternative is too terrible to contemplate.

The speech by Leonid Brezhnev, the General Secretary of the CPSU Central Committee, was a well-reasoned presentation of his party's point of view. I have read it over once and will read it again when I return home because I think it's a most practical guide to the solution of some of the problems facing us.

What about American representation at the congress?

The American delegation here was large and varied. Besides trade unions, a sizable cross-section of the peace movement, women's and veterans groups and other organizations was represented.

Despite this diversity and the sometimes sharp differences it produced, we were held together by the same bond that united the entire gathering—the strong mutual desire for peace.

The congress had 14 committees, permitting very broad participation. More than 1,000 people took part in the committee discussions. I was one of some 400 delegates who attended sessions of the group dealing with détente and world security; about 73 of us participated in the discussions. The work was handled very well—people were encouraged to present the most divergent points of view, and everyone's opinion got serious consideration.

In your opinion, can differences in the systems of your two countries interfere with good relations?

I think peaceful relations between the USA and the USSR are not only possible but necessary, and therefore will continue to develop. Each of our countries has things that the other wants and needs. That's a basis for trade and also for peaceful relations, because without peaceful relations trade cannot exist.

We are clearly moving now toward détente, toward peace with your country and other countries as well, toward the control of armaments. After all, the two most powerful nations in the world should set an example for others. There is no reason why international problems, big or small, cannot be solved by peaceful means.

FRANK BATTERSON: "THE CONGRESS UNITED US."

By Oleg Shibko
APN Correspondent

The exchange of visits by President Nixon and General Secretary Brezhnev and the agreements that resulted are of great importance for both our countries and for the rest of the world as well.

What would you say the congress accomplished?

In the first place, I got a great deal out of it personally. Meeting people from Asia, Africa, Latin America gave me a better understanding of other countries' problems and of our own.

Second, a gathering of this size is a major landmark along the road to universal peace. It convinced me that despite the difficulties, we can achieve this goal, because we represent the hopes of the overwhelming majority of humanity.

Trade unionist Frank Batterson, 65, of Everett, Washington, had more reason than most members of the American delegation to hate war—it cost him his leg.

In January 1943 the B-17 bomber on which he was machine gunner was shot down by nazi fighters over northern France. Batterson was taken prisoner by the Germans, and his leg was amputated.

He spent a year near Vienna in Stalag 17, a prisoner of war camp. Here he and other Americans organized a group to collect food for Soviet POWs at another camp nearby.

"Many of us were receiving Red Cross packages, and we collected canned meat, chocolate and cigarettes for the Russians. We knew they were starving. First we tried to throw food over the barbed wire to them during our walks, but the guards got most of it. Then we said we wouldn't eat until the Germans handed the food over to the Russians, and that did it."

After his release in 1944 Batterson was awarded the Air Medal with Oak Leaf Cluster and the Purple Heart. In his acceptance speech he said that returning American servicemen would not tolerate racial and religious prejudice. This statement was widely publicized in American newspapers.

Since then Batterson has worked for civil rights and for peace. In his home town of Everett he is a well-known trade union activist.

Batterson served on the congress committee for peace and security in Asia and made a report at one of the committee sessions.

What was his opinion of the congress?

"It was a historic event, excellently organized and, I felt, very successful.

"The U.S. delegation included some 170 people from all over the country, of various ages, occupations and points of view. We all wanted peace and were ready to fight for it. But while approaches to the problem of peace differed, there was no doubt about the commitment.

"In Moscow we had an excellent opportunity to meet people and exchange opinions. The congress united us, that was one of its most important accomplishments."

Batterson was a delegate from the Washington Institute for Cultural Relations with the Soviet Union in Seattle. He has worked to improve American-Soviet relations, for peaceful coexistence and trade between the two countries.

At the Kremlin Palace of Congresses he made a 16-millimeter film of General Secretary Leonid Brezhnev's address to the delegates. "I was only 100 feet away," he said. "When I get home I'll show it to students, workers, peace groups.

"It'll be a long time before I forget the charm of your capital, the warmth and hospitality of the Soviet people," Batterson told me. "It was obvious to all of us at the congress that they want peace and friendship with the other peoples of the world."

Alfredo Varela (right) of Argentina, Secretary of the World Peace Council, with singer Dean Reed of the U.S. after a meeting on Chile.

The Young Pioneers of Moscow School No. 81 were hosts to a group from the German Democratic Republic headed by Greta Kuckhoff, Vice President of the World Peace Council.

FOREIGN DELEGATES TO THE CONGRESS

PIERRE GODEFROI, France, political leader

What impressed me most about the congress was the overriding desire for peace motivating people from such diverse backgrounds. Our continent is tired of war, and Europeans must do their utmost to ensure a lasting peace for their children. The congress proved once again that the Soviet Union is in the forefront of the struggle to achieve this goal.

During the Second World War I joined the resistance movement. I was captured by the Nazis and sent to a concentration camp near Lvov, where I met a wonderful Ukrainian man, Danila Dudko. I have seen the horrors of the war so I'm deeply aware of how important it is to work for peace.

DOMINGO SANCHEZ SALGADO, Nicaragua, Secretary General of the Confederation of Agricultural Workers

Participating in the congress was particularly important to us because it was a reminder of the support for our struggle on the part of the Soviet Union, the other socialist countries and progressive forces all over the world. The struggle for peace is inseparable from the effort to achieve national independence and social progress.

The attainment of these goals depends on the united action of people of good will everywhere.

MULK RAJ ANAND, India, writer

I am one of the oldest participants in the peace movement, which I joined back in 1948. I have taken part in every world peace congress and conference since then and remember Joliot-Curie, Picasso and many others who left an indelible stamp on the movement. So I can compare the decisions of past years with the great event which took place in Moscow.

The peace movement is still not strong enough to put an end to war, but it has succeeded in convincing people that war is evil and that it can be eliminated. In other words, we are past the stage of defending peace verbally and can begin to build it.

In his speech to the congress Leonid Brezhnev found the most appropriate and moving words to describe what should be done to attain lasting peace on Earth. For us this speech has become a manifesto which can inspire people all over the world. He showed that the struggle for peace is the responsibility of men and women everywhere, and that we must be worthy of it.

GUSTAV ZEMLA, Poland, sculptor

It was both an honor and a joy for me to take part in this congress. It brought together what I consider the cream of humanity and will undoubtedly be a creative inspiration for many artists.

On the eve of the congress I conceived the idea for a series of sculptures dedicated to the struggle for peace. I have brought to Moscow the first of these, cast in bronze. It's the figure of a woman looking hopefully at the world. She is a symbol of life, giving life and therefore wanting to preserve it.

Art should be more than a feast for the eyes, a source of pleasure. It should celebrate life by addressing people on the most crucial issues of the day.

JOHNNY HANSEN, Ghana, president of the Ghana Peace Council

The international situation is very favorable today for averting the threat of a new world war. I think most of the credit for this goes to the Soviet Union and other socialist countries; the treaties and agreements they have concluded with a number of Western states have laid the foundation for the present détente.

The freedom-loving peoples of Africa, especially, placed their hopes in the congress since the struggle against war and violence is inseparable from the task of liberating humanity from all forms of oppression and exploitation. The struggle for freedom by millions of people still held down by colonialism and racism is an integral part of the struggle for a lasting world peace.

APPEAL OF THE WORLD CONGRESS OF PEACE FORCES

We, the participants in the World Congress of Peace Forces gathered in Moscow, call on all people of the Earth to unite their efforts to ensure a just and enduring peace on earth!

Our appeal is the result of much reflection and discussion concerning the ways to a lasting peace. Our viewpoints on life differ in many ways but all of us are agreed on the main point—the need to eliminate war from human society, to ensure for each people the right to choose its own way independently and to place the great achievements of science and technology at the service of social progress.

Of late, the international political climate has begun to improve, thanks to the success of the peace forces. The costly and burdensome cold war is beginning to recede into the past. There is now real hope that the present and future generations can be delivered from the nightmare of nuclear disaster. The embitterment and confrontation in international relations gradually give way to peaceful, mutually beneficial cooperation and to greater trust among states.

Much has already been done, but far from everything. There are still regions in the world where tensions are running as high as before, where outbreaks of aggression fraught with danger for all mankind have not been eliminated. While the foundation is being laid for peaceful coexistence between states with differing social systems, those who wish to tear down what has already been built and throw the world back to cold war times are still at work. The arms race has not been stopped; the nuclear bombs are not destroyed. The military budgets of many countries continue to grow, and the military blocs have not been dissolved.

The forces of imperialism, aggression and reaction are still retaining the last remaining strongholds of colonialism. They are organizing fascist putsches. They are sowing the seeds of strife and enmity between peoples. And as long as there is even an inch of land where blood is being shed and aggressive acts committed, as long as a single people is denied the right to decide independently its own future and as long as there are fascist and racist regimes suppressing the democratic will of the people, the conscience of mankind cannot rest and the edifice of peace will not stand on a dependable foundation. The peoples of the world should no longer tolerate a situation in which a major part of the world's resources is spent on war preparations. They should not tolerate the constant threat of annihilation by war. War is not inevitable, but peace will be endangered if we fail to eliminate the injustices which condemn forty per cent of the world population to live on the verge of starvation and in economic degradation. Military expenditure throughout the world exceeds that for health services by two and a half times and that for education one and a half times.

Racial discrimination, colonialism and neocolonialism reduce human beings to a slave status in large areas of Africa and other parts of the world. Democratically elected governments are overthrown or subjected to blackmail; multinational corporations threaten the economic independence of weak states and hinder their development.

In many countries human rights are disregarded; people are denied political, civil, economic, social and cultural rights; though lip service is paid to the equal status of women, real opportunities to achieve equality with men are often denied to them; often inadequate protection is given by law to workers' rights. On the international level, effective machinery must be provided for the better protection of human rights and efforts should be made to secure the ratification and implementation of the human rights covenants.

Grave crimes against humanity have been committed in recent years and even in recent weeks that weigh heavily on human conscience. There have been acts of aggression and horrifying massacres continuing up to this day. Genocide, ecocide, the torture of prisoners and the use of indiscriminate weapons such as napalm and booby traps have unfortunately become commonplace in some parts of the world. Everyone knows the most notorious cases only too well. We must not allow these crimes to become common, and the sense of horror and indignation which these acts arouse to be dulled. Crimes against humanity must be identified and condemned as such.

The World Congress of Peace Forces represents the response of the ordinary people of the world to the existing dangers and injustices. It calls for a new effort to ensure that the knowledge, labor and wealth of mankind be used for the benefit of the people and not for the destruction or enslavement of human beings.

The peoples demand:

—The acceptance and implementation of the principles of peaceful coexistence, based on international security and mutually advantageous cooperation between states in all fields;

—Respect for territorial integrity, national independence, sovereignty, equality of all states, noninterference in internal affairs, and renunciation of the threat or use of force;

—The elimination of racism, colonialism and neocolonialism in all their manifestations;

—General and complete disarmament; the removal of all military bases and withdrawal of foreign troops; the abolition of all military alliances; the adoption of an international convention banning the use of nuclear weapons, their production, testing and stockpiling;

—The end of all forms of aggression and the suppression of any attempts to acquire by force the territory of other states;

—The utilization of the resources, now used for military purposes, for the eradication of poverty, illiteracy and disease, and for the improvement of education, health care, and social maintenance;

—The elimination of injustices, and the more effective protection of human rights;

—The right of all peoples to own and manage their national resources and to carry out social and economic reforms as they see fit;

—The implementation of U N decisions as a necessary condition for ensuring peace, security and justice.

These demands correspond to the principles of the U N Charter, to the principles of the Bandung Conference, conferences of nonaligned states and various recent agreements and declarations enunciated for the preservation of peace, signed by the leaders of states with different social systems.

To these ends national and international organizations must coordinate their efforts to mobilize world public opinion as an effective instrument of peace. Educational policy must be duly oriented to achieve these objectives.

We call on the entire international community to eschew the views of cold war times and in the words of the United Nations Charter: "To practice tolerance and live together in peace with one another as good neighbors." We are determined to protect our generation and succeeding generations from the scourge of war, and we reaffirm our faith in human rights and universal progress. It is only on this basis that the edifice of peace can be built. We appeal to all those who cherish peace: Reason and trust must prevail on the Earth. They can prevail, but they depend on every one of us.

QUERIES FROM READERS

QUESTION: I wish you would have something about health resorts in the USSR (I. Carter, Brooklyn, New York)

ANSWER: The Soviet Union's unusually varied terrain and climatic zones allow for hundreds of sanatoriums for the treatment and prevention of any number of ailments. There are some 4,000 mineral springs of various types, over 700 areas where the mud has medicinal properties, and about 450 districts whose climates are particularly suitable for medical treatment and rest.

The largest groupings of health resorts are in the Caucasus, the Crimea, the Carpathians, the Urals and the Altai Mountains. But many new sanatoriums have been opened in recent years in the central zone, the Far East, Central Asia and even the North; often people prefer these areas to the hot South or the mountains.

The number of hydropathic and mud bath facilities and health resort polyclinics is growing as the country's extensive public health services are expanded further. More and more sanatoriums for parents and children, sanatorium-type Young Pioneer camps for ailing youngsters, and the like are being opened.

The country's 3,000 health resorts are managed by the trade unions. Factory or office workers who need treatment at such a facility apply to a physician either at their place of work or in their home district. They are referred to a sanatorium geared to their particular ailment. The trade union committee then provides an accommodations voucher either free, at a 70 per cent discount or at full price, depending on the gravity of the illness and the worker's length of service.

If, during a periodic checkup, a doctor finds symptoms of an ailment that requires immediate attention, the worker gets an accommodations voucher without waiting. People showing any signs of an occupational disease are scheduled for sanatorium visits annually.

The 13 research institutes for health resort therapy and physiotherapy in the country work out recommendations for the most up-to-date medical equipment and treatment methods.

Natural medicinal factors combined with a wide range of treatment give good results. Studies show that 98 out of every 100 persons who visit health resorts show substantial improvement.

About 50 million people will spend their vacations at the country's health and vacation resorts during the current five-year plan period (1971-75).

QUESTION: Could you send me any information on circuses in your country? (Beverly Urban, East Haddam, Connecticut)

ANSWER: In the spring of 1971 the world's largest circus opened in Moscow's Lenin Hills. The old Moscow Circus seated 2100, the amphitheater of the new building accommodates 3,350. The view is good from any part of the house, amplifiers in the seats bring every sound and word to the audience, and the whole circus building is air-conditioned.

There are four self-propelled rings. In five minutes or less the main ring, which is carpeted with rubber instead of the usual sawdust, can be replaced by an ice rink or a pool for aquatic shows.

The circus top is unusually high with none of the usual clutter of apparatus. Everything is hidden behind the top's inner sheathing.

The new circus immediately became popular with Muscovites and the capital's guests. The shows Moscow Meets Its Friends, Russian Precious Stones and There's a Festival at the Circus Today are presented to full houses.

Twenty new circus buildings have gone up in the Soviet Union in the last few years. Some are distinguished for their bold, original design. In Sochi and Krasnodar, for instance, the circus buildings merge with the surrounding landscape. In Alma-Ata the circus is shaped like a yurt—the traditional Kazakh tent.

All in all, there are 53 permanent circuses, 15 traveling circuses and 13 zoological exhibitions. They draw 55 million spectators annually.

Our circus companies are world famous; they have toured 36 countries, the USA included. Americans have applauded the clowning of Oleg Popov, the Volzhansky tightrope walkers, Dzheras Tuganova's trick riders, master jugglers Igor Petrukhin and Vladimir Smirnov, Valentin Filatov and his bear troupe, and many others. Performers are trained at the State School of Circus and Variety Art in Moscow, founded in 1927.

Konstantin Stanislavsky once called the circus the best place on Earth, and our circus audiences obviously agree.

QUESTION: Could you please run an article in SOVIET LIFE showing the set of exercises in the new PWD (Prepared for Work and Defense)? (Michael Rubin, Seattle, Washington)

ANSWER: The slogan Prepared for Work and Defense (Russian abbreviation GTO) was launched more than 40 years ago, when the first set of GTO exercises was introduced in March 1931. The exercises to qualify for the GTO badge helped build the health of millions of Soviet people of all ages.

A new set of GTO exercises was introduced on March 1, 1972. The need to revise the old ones was dictated by the gradual change in living conditions. People nowadays are increasingly subject to mental and emotional rather than physical stress, so that exercises are required which will balance mental and physical activities.

The new rules increase the number of age groups from three to five. The idea is to draw the entire population of the country between the ages of 10 and 60 into the GTO movement. The groups are the Bold and the Deft, for boys and girls between 10 and 13; the Sports Replacement, for 14- to 15-year olds; Strength and Courage, for teenagers 16 to 18; Physical Perfection, for women 19 to 34 and men 19 to 39; Vigor and Health, for women 35 to 55 and men 40 to 60.

The new GTO standards are higher. For instance, a young man of 19 formerly qualified for an excellent mark if he did the 100-meter dash in 14.5 seconds, covered 3.1 miles on skis in 30.5 minutes and passed 13 feet 9⅛ inches in the long jump. To qualify for the gold badge (also an innovation) now, he must clock 13 seconds in the 100-meter and 24 minutes on skis, and leap 16 feet 4¾ inches in the long jump. The standards have been set high purposely, to encourage people to go in for exercise and sports on a regular basis. The silver badge has slightly lower requirements but still involves rigorous training. GTO tests are given at industrial plants, schools and government institutions. During the spring and summer of 1972 alone, 12 million people participated in GTO competitions, and one million won badges.

INTERNATIONAL FORUM OF PEACE FORCES

Continued from page 8

that tried to equate the victims of aggression with the aggressor found no support at the congress. What is more, many delegates proposed increasing public pressure, even organizing worldwide campaigns, to show that aggression and the capturing of other countries' lands do not pay nowadays, that a lasting peace for every nation must be based on justice, respect for and observance of human rights, the rights of peoples to be the masters of their own lands and their own riches.

In the appeal of the congress, in the program of action it worked out, every part of the world, every public force of our time will find concrete proposals relating to its own specific tasks and interests as well as to those affecting the entire world. The problems of Europe, Asia, Africa, Latin America and the entire third world were examined in great detail—from the collective efforts to consolidate peace and security, to the better protection of human rights at the international level.

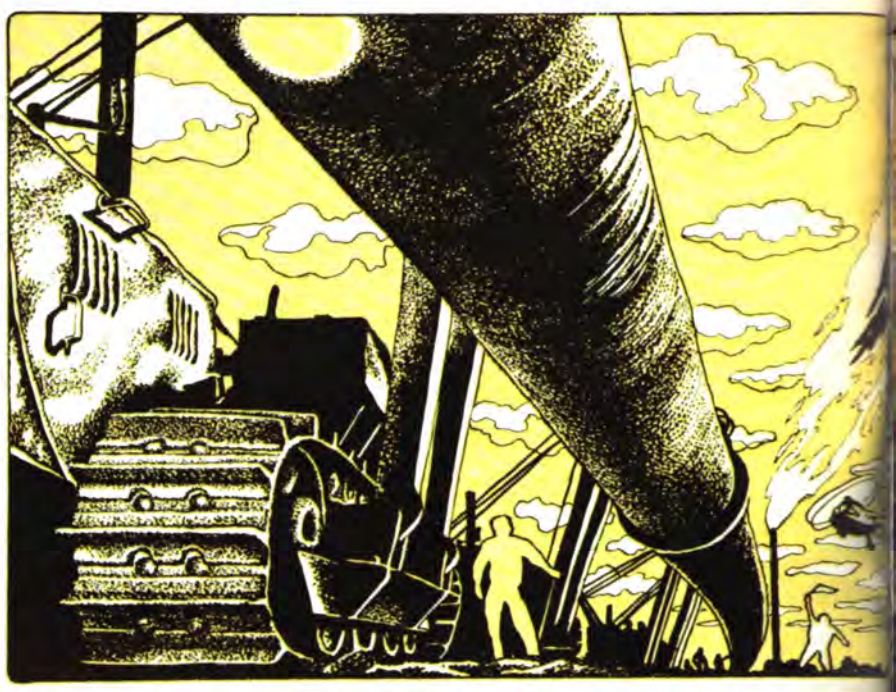
But all these concerns have one common denominator—concern to defend this and future generations from war, to build a solid structure of peace. Will our generation succeed in this? Despite the bitter experience of the past from which, incidentally, many lessons have been derived, the answer to the question is determined by the special characteristics of our epoch, by the hitherto unprecedented combination of weighty factors operating for peace—from the powerful advance of socialism to the more realistic attitude in dealing with international affairs.

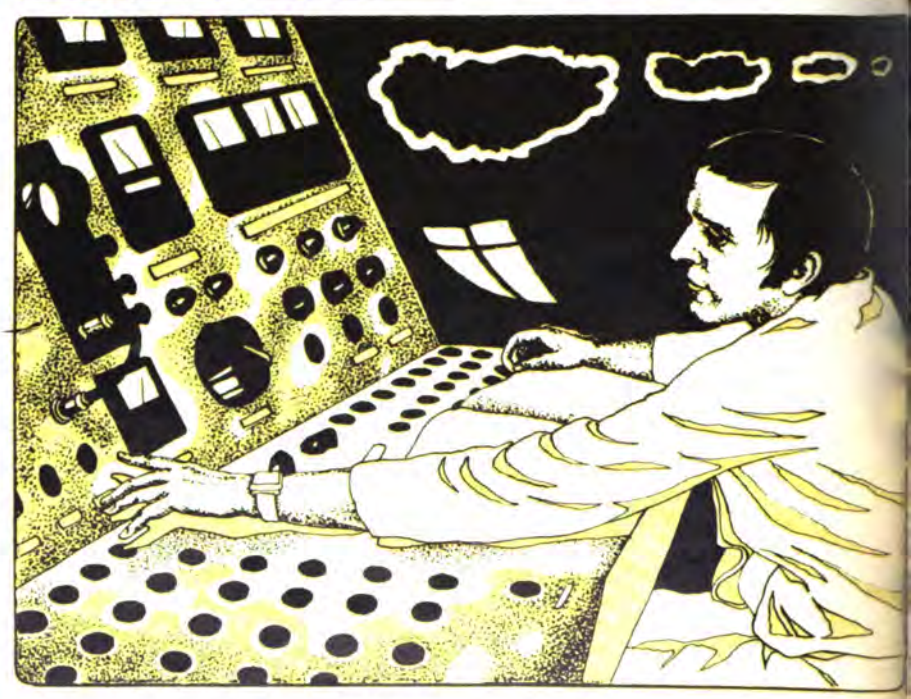
The speech addressed to the congress delegates by General Secretary of the CPSU Central Committee Leonid Brezhnev, his words, "Our philosophy of peace is a philosophy of historical optimism," strengthened their faith in the future. Starting on this optimistic note, the World Congress of Peace Forces ended with an expression of confidence that despite the complexity and contradictory nature of the present situation, the peace offensive that has been launched will win ever more successes for the good of all peoples.

THE ENERGY CRISIS — WILL IT HIT US?

FUEL AND POWER RESOURCES

Interview with Yevgeni Steinhaus, Doctor of Science (Economics), member of the Council for Problems of Energetics, USSR Academy of Sciences





The problem of fuel and power supply has been getting a great deal of attention in recent years. Some say that the reserves of fuel minerals in certain industrially developed countries are being exhausted, that a worldwide power blackout is imminent. What is the situation in the Soviet Union? What fuel and power resources does our country have?

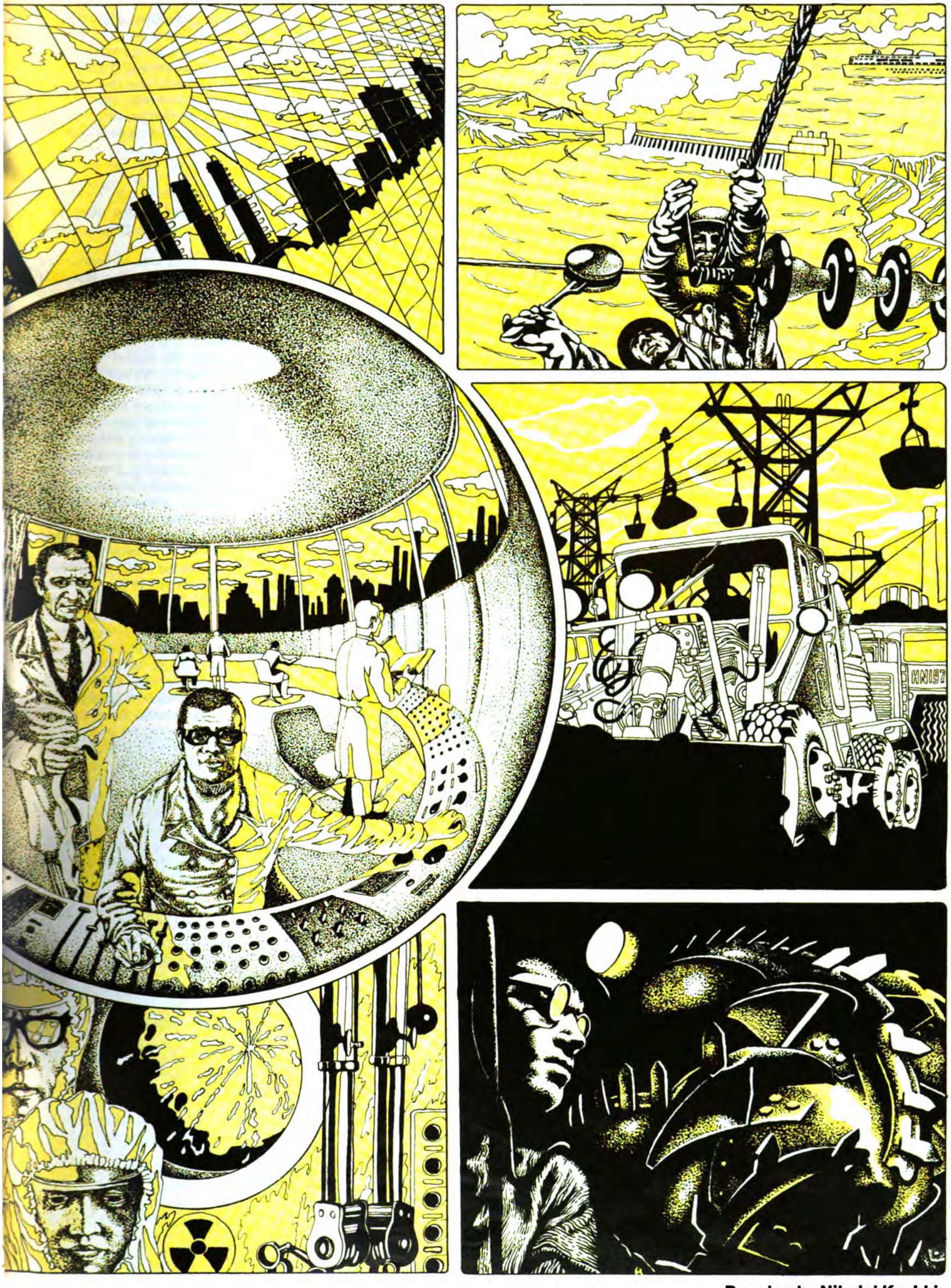
Quite a large number. For example, our overall fuel mineral reserves—I am referring to combustible shales, coal, oil and natural gas —as of today come to about 6.6 trillion metric tons of standard fuel.* Of these total reserves more than 1.8 trillion metric tons are already available for extraction and use under present technical and economic conditions.

As for the quantities of surveyed resources, coal comes first, then oil, gas and combustible shales. While the reserves of oil and gas are smaller, they are nevertheless sufficient to guarantee our unimpeded economic development for a long time to come.

A figure like 1.8 trillion is impressive but somewhat abstract. Could you explain it more fully?

I'll try. The utilization of fuel and power resources in the Soviet Union, as in certain other industrially developed countries, has

* One kilogram of standard fuel produces 7,000 kilocalories.



Drawing by Nikolai Koshkin

been doubling every 10 years. This means that the available reserves I mentioned should last about 200 years. But, of course, these reserves comprise only a portion of our resources, only one type—mineral resources. We also have at our disposal hydropower resources and atomic energy. We can build power stations on our rivers with a total annual capacity of over one trillion kilowatt-hours. In addition, the fuel mineral reserves not yet available for extraction come to about 4.4 trillion metric tons. Actually, our resources are large enough so that we don't have to worry about the future.

You mentioned the over-all reserves of fuel minerals. Are these figures final?

No, they're not, because we don't know what geologists may discover. The present estimate is most probably low. Natural gas is an example of how potential resources increase as geologic exploration continues in a particular area. In 1937 the country's over-all gas reserves were estimated at approximately 35.3 trillion cubic feet. In 1956 the figure rose to two quadrillion, and it has now topped the three quadrillion mark.

The same holds for oil. Up to 1965 our country's known oil reserves were very modest. Then, in the second half of the sixties, geologists found rich deposits in Western Siberia, and the situation changed sharply. No more than 20 per cent of this area has thus far been surveyed, and we have reason to believe that additional deposits will be discovered. According to estimates by highly competent Soviet scientists, the country's oilfields cover some 4.5 million square miles and comprise about 40 per cent of the world total. That looks very good to me.

How about the use of these resources? At what rate have fuel mineral extraction and electric power production been increasing in our country?

Between 1940 and 1972 coal output rose from 166 million to 655 million metric tons a year, oil extraction from 31 million to 393 million metric tons, and natural gas extraction from 113 billion to 7.8 trillion cubic feet. In 1940 the Soviet Union generated 48 billion kilowatt-hours of electricity, and in 1972 858 billion kilowatt-hours. By 1975, under the current five-year plan, the output will be more than a trillion kilowatt-hours. These increases were achieved in spite of the tremendous damage the war against nazi Germany did to our economy.

Our state is based on a socialist economy. How does that affect fuel and power production?

In the first place, such production is developing on the basis of an over-all national plan and is linked with all the other branches of the national economy. This makes it possible to do wide-scale geological surveying of mineral resources, as well as basic studies in the field of fuel and power, especially of new sources and types of energy. We are introducing on a broad scale the most efficient and economical methods of fuel utilization and power production.

Here are several examples of the advantages of a socialist economy in this field. In a very short time, we made a fundamental improvement in our fuel and power balance by increasing the use of oil and gas as compared with coal. In 1950 coal accounted for 62 per cent in this balance, and oil and natural gas for only 18.5 per cent. By 1970 the share of oil and natural gas had risen to 58 per cent, while the share of coal had dropped to 35.5 per cent. In 1975, oil and gas will account for 67 per cent.

A considerable portion of our total fuel resources are expended on power production, making it especially important to economize on fuel in this field. Economies are effected in three ways: first, by raising the efficiency of thermal electric stations by every possible means, including increases in turbine capacity and conversion to higher steam parameters; second, by expanding the construction of hydroelectric stations, which in 1970 accounted for 17 per cent of the country's total electric output; and third, by increasing the number of plants which produce both electricity and heat simultaneously for industrial and residential use.

The first two methods are widely employed in a number of countries, particularly the USA, but the third, the large-scale construction of heat and power plants, is a distinguishing feature of Soviet electricity production. In 1970 electric stations of this type accounted for 27 per cent of the country's over-all energy budget. Because of their high efficiency—65 per cent and more as compared with 40 to 42 per cent for traditional thermal power plants—we were able in 1970 to save more than 25 million metric tons of fuel.

Much has been done in the USSR to conserve fuel in our main type of transport—railroads. As recently as 1950, about 95 per cent of Soviet rail transport was steam-powered—a notoriously inefficient method. By 1970 steam engines handled only 3.5 per cent of our rail transport; the rest was divided about equally between diesel and electric traction. This fundamental change saved us 125 million metric tons of fuel in 1970 alone.

> Increasing the capacity of power-generating equipment is one of the most efficient ways to reduce the consumption of fuel. The Soviet Union's planned socialist economy facilitates this type of conservation. For some time we have had 800,000-kilowatt turbines operating at thermal electric stations. By utilizing an optimum pressure of 240 atmospheres and steam temperatures as high as 550 degrees centigrade, these large turbines make the most effective use of fuel. Preparations have now begun to build a 1.2-million-kilowatt turbine.
>
> Experience has also shown that the total capacity of a thermal power station should be as large as possible. There are more than 30 of these stations in the country at present with a capacity of a million and more kilowatts. During the current five-year plan period (1971-1975), 19 thermal plants with a capacity of 2.4 to 4 million kilowatts each will be built.
>
> Additional economies, including conservation of fuel, are made possible by unifying power transmission systems. The more than 100 district power systems in the USSR are grouped into 11 zonal grids. Eight of the latter are combined to form a high-capacity unified power system for the European part of the country. It will shortly incorporate the remaining three grids. A single power grid for the USSR will thus take shape, covering an area of 8.5 million square miles.

On the one hand you talk of our "inexhaustible" fuel resources, and on the other you emphasize economical use. Is this a contradiction?

No, because it's a good idea to economize before you have a shortage. The fact that fuel minerals are nonrecoverable makes us eager to conserve them. Besides, in saving fuel, we are also saving the effort required to extract, process and ship it.

Equally important, the natural resources of individual countries are, in a certain sense, the property of all mankind. Under conditions of peaceful coexistence, economic exchange between states with different political systems will be increasing steadily. Our country is already exporting a considerable volume of oil and natural gas. Obviously, then, the more economical we are at home, the greater our export potentialities will be.

Here are some further examples of how we apply fuel and power economies. Ours is a northern country with long, cold winters. In 1970 we expended about 25 per cent of all the fuel we extracted to produce heat and hot water for homes and industrial enterprises. The basis for a rational expenditure of fuel for these needs is our centralized heat supply system, primarily the central heating and power plants. In 1970, 38 per cent of our heat requirements were met by these plants and 28 per cent by large district and industrial boiler plants. Decentralized installations thus accounted for only a third of the total output of heat, while in 1950 they accounted for about 70 per cent. The progress made is apparent. We will continue to emphasize centralized heating, and particularly central heating and power plants, in the development of our heat supply facilities. Research has shown that it is technically and economically feasible to raise the proportion of this type of heating to 75 per cent and perhaps even higher.

To economize on fuel, we also make wide use of heat from secondary sources: the hot gases emitted by industrial furnaces, the evaporative cooling systems of blast furnaces, and so on.

What about our fuel and power utilization factor?

As a number of studies by specialists have shown, we lose 2.5 units for every unit of efficiently expended fuel and power of all types. These losses distribute themselves as follows: 1.25 units in consumer installations, 1 unit at electric stations and in large boiler rooms, and 0.25 of a unit in fuel converters (mainly at coking and gas plants). The over-all fuel and power utilization factor in our industry, according to present estimates, is 28.5 per cent. However, an estimate made by a U.S. method, which takes into consideration only the losses of electric-generating and heat-converting installations, shows that our efficiency factor

today is already 70 per cent. This is the same as the index forecast by the U.S. Department of the Interior in December 1972 for the USA in the year 2000. By 1990-2000 the fuel and power utilization factor in the Soviet Union will be even higher—slightly higher, we hope, than the average for industrially developed countries. Considering that a one per cent increase in the utilization factor, at the 1990 level, will save 30 to 35 million metric tons of standard fuel units, it should be clear why we pay so much attention to the rational consumption of fuel and power in all branches of the national economy.

Let's take a look at nuclear electric power. The feeling in the West seems to be that it has not justified expectations, that its development has been too slow. What do you think? What role does this type of energy play in our country?

I don't think we have any reason to complain that nuclear electric power isn't developing fast enough. Actually, it is coming along rather well. Quite a few atomic power stations have already been built in the USSR, both in districts where the reserves of conventional fuels are low—the Central European part of the country, for instance—and in remote areas like the Far North. The importance of atomic power stations will increase as time goes on. According to estimates by some of our scientists, these stations will be our chief source of energy by 1990-2000. I believe that no more than seven to ten years from now, the main electric power consumption increment in the European part of the USSR will come from atomic power stations and that by the year 2000 they will account for no less than a third of the country's total electricity production, or about two trillion kilowatt-hours annually. This is only one forecast, of course.

The share of atomic power stations in the total electric power output may perhaps be slightly less than in some European countries and the USA, but the very large reserves of conventional fuels in Siberia will permit us to base our power production on them to a considerable extent.

Present-day atomic electric stations use uranium fission, but a controlled thermonuclear reaction involving the fusion of hydrogen isotopes holds even greater promise for the future. Stations employing this method could be truly inexhaustible sources of electric power since their raw material would be the waters of the seas and oceans. However, an extremely high temperature of 70 to 100 million degrees is required for nuclear fusion. In what sort of installation could it be contained?

Scientists in a number of countries, the USSR and the USA included, have been working on the problem for two decades. The sixth European conference of researchers in the field was held in Moscow last year. The participants devoted considerable attention to the Soviet Tokamak system, in which plasma is heated and contained in a magnetic field, where a controlled thermonuclear process is possible. Different versions of the Tokamak unit are now in use in England, France, Japan, the USA and the USSR. Experiments with them have already yielded promising results. Even more powerful installations of this type are being developed—the Tokamak-10 in the USSR and the Princeton Large Torus in the USA. A similar system of slightly smaller capacity is being designed in Italy. Scientists hope that the temperature of the plasma in the new systems will reach tens of millions of degrees.

Soviet specialists are convinced that achievements to date in the field of plasma physics are sufficient reason to begin work on the design and engineering of future thermonuclear reactors.

Eastern Siberia, which extends over an area 2,000-4,500 miles from Moscow, leads the country in major fuel and power resources with its 3.95 trillion metric tons of coal and 146.53 trillion cubic feet of natural gas. The area's rivers can activize hydroelectric stations that will generate a total of one trillion kilowatt-hours a year. This is almost equal to the power output projected for the entire country in 1975.

The Kansk-Achinsk coal basin is one of the largest in Eastern Siberia. It is situated along the Trans-Siberian Railroad in the vicinity of Krasnoyarsk and Irkutsk. The basin is 435 miles long and 30 to 185 miles wide. It ranks third in the USSR for coal reserves (1.2 trillion metric tons), after the Lena and Tunguska basins, also in Eastern Siberia.

The deposits of the Kansk-Achinsk region are highly accessible. The 260- to 330-foot-thick seams lie close to the surface, and the coal—up to a billion metric tons a year—can be mined in opencast workings. The cost of extraction here is 11 times lower than in the Donets Basin in the Ukraine.

Coal is already being mined on a large scale in the Kansk-Achinsk region, and the pace will soon be accelerated.

I get the general impression that all is well with Soviet fuel resources and power production. But there are undoubtedly problems too. What are they?

Our principal problem here is the distribution of fuel resources. The European part of the country, with most of the population and basic industry, accounts for only about 10 per cent of the over-all fuel reserves, while the Asian part, east of the Urals, has the other 90 per cent. For example, the Kansk-Achinsk coal basin in Siberia, which has reserves of over 1.2 trillion metric tons of fuel, is 2,000 miles from Moscow. Our northern oil and gas deposits are also a considerable distance from the country's main consumption centers.

This gives us two crucial jobs: to accelerate the development of industry in the East, in areas with a concentration of energy resources, and to enlarge the scale of fuel transport and power transmission from east to west. Much has already been done along these lines. Major projects have been completed for the development of the productive forces in the country's eastern districts—the Central Asian republics, Kazakhstan, Eastern and Western Siberia and the Far East.

As for supplying energy to the European part of the country, large amounts of coal, oil and gas are already being shipped from the East. However, by 1990, the shortage of fuel in the European part of the USSR is expected to multiply by 10 times. Meeting this shortage will call for a further and very considerable development of facilities for the transport of oil and natural gas, principally from Siberia and, to some extent, from Central Asia. It may also be necessary to ship large amounts of coal from the Kansk-Achinsk Basin.

In the USSR oil and gas are transported over long distances via large-diameter pipelines. We have a whole network of these already, and it will be augmented.

Large quantities of electricity will also be transmitted westward. This complex task will be facilitated by a single power system covering the entire country. The base for the system has already been created, and in another few years we will have a powerful high-capacity grid.

Of course, it will take enormous capital expenditure and effort to eliminate the inconveniences created by the peculiar territorial distribution of our fuel and power.

What are we doing about fundamentally new sources of energy?

A great deal of research has been going on in this field. An experimental tidal electric station was built recently in the northern European part of the country. Preparations are now under way for the construction of another such facility—a larger one. Potentially, sea and ocean tides are tremendous sources of energy.

A geothermal power station is also operating in the Soviet Union.

Very intensive work is being done on the magnetohydrodynamic method of electric power production, which converts heat directly into electrical energy. Two fairly high-capacity installations of this type have already been built here, and specialists believe MHD installations are a promising source of energy for the near future. The advantage of MHD electric power stations is that they can reach an efficiency of up to 65 per cent as compared to 40 to 42 per cent for traditional thermal stations.

Considerable research is being done in our country on the generation of electricity by a controlled thermonuclear reaction involving the fusion of hydrogen isotopes. This method would solve the world's fuel resources problem for hundreds of years to come since it utilizes ordinary sea and ocean water.

Soviet scientists believe that a great deal of time and effort would be saved by concentrating worldwide research in this field.

No one can definitely say when a fundamentally new source of energy will be placed at the service of mankind, and what form it will take. But success would seem assured by the scope and depth of the research under way on the problem, both here and abroad.

SIBERIA: NEW FRONTIERS

Siberia is part of the Asian territory of the Soviet Union, reaching from the Urals in the west to the mountain ranges of the Pacific watershed in the east, from the Arctic Ocean in the north to the Kazakh Republic and the boundary with Mongolia in the south. Its 3.8 million square miles make up roughly 45 per cent of the country's total area. Geographers are accustomed to divide Siberia into two parts: the western, from the Urals to the Yenisei River, and the eastern, from the Yenisei to the Pacific watershed. The gas and oil country of Western Siberia is predominantly swamp and sparse dwarf taiga, dotted with many lakes. It is here, in this harsh landscape and forbidding climate, that new roads and airports are being built and new towns are mushrooming. Development of the areas east of the Urals began long before gas and oil were discovered there. But the great scope and intensity of today's development is a relatively recent phenomenon.

CHANGING THE TAIGA

By Georgi Tarasov
Doctor of Science (Economics)

THE AREA of the Soviet Union east of the Urals (the border between Europe and Asia) holds 80 per cent of the fuel and power resources of the country. Most of this natural wealth is in Siberia. Its lands are rich in oil, gas and coal. It has forests and swift-running rivers. The development of Siberia is strategic to the whole national economy.

Treasure House

The West Siberian Plain stretches from the Ural Mountains to the Yenisei River. Enormous reserves of gas and ore have been found here—preliminary estimates say hundreds of trillions of cubic feet of gas and tens of billions of tons of oil. More than 200 fields have already been discovered.

But prospecting for minerals is not the only activity going on in Western Siberia. Cities are being constructed, high-capacity oil and gas pipelines are being laid, and railroads, highways and power transmission lines are being built. A pipeline 1300 miles long leading westward began functioning in 1973, followed by another leading eastward. Now that large pipelines have been laid, it should be possible in 1975 to get not 130 to 135 million tons of oil from Western Siberia as planned, but 155 to 165 million tons.

The arterial system of trunk pipelines keeps penetrating new regions of Western Siberia. Annually it will pipe tens of millions of tons of oil and hundreds of billions of cubic feet of gas to Eastern Siberia and the Far East, to Kazakhstan, the European part of the Soviet Union and farther west to the socialist countries, as well as the Western and Northern European countries. Western Siberia is simultaneously building gas and petrochemical plants as well as plants for the timber and woodworking industry.

There is every indication that this region will have its own diversified economy. New deposits of various minerals have been discovered, considerable reserves of titanium and bauxite have already been found, and there is reason to believe that chromite, polymetallic ores, rare elements and fluorite are also here. Our geologists have high hopes that the basin of brown iron ore crossing Western Siberia in a wide band may contain metal of high quality.

Alexei Kosygin (second from left), Chairman of the Council of Ministers of the USSR, took a trip across Western Siberia last winter so that he could see for himself the scope of the work going on there.

West Siberian fuel resources.

The nearly untouched taiga of Western Siberia covers an area of over 345 million acres. About half the local supply (over 100 billion cubic feet) consists of mature trees that must be cut and used. The comprehensive wood-processing industry to be set up here will service the whole country.

No less important are the branches of industry essential for the region's growth: electric power, transportation, building materials, machine building. Several powerful thermal stations operating on natural gas and long-distance high-voltage lines are planned. The excess power will go to the Urals and the European part of the country.

Finally, the living conditions of the new settlers must be considered. This means building new cities and radically reconstructing the old ones.

Balanced Development

There is a comprehensive plan for building up the eastern part of the country. State ownership of the land and natural resources rules out entrepreneurial speculation and lopsided growth, and allows for the development of large new regions. It is not immediate profit in some branch of the economy, tempting though that might be, that decides general policy. The ruling principle is the balanced development of whole economic areas.

This applies to Western Siberia as well. A major industrial complex covering an area of some 800,000 square miles is now being built beyond the Urals. This is large even for a country the size of the Soviet Union.

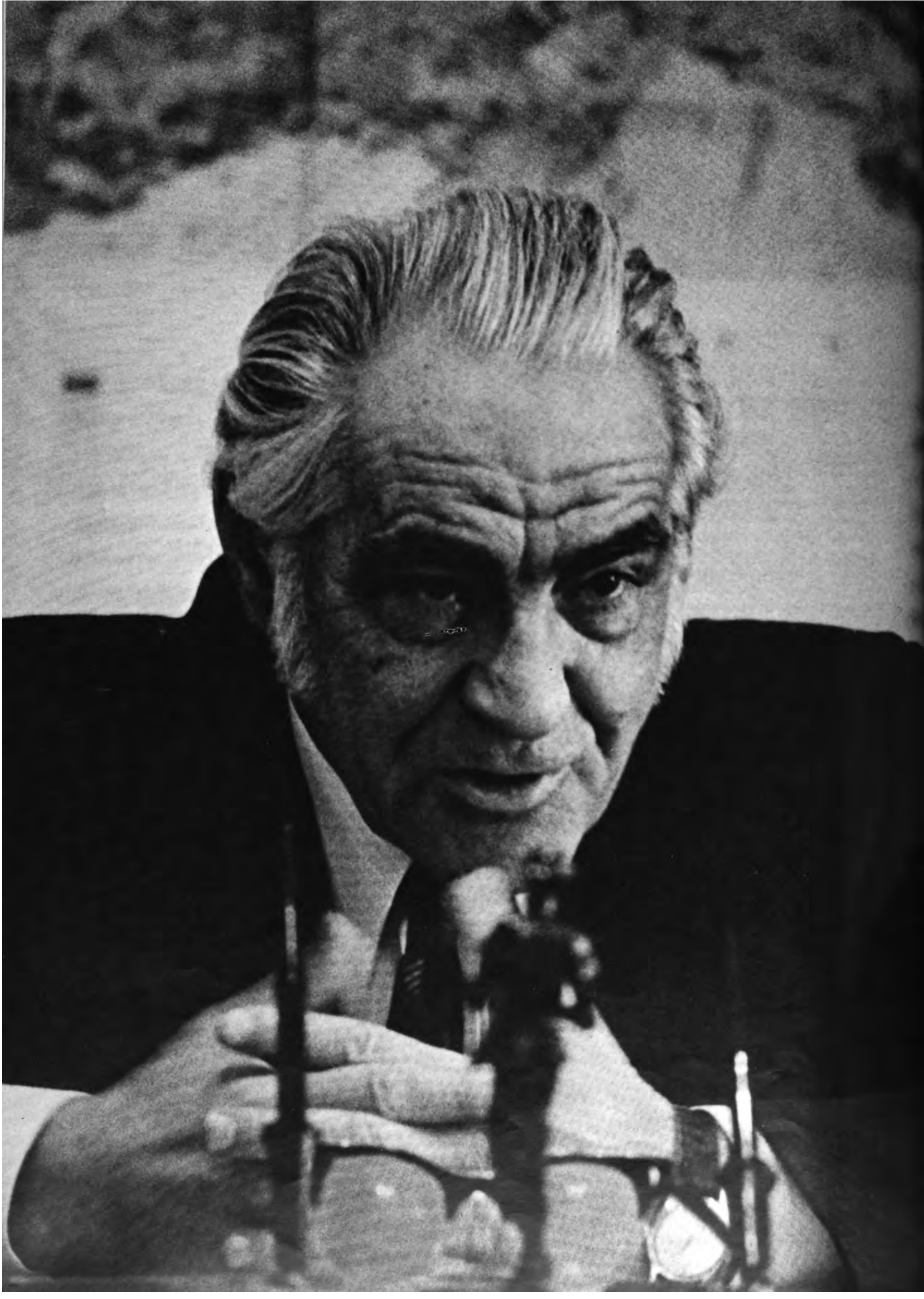
It has been suggested that development on such a scale might waste funds and manpower, but our figures indicate that it is precisely this approach that reduces capital outlay and operating expenses. Since under socialism there is a single funding source, the State Budget, the economic effectiveness of the project is felt by the whole country. What is found in our underground treasure houses belongs to all of society; the only problem is how best to use the wealth.

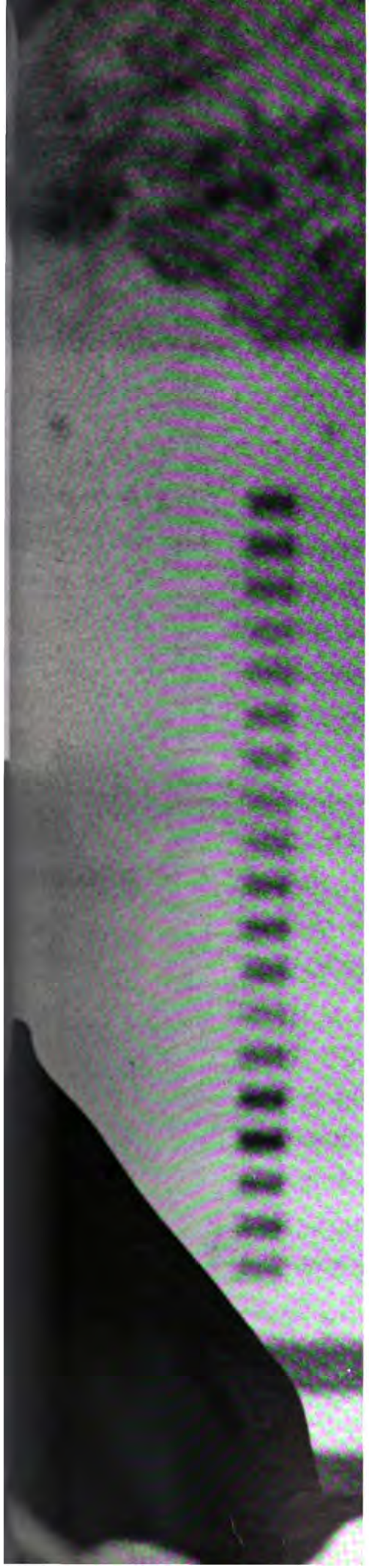
At the same time that the planning bodies are recommending the development of mineral deposits, they are taking into account the conditions in which people will work and live in Siberia, where they will spend their vacations, where their children will go to school, how the family will spend its leisure and the hundreds of other details that go into everyday life. In short, comprehensive planning includes not only the best ratios for the development of various branches of the economy, but also the solution of a number of social, cultural, city-planning, demographic and other problems.

One of the major problems in building the Western Siberia complex is attracting skilled personnel. Higher wages and bonuses are helping to stimulate migration east. Liberal financing for housing and the construction of social and cultural facilities are other incentives. All this is planned. Demographers believe that the intensified eastern migration will accelerate the natural population growth.

A new system of population distribution is planned for the West Siberian Plain. In the middle reaches of the Ob, in the center of the oilfields, cities with a population of 100,000 to 200,000 will be developed, as well as numerous workers settlements. A long time from now, when the oilfields are depleted, the cities will not decline but become bases for the development of more northerly territories.

Many Soviet authorities believe that for those working in the Arctic regions of Siberia it will probably be best to build permanent settlements in accessible areas with a favorable climate, while providing temporary hotel accommodations for the current shift near the deposit. When the shift is over, the worker boards a plane and returns to his base city. The idea is that if people have to work in the harsh climate of the Far North, at least their stay should be reduced to a minimum. Automated production will help do that.





Yuri Erviet was one of the handful of geologists in the mid-1950s who stayed convinced, when many of the eminent experts had given up hope, that Western Siberia was one enormous oil basin.

ON THE MAP in Yuri Erviet's office you won't find cities, rivers and most of the usual geographical divisions. This wall-sized map charts the interior of the part of the Earth on which the Soviet Union is located, so it takes a geologist to read it. Here is a topographic picture of the Ural Mountains. And to the right is a broad area colored light brown —the lowlands of Western Siberia, where colossal oil and gas reserves have been found and where Yuri Erviet made the most important discovery of his life.

The biography of Yuri Erviet, 64, is as interesting as the story of his discovery. His grandfather and grandmother emigrated to Russia from France in the 1870s. His father, born in Russia, worked as a mechanic. There were four other children in the family besides Yuri. At the age of 14 the future geologist got a job in a soap factory. But this trade was no more to his liking than his later stint as a stevedore in the port of Baku (on the Caspian Sea). The oil of Baku didn't interest him then. It did later, when he came to Leningrad to enroll at a mining institute. But he was not in time for the entrance exam, and that accident decided his career.

"I was lucky," Erviet recalls. "I met geologists looking for gas in the Ukraine, and they took me along as a helper. That was the beginning of my wandering life as a prospector."

He has crisscrossed the Ukraine, the Caucasus and Central Asia. In 1933 he completed the higher engineering courses, earning a diploma in geology. Again he left for the field. But soon afterward he had to leave the oil-prospecting agency because of difficulties with the chief engineer. Their views on oil exploration differed greatly, and their personalities were incompatible. After that he worked in the dry steppes of the South, drilling artesian wells. He went on doing that all through the war. The detachment he headed was assigned the job of supplying water to the troops of the Southern Front.

"When the enemy broke through to Mozdok," Erviet now recalls, "both armies were desperately short of water in the sun-scorched steppes. We found it first."

At the end of 1944 he was relieved of army duty and appointed chief of a geological expedition in Moldavia, a union republic to the southwest of the Ukraine. The search for oil started there. But the area showed no promise, and he asked to be sent to Siberia. "I have come to the conclusion," he explained, "that there is no hope of finding oil in Moldavia, but there is in Siberia."

Now we know that Western Siberia is a tremendously rich oil basin, but in the early fifties there were many doubts on that score. Erviet was one of the convinced.

In 1955 he was appointed chief engineer of the Tyumen oil-prospecting agency, and a year later its head. According to Erviet, the difficulties were almost insuperable and the results hardly commensurate with the effort. Boreholes were drilled in many places without a strike. Confidence in the oil of Western Siberia began to wane. Even prominent scientists lost faith. Some had only been half-convinced to begin with, others believed that prospecting the great marshes and taiga was too hard and too risky.

Argument about Tyumen oil seemed to be unending. It was even seriously proposed and considered that a hydroelectric power plant be constructed on the lower reaches of the Ob. Its reservoir would have inundated a big stretch of country where gas deposits had already been found.

Fortunately the optimists won out. Their big moment was the discovery of vastly rich oil and gas deposits. The stubborn prospectors were led by Yuri Erviet.

Turning to the map, he said:

"Almost all the deposits found are located along riverbanks or close to them. Is there some inexplicable connection between oil and rivers? Not at all. This is just the cream of the crop. We are finding oil where we can get at it."

After a long look at the map, he continued:

"We have faith in new discoveries. And we are not afraid of the trials and tribulations, hardships and disappointment that come with it. Victory is the reward for labor, for having the courage of your convictions."

THE COLUMBUS OF TYUMEN OIL

TYUMEN MERIDIAN

By Yevgeni Dvornikov
Photographs by
Vsevolod Tarasevich

WE ARE HEADED along a concrete road in a small jeeplike passenger car, with the speedometer wavering between 50 and 55.

The road and speed are not unusual, but the locality is. Extending on both sides, as far as the eye can see, is a swampy plain with oddly shaped large and small lakes dotting the landscape. Sickly little trees hug the edges of the lakes, as if seeking shelter from the water. Some of them, rotted at the roots, lean against their neighbors. Others have arched their boughs.

The color of rust predominates, and only once in a while is the eye refreshed by a bright green moss glade. But even these little islands are deceptive and dangerous to step on. At first the soil rocks underfoot like an aerial gymnast's net. And then, if the net should break, the irremediable may happen. The swamp will hold its captive fast. There is a quagmire 30 to 40 feet deep beneath the moss. And here is one of its captives—not human, an excavator. Only a couple of feet of the almost vertically raised boom juts out of the bog. The quagmire has swallowed the rest.

The concrete roadway along which we are driving is the only strip of safe ground. We are approaching the biggest oilfield in Western Siberia—Samotlor, named after a lake close by.

Date: 1965

The deposit was discovered only nine years ago by a geological expedition that is still based in the small village of Megion, 20 miles to the west of the oil-bearing pools. It was a cold January when foreman Grigori Norkin's team set out from Megion for Samotlor to do some exploration drilling. Tough going. The frost made the men's eyes tear. The machinery had to be heated constantly, and the men themselves every now and then had to hover over bonfires.

But they had no choice. Winter in Siberia, particularly in swampy areas, is the most favorable time of the year for such operations; the soil is frozen and can support the heaviest machinery.

No one had any doubts that there was oil in the vicinity of Lake Samotlor. But the members of this icebound expedition hardly expected to strike such a rich field.

It was on a Sunday when oil gushed from the prospecting hole. A free discharge of 385 tons of black gold a day! The commercial development of the field followed soon after.

Geologist Yuri Erviet, who had done so much to pinpoint the oil-bearing areas in this region, said to me: "Samotlor, to my mind, deserves a very high rating in the hierarchy of the world's unique fields. A determination of the borders of the field shows that this subterranean storehouse is connected to another. We know now that its area is considerably greater than we thought."

The country's main oil supplier, as of now, is the autonomous republic of Tataria on the Volga, in the European part of the country, west of the Urals. But that's only

The people who live in this West Siberian settlement, Nefteyugansk, [illegible] oil pipeline [illegible]

Victor Muravlenko, 61, head of the department for the exploitation of oil and gas deposits; deputy to the USSR Supreme Soviet:

My last job was in Kuibyshev, on the Volga, in the European part of the Soviet Union. I think about that place often, and I go to the Volga on my vacations. As far as I'm concerned, there is no better place on earth than along the Volga. If it hadn't been for the fantastic scale of the work here, I doubt that I would have stayed for nine years.

There is no question that some people come to Siberia because the jobs here pay substantially more. Another reason, especially for young people, is that Siberia offers more possibilities for advancement. However, I'm convinced that the main stimulus is the opportunity to take an active part in building up this virgin territory, to work at the vital and tough job of improving the country's economy.

WHY DID I COME?

as of now. The center of oil extraction will move sharply to the east in the next few years, and the West Siberian Plain, that very plain in whose depths the Samotlor bed was discovered, will play one of the leading roles.

The total number of large oil, oil-gas and gas fields in Western Siberia has long topped the 100 mark. Not all the fields have equally large reserves, but a number of them are giants.

A look at a map will show that the explored fields are located mainly along rivers. The explanation is simple: The only way of getting to the interior of this territory was by water. And so the fields extend in a chain from the south to the north, right up to the Arctic Ocean coast. It was this that evoked the image of a kind of "Tyumen Meridian" in the minds of our journalists.

Keep in mind that only some 15 to 20 per cent of the possible area in Western Siberia has thus far been explored. There are substantial reasons to believe that when our geologists get around to probing the districts away from the rivers, a good many Samotlors will be discovered.

Changing the Coat of Arms

It was once thought that the great resource of these parts was fur. The first coat of arms of the city of Tyumen showed a sable and an ermine. Then the value of the local rivers came to be appreciated, and a ship with golden masts was added. But no one ever imagined that there was still another, perhaps even greater, treasure buried in the land east of the Urals.

Records of a report made by Yuri Krizhanich, a seventeenth century traveler and scientist, have come down to us. He wrote about bituminous shale in Western Siberia, and it is common knowledge that bituminous shale means oil. Such observations should have caught the attention of geologists, at least at the turn of our century. But if things in life were as simple as that!

Krizhanich's report was stuck away in some files. Czarist Russia was developing Western Siberia slowly. Leather, felt boots, candles, soap and rope were the only items

This is rough country, winter, summer and the seasons in between. In the winter the Siberian plain is one great expanse of ice, open to every wind that blows. In summer the big Siberian mosquito comes out in force. Locally, it is called "the four-engine rammer."

Machines adapted to swamp and below-zero temperatures are used for construction and transportation. Winter is the best working season, especially in swamp areas. The frozen soil supports heavy machinery.

The pay is good, higher than in other parts of the Soviet Union. But it is not only money that brings young people. Siberia is adventure country, it always has been. What for an older person is just hard and trying, youth finds hard but exciting. Their age and ambition move these 20-year-olds to leave more settled places.

manufactured here. Local timber was used mainly to fuel steamships.

The real exploitation of Siberia began with the Soviet five-year plan periods. But even then it was impossible to carry out the full-scale development of this immense region. The country's economy had to be placed on a sufficiently powerful foundation first.

However, geological prospecting in Siberia did begin during the very first five-year plan period. In the thirties, Academician Ivan Gubkin, after studying the structure of the West Siberian Plain, came to the conclusion that there was oil to the east of the Urals. His conclusions were disputed, but the country's needs demanded an examination of his optimistic forecasts, and geologists were sent to Siberia. Exploration drilling was interrupted by the war.

Following the victory over Hitlerite Germany, the development of the Volga-Ural oil region began. The country, badly in need of more oil, was granted a respite, but not for long. Development would slow down without new oil and gas areas.

By the fifties, scientists had amassed sufficient evidence of Western Siberia's potential, but the traditional distrust of Siberian oil continued. In June 1960 a gusher was struck in Shaim, in the remote taiga area near the Ob River, putting an end to the controversy. From that day on oil exploration moved ahead with assurance. An oil derrick might well be included now in Tyumen's coat of arms.

Siberia Without Embellishment

There was a small village called Nizhnevartovskiy some 600 miles to the northeast of Tyumen, in the middle course of the Ob. It turned out to be at the very edge of the Samotlor deposit. That otherwise inconspicuous village became the focal point of the area's development and in a few years grew into a city. The concrete runways of its airport today accommodate turbojet liners from Moscow and other big cities.

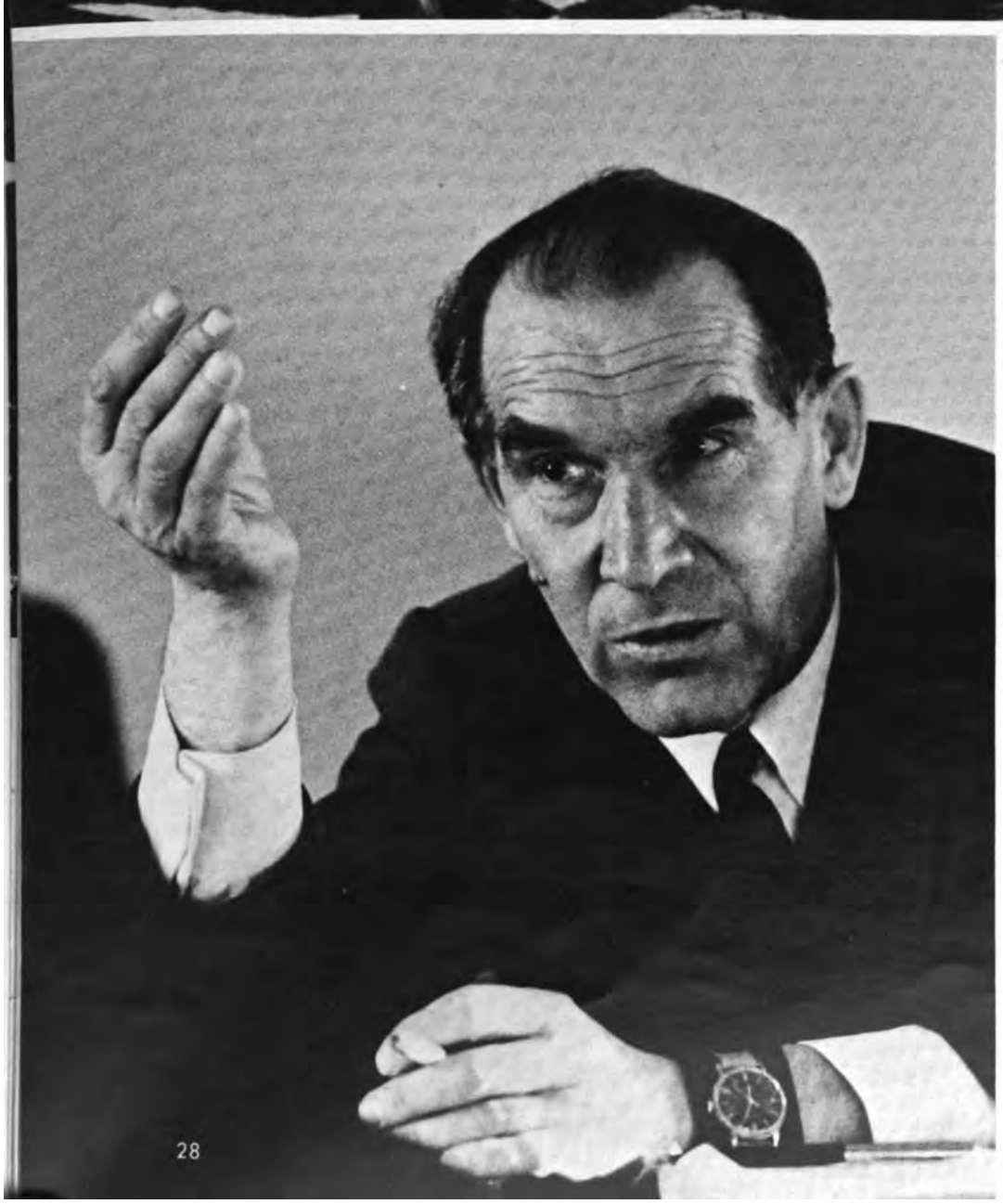
Toward the end of April I boarded a TU-134 in Moscow and in a little more than two and a half hours landed at an airfield in the taiga. From the ramp I saw a rather unattractive landscape: a mangy woodland, with small lakes glittering like mica here and there amidst hummocks. On a closer look it turned out that there was no land in the commonly accepted sense—just tiny islands. And the thought crossed my mind that people here were not so much settling the land as creating it. I later found that this was the typical landscape of the greater part of Western Siberia.

Perhaps spring is not the best season for traveling in these parts. But is winter any better?

In the winter the plain here, exposed to all the winds, is a solid expanse of ice. It's hard to keep the biting cold wind from making your eyes tear. Siberians get a kick out of demonstrating a local trick: They pour fruit juice from an ordinary glass onto the snow. Even before reaching the snow, the little stream turns into a colored icicle. The trick is frightening in a way and always awes visitors.

Summer, too, is hardly paradise. And not only because of the swamp's treachery. The big Siberian mosquito, locally dubbed "four-engined," literally rams its victims. It has been estimated that an arm bared to the shoulder is bitten 100 to 120 times a minute. Of course, in Siberia special clothing is worn made of light repellent fabric which the mosquito sting cannot pierce, and various creams and mosquito nets are used. But it's still no fun to constantly feel pursued by this bloodthirsty hoard. A special antimosquito and midge department has been set up by the oil and gas extraction board.

But the most difficult time of the year is, perhaps, the fall. Settlements are isolated by the rains and flooded roads. Only the concrete roads remain passable. Planes can land only on well-equipped airfields. Normal



You find the same food in Siberia as in European USSR, even fruits which do not grow locally. Siberia gets Moldavian cheese, Moroccan oranges, Ukrainian cucumbers and Moscow cabbages. TV sets, refrigerators, passenger cars and a long list of necessities and luxuries are brought in by river, air, rail and truck. Left: Vasili Bakhilov, secretary of the Nizhnevartovskiy City Party Committee, says, "We like our location right in the center of the oil basin."

Semyon Sulyatitsky,* 28, *heavy-duty truck driver:

I came to work at these oilfields from Lvov, a town in the Ukraine, because, frankly speaking, my wife and I wanted to see what this part of the country is like. It's the first time we've been so far east.

I must say we were a little worried about how we'd adjust to the severe climate. We were particularly afraid of the frosts. Neither of us was able to stand much cold.

Three years have already passed, and we still don't want to go back home. Siberia has captivated us. It didn't take us too long to get used to the cold. Even my rather prosaic work seems different here. Of course, it's more difficult, but it's also more interesting.

Eventually we'll return to the Ukraine. That's our homeland and where our relatives live. But I can't say when it will be. All sorts of new opportunities have opened up for us here, and it's not easy to give that up.

WHY DID I COME?

Continued from page 27

footgear during this season is knee-high rubber boots. Anything else is useless.

So the reader does not think I am painting too gloomy a picture, let me say I haven't allowed myself a single exaggeration. It was because of these incredibly difficult conditions that the question of developing already discovered oilfields remained open for some time. What would the development of a field under such unfavorable conditions cost? To justify working such fields, there had to be not merely oil reserves, but concentrated oil pools. They were found.

How Is Oil Extracted Here?

How then is oil extracted from these practically impassable Siberian swamps, swamps which are incapable of supporting a man, let alone a multiton derrick? First of all, little islands of firm ground are won away from the bog. Tiny patches are created on which both men and machinery can move safely. These man-made platforms, about a quarter the size of a soccer field, provide sufficient ground support.

Having captured a bit of firm land, people try to get the most out of it. Wells are sunk with very little space between them. The practice of cluster drilling was, of course, known before oil was discovered in Western Siberia. But nowhere else, probably, has it been so generally applied and perfected.

Vertical wells are not drilled here. Most of them go down into the ground at various angles, approaching an oil pool like arms of a giant octopus. Cluster drilling is the only solution. This method makes it unnecessary to move drilling rigs around. Any kind of movement is a problem related, among other things, to the season. A possibility thus opens up for round-the-year drilling. This is economically very profitable and simplifies oil collection and transportation.

You now frequently see wheeled derricks in Siberia moving along conventional railway tracks. After a few yards they stop and a new well is sunk. Engineers are working on still more practical solutions. For instance, drilling gear is mounted on airplane wheels, as well as on gas-turbine engine-propelled "air cushions." These innovations may well become regular practice here.

So people have found a way of coping with the swamp. But what about the lakes? There are a great many of them here. The Samotlor field is under a layer of water, a lake eight miles long and five and one-half miles wide. And though its depth is not great—not over 10 feet—the water is an additional barrier.

At first it was decided to drain the lake. But it didn't work; there were too many springs, and the lake itself had underground connections with other lakes. Attempts to drill from pontoons were also unsuccessful. Decomposed peat filled up the channels made in the bottom for the drill rigs to move along. It was finally decided to lay causeways through the lake, and that is now being done. Cut by the causeways into sectors, the lake will be manageable. It is the first time anywhere this has been tried.

The people working in Siberia's oilfields came from other areas. Hence, the need to economize on manpower. Installations are assembled at plants and delivered to the field ready for operation. They are automated and require no servicing personnel. A single controller runs them from a central panel. Oil extraction in Siberia will be fully automated by the end of 1975. Computing centers being set up in operating fields will transmit data to Tyumen. That is how the manpower shortage is being met.

Machines adapted for swamps and below-zero temperatures are used for construction and transportation. Aircraft are widely used in working oilfields, laying pipelines and geological prospecting. This part of Siberia has become a kind of testing ground for new types of machinery and original methods and processes.

Roads are a primary concern. Lake Sa-

Nizhnevartovskiy is not much older than he is and growing just as fast. Not too long ago it was a village marked only on the most detailed maps. By the time he is adult, the scenes he is photographing will have changed beyond recall. Below: Most residents of Nizhnevartovskiy are young. They came here because they want to contribute to this important project.

This oilfield city has a large and booming juvenile population. Housing and school and preschool facilities are being built at an even faster pace than industrial installations. Left: There's still ice in the river, but a Sunday boat trip was promised.

The people working Siberia's oilfields come from other parts of the country. Manpower is in short demand and must therefore be economized. Installations are assembled in factories elsewhere and shipped to the field ready for operation. They are automated and require no servicing personnel. Aircraft are in general use in working deposits and geological prospecting. This part of Siberia has become a kind of testing ground for new processes and machinery.

Siberian silver wedding, an old tradition in a new setting. Below: Oilfield control panel. Oil extraction in Siberia will be completely automated by 1975.

motlor, for instance, is already ringed by a concrete ribbon, and it takes only 35 to 40 minutes to drive around it. Hardly a tourist route, but it gets machinery, oilmen and supplies where they are needed. Similar concrete roadways are being laid to connect residential areas.

The rail line presently being built from Tyumen to Nizhnevartovskiy will link this oil-bearing area with the Trans-Siberian trunk line. It will not be used to carry oil in tank cars (the Soviet Union is counting on pipelines), but the railway will, to a considerable degree, solve the problem of uninterrupted flow of supplies, regardless of weather and season.

For Man

The construction of housing and cultural and service facilities in Western Siberia is moving ahead fast, even faster than industrial construction. The idea is to attract the tens of thousands of people needed. Before people set out for Siberia, even for a temporary job, they want to know about living conditions. Among other things, they are guaranteed housing.

Some two years ago the population of Nizhnevartovskiy was about 15,000; now it is more than 40,000. The houses being built are mostly five-story with all modern conveniences. School and preschool facilities and sports centers are also going up.

Siberia is supplied with the same food you find in the European areas of the country. This holds for fruit and vegetables, which cannot be grown locally. Siberia gets Moldavian cherries, Moroccan oranges, Ukrainian cucumbers and cabbages from near Moscow.

TV sets, refrigerators, cars and everything else people need these days are brought in by river, air and rail. Although transportation is costly, the consumer is not worried about prices: They are fixed, and the state covers transportation costs.

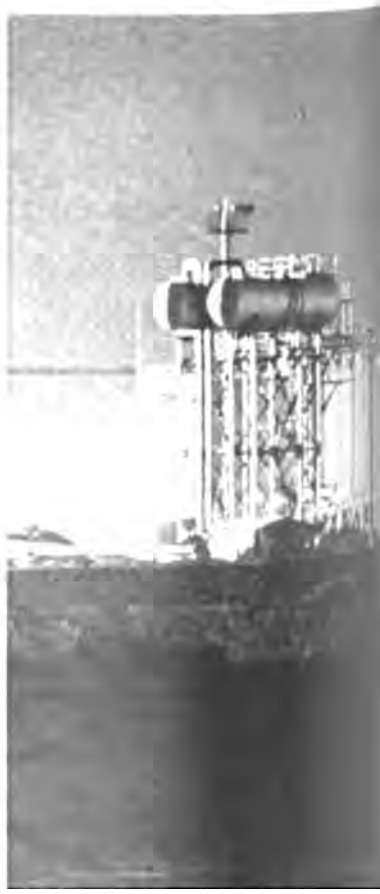
Tens of thousands of students arrive in Siberia in the summer to help on construction. The pay is good, and in a couple of months a student is able to substantially supplement his stipend. But it is not only money that brings the young. Siberia is adventure country, it always has been, and what for an older person is sometimes just hard and trying, youth finds hard but interesting. Their age and enviable ambition make these twenty-year-olds ready to get going. They want to contribute to the great nationwide undertaking that is being launched beyond the Urals. They are discovering Siberia for themselves and, returning to their classrooms, become impassioned propagandists. "Discover Siberia for yourself!" they advise those who have not yet been there.

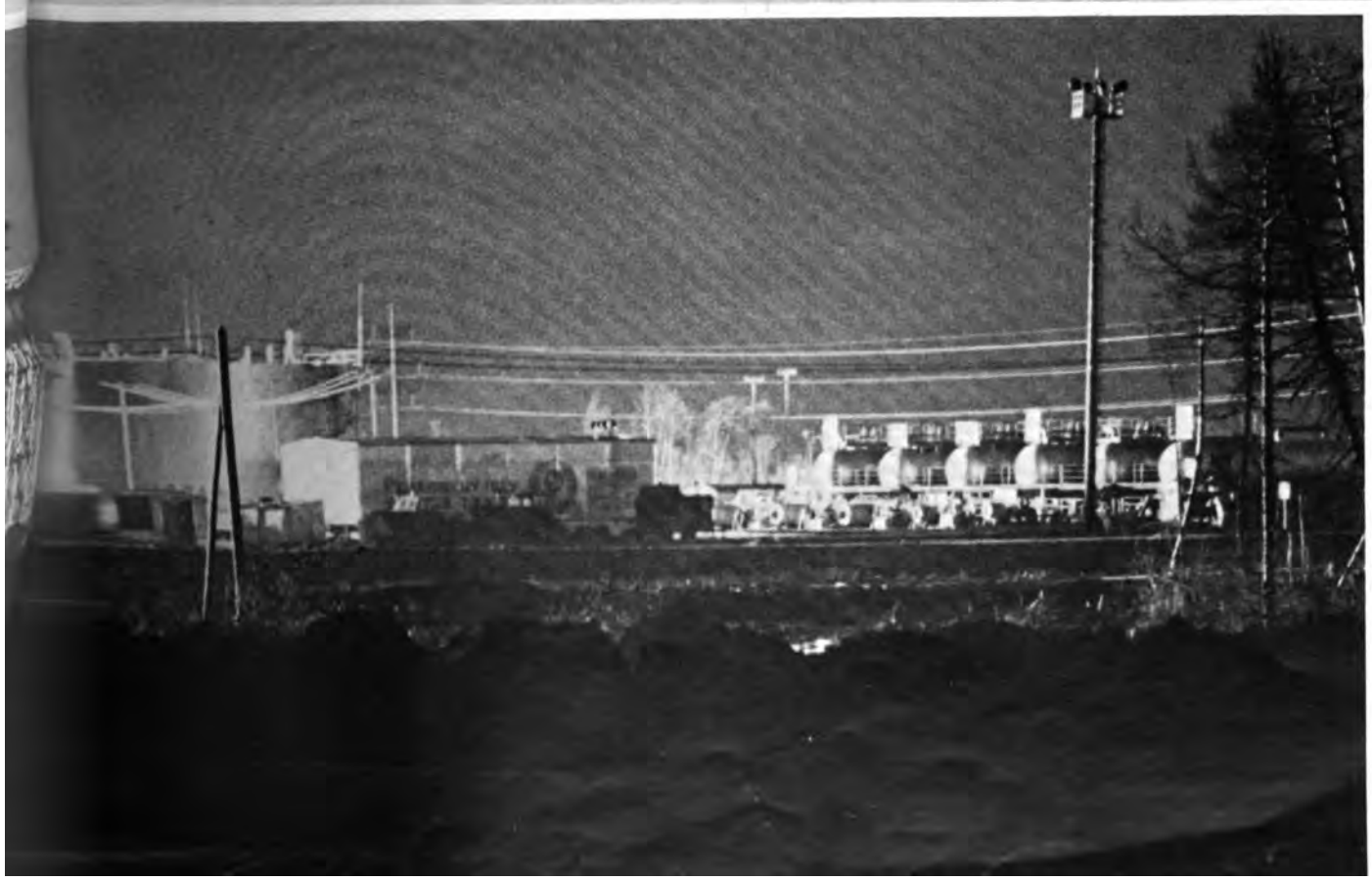
The explored and potential reserves in Western Siberia will make it possible to bring oil extraction in 1980 to 330 million tons a year. It is expected that beginning with 1975 these fields will supply the country with more than a billion tons of oil over a five-year period. A billion tons annually is scheduled for the future.

In the nineties Siberia's fields will account for two out of every three tons of oil extracted in the country. Quantitative potentials here have reached such a high degree of concentration that they are engendering qualitative changes, not only in oil and gas extracting and processing branches, but in the entire economy of the country.

The rates of development of Siberia's oil industry will soon be determined not by oil reserves but by the potentials for oil transportation and processing on the spot. The pipeline laid from Siberia to the Volga area in 1973 is only one of many such future channels. A number of new oil pipelines are to be built, as well as oil processing and refining complexes. These projects are already planned and off the drafting boards.

Eastern Siberia, whose natural resources are also expected to be impressive, is next on the agenda.





Only two years ago Nizhnevartovskiy had a population of about 15,000. Now it's more than 40,000. The housing going up is mostly five story; the apartments have all the modern conveniences. A worker who signs up for a job in Siberia, even on a temporary basis, is guaranteed housing. Left: The new hydroelectric project near the old city of Surgut. The station is fueled by gas from a local field.

WHY DID I COME?

Dmitri Korotchayev, 64, head of the department building a railroad line between Tyumen and Surgut:

My work keeps me constantly on the go. I've been in the Far East, the Ukraine and near Moscow—wherever new railroad lines are planned. The line we're on now isn't very impressive to look at. How could thousands of miles of track, without a single tunnel, running through nothing but swampland, be anything but monotonous? But from my point of view, because I have never worked on a more difficult job, it's been my most interesting project.

Vladimir Leitland, 24, head of a construction section:

I came to Western Siberia from my native Latvia when I was 19, right after graduating from a construction technical secondary school. I was drawn here strictly by the romance of the place. Now I've had some experience in life, and I'm finishing an evening course at the Engineering and Construction Institute in Tyumen. The work here has given me a wealth of material for my diploma thesis.

My section surfaces roads and builds bridges. I'm responsible for the work of 150 people, most of them around 22 years old. All of us want to prove ourselves by helping to develop a land where natural conditions are so difficult. We new Siberians want to be worthy of our fathers, who, in their time, did such great work on the first big Soviet construction projects.

Anatoli Kosukhin, 49, rector of the Tyumen Industrial Institute:

I was working in Sverdlovsk, the capital of the Urals, 10 years ago, when I was offered the rectorship of an institution that had just opened. I agreed to move to Tyumen, believing that a young institute has its own advantages. We began from scratch, which was wonderful. The specialists to be trained by the institute had a tremendous amount of creative work awaiting them in a still undeveloped and challenging land. Our students came from work teams and new industries, they had already proven themselves in work and in solving problems. The faculty, too, was made up of people who were deeply interested in Siberia.

Ivan Khokhlov, 40, head of the Tyumen Aeroflot office:

I came to Siberia quite by accident. At a Crimean resort I met a friend with whom I had attended flying academy. He told me he had a very interesting job with geological prospecting teams. I was inspired to go to Siberia myself. Here I met working people who were not afraid of taking risks, and that appealed to me. I remember how we loaded 10 tons onto a helicopter that, according to instructions, held a maximum of seven. The helicopter could not get off the ground. We tried lifting it with a running takeoff. And lift it we did. We delivered the load to its destination, and many more 10-ton loads the same way. The designer of the helicopter couldn't believe it. But in Siberia, everything is possible!

Then there are the pipes. They're suspended from the helicopter, and sometimes they swing around in the air so much that there is danger they'll knock against the propeller blade. Anything can happen. So what! Life without risks would hardly be interesting. Especially in Siberia. I have a few more gray hairs on my head, still, it gives me something to tell my daughter.

Vyacheslav Kostikov, 36, highway construction engineer:

I was born in Moscow, but I've worked everywhere. I even built a highway in Ethiopia—that's the southernmost point in my work experience. After Africa I decided to go to Siberia; I began my engineering career there 14 years ago. Of course we couldn't have experienced a more extreme change in climate than between Africa and Siberia, but no one in my family, neither I nor my wife and two children, was bothered at all. My parents want us to return to Moscow, but I'm so used to moving from place to place, I can't imagine any other kind of life. Concrete highways make it possible to reach the oilfields so the importance of this work more than compensates for the difficult living conditions.

Victor Kitayev, 35, oil driller:

My home town is Voronezh, in the heart of Russia. I attended the Polytechnic Institute in Kuibyshev, on the Volga. The subject of my diploma thesis was multiple drilling. Siberia gave me the opportunity to use everything I had studied. The team I lead set a record by drilling 23,000 feet in a year, double the average throughout the country.

I intend to stay here. After all, I'm an oilman, and there is enough oil here to satisfy me for the rest of my life.

Vladimir Kazakov, 27, geophysicist:

Some geologists prefer to work in a laboratory, studying materials gathered in the field by their colleagues. I like working right on the spot, under the open sky. That's why I left the big city of Novosibirsk and the research laboratory. Siberia is an ideal place for a geologist. There is so much to be explored! At the same time you don't feel cut off from the rest of the world. I have television and a radio set in my house trailer on the banks of Lake Samotlor, and I get the daily papers, just as I do in the city.

Nadezhda Peskova, 20, hotel administrator in the town of Nizhnevartovskiy:

Specialists just coming to work here generally stay for a while at our hotel. I often see a look on their faces that's asking the same question: "What is Siberia really like? Can I really get used to it?" How good it is to see that look change. Many of these newcomers end up loving Siberia.

I'm another one who was afraid of the place. I thought I wouldn't be able to stand living here for very long. My parents died young, and I was raised by my aunt. She didn't want me to come and was sure that I would return home in short order. I felt I would work here for a year or two but no more. At first in every letter I promised to return, but somehow I never got around to it. Now there is little likelihood of that, I'm getting married.

My work is nothing unusual, but because I meet such fascinating people, I am caught up in the life here, and I'm as enthusiastic as everyone else.

THE FOR

Victor Kitayev, a boring-crew foreman, is interviewed by Y Kaleschuk, correspondent of Smena, the youth magazin

EMAN

I HAD TO GO LOOKING for Victor Kitayev when I got to the Samotlor oilfield. He had gone out with his crew, long before his own shift began, to help out; the crew, he told me when I introduced myself, was getting ready to start up an operating column. This was the preparation time for a whole week's work: They were removing the equipment—the driller was taking out the tubing, assistant drillers did the backing-off and let the tubes down a gutter, while another worker and an electrician rolled down the shelves.

"That will take us about four hours," Kitayev figured as we walked to the little mobile office. "Excuse me while I rough out the day's schedule."

As Kitayev made his calculations, I had a chance to put together my first impressions of the boring-crew foreman, who had a formidable reputation for doing a job. He is a robust, broad-shouldered young man of about medium height, light on his feet and with steely blue eyes that look at you sharply and directly. A man, one feels, of strong and honest opinion.

"Let's get started," he said, "I'm pretty busy this morning. Samotlor is our biggest operating oilfield, you know, and my crew made a pledge to meet our quota a year and a half before the end of the five-year plan."

"I take it," I said, "from your success here, that this kind of job is something you had in mind for yourself when you were a student."

"Oh, no. When I was a boy, I had the romantic notion that I wanted to be a lawyer. I loved mystery movies and good lawyers defending the innocent. What would be better than saving a human being? I imagined myself investigating all sorts of crimes and making fiery speeches for the defense."

"So what did you do about it?"

"Nothing. I applied for admission to an automation and remote control institute."

"Then how did you come to oil and boring?"

"Well, my grade in the entrance exams wasn't good enough so I had to put that off for a year and then I applied at the Kuibyshev Polytechnic Institute. It turned out to be the move of my life. It was as if while I was looking for the job, the job was looking for me."

"So eventually you got to this job here?"

"Right," he said, "and I'm a lucky man. I have a great crew to work with—here's one of my men," and he introduced me to the crew's driller, Fyodor Metrusenko.

"We've got a great foreman," Fyodor told me. "You should have been here in 1969; you would understand why Victor is tops with us. The crew was left at the boring site by a helicopter on an island cut off from the rest of the world. When the crew—half of them had been drilling foremen themselves—heard Victor Kitayev was going to be their foreman, they took the news with skepticism and even condescension. Perhaps it was his technical background or maybe his dedication to the work—most of us didn't find it quite so absorbing—they didn't give him the greatest welcome. But one day we struck a gas-bearing formation. There was an explosion, a real emergency. Through the endless eight-hour shifts Victor practically lived in the boring tower. What more could you ask of a leader? We learned a lot from him. He's irreplaceable."

Victor waved the compliments aside. I asked him for more details on how he had made his way to the job of leading a group of men who obviously showed him all the respect a man could hope for.

It was rather late in his career (he's 34 now) that Victor became a boring foreman, at a point when people he had gone to college with had already passed that stage and moved up the ladder. He started out later, for a number of reasons, but he put all of himself into it.

"A leader is somebody who gets the ball rolling with his own ideas and his own effort. You're a leader to the degree you can get things started. If you want others to work well, do it yourself first. Give your men the benefit of your experience, show them the short cuts, make them a collective. But the collective will have no strength if you forget the individual. The leader has to find an approach to each member of the crew, be able to assess his strength and weakness and then assign the jobs to the right guys to build up the collective power. Before you leave here, I want you to take another look at my men. Each and every one is a personality. And their qualifications for the work differ just as much. For those reasons they couldn't work without leadership that gives them cohesiveness; even where you find rivalry, they still work by the all-for-one, one-for-all principle.

"It's as true as it ever was that when we're building something, we're also building ourselves. Two of the fellows in the crew used to throw their weight around. Now like most people, the men here are reasonably tolerant of human frailties, so long as they don't interfere with the work. It didn't take long for the two who were out of step to get the message. They've turned out to be our best assistant drillers and have since become YCLers.

"We've got six nationalities here—Russian, Tatar, Mordvinian, Ukrainian, Bashkir and German—this is typical of Samotlor. What a crew they make! I have to tell you that when I first came here, the group was disheartened—there had been so many failures. Now we didn't work miracles right away, but in two years it was the top team—the same men, but they had become confident, full of purpose, strong in every way. When I took over, my ambition was to make my crew the envy of all the crews."

"Do you think you succeeded?"

Victor gave me a half-smile. "I'm not the one to judge, I suppose, but I certainly hope so."

"I'd say you were a happy man, Victor. What do you think happiness comes from?"

"You're happy when you like the job you do. When you see your crew pleased with the way things are going and when you can see the results of your work, that you're contributing something worthwhile to the common cause."

"But suppose you haven't really made it, suppose you just believe things are that good?"

"It's up to a man to make what he believes a reality."

"I guess you're telling me that work is the main thing in life."

"Absolutely. It's the be-all and the end-all. Maybe it's vanity, but I like doing my job better than others can do it. I'd like to beat Levin's crew all the time—to test my ability, to keep the level of our work high. I never could wait for anybody or anything—whether it was for someone to pick up the ball in a game or maybe just getting to a destination. I can't stand slow walking or slow living. I have to be on the go. Maybe I'm a little crazy, kind of a nut when it comes to my work. Maybe I should think more of today, make my life more interesting today." He shook his head.

"I still say you're a happy man. You've got a job you like, everything seems to be fine with you. How about your family?"

Victor jumped up. "Wait a minute! My Sergei will be seven tomorrow. I bet my wife forgot to send him a happy birthday telegram. He's staying with my father this summer at Kuibyshev." Victor turned on a transmitter, got through to the telegraph office.

"What are your plans for Sergei?" I asked.

"My plans for Sergei? I haven't thought about that yet. All I know is I want him to be a good man, honest, fair, respected."

"What quality is most essential in a man in your opinion?"

Victor's answer was very quick. "Sincerity. A man can make mistakes, do the wrong thing, but if he's sincere, people will respect him and be glad to help him. I don't like hypocrites. And I don't like people who blame others for their own shortcomings. You have to find out what you're suited for and not complain that with luck things would have been different. I know my own limitations. I couldn't have made a doctor's degree—I'm a plain man, I don't go for theory, I'm too practical. Any intelligent man can get an advanced degree if he works hard for 10 or 15 years. But a scientist has to have boldness, ideas. Just the same, to handle a tough practical job, you have to have another kind of talent."

As we left the office to meet the crew, I asked Victor whether he got away from the job on occasion.

"Sure. Last summer I was a delegate to the Tenth World Festival of Youth and Students in Berlin. The crew sent me. It was a great experience and a real change. But I was glad to get back here. I need my work. This is my life."

OPERATION SIBERIA

DEVELOPMENT of this very rich territory started many years ago. Among the milestones was the construction of the 5,000-mile Trans-Siberian Railroad. There is nothing like it anywhere else in the world.

The Great Trans-Siberian, the name it has acquired, largely determined the area's growth. Industrial centers—Omsk, Novosibirsk, Irkutsk and Chita—followed the railroad into the taiga.

Development was rapid, and the funds invested grew steadily. From millions of rubles, they increased to many billions.

In the thirties the Kuznetsk iron and steel works was built in Southern Siberia. The city of Novokuznetsk grew up around it.

Coal seams 40 to 52 feet thick are usual in the Kuznetsk Basin. Often they are 165, 260 or 295 feet thick.

In the thirties a rail line—the Turksib (Turkestan-Siberian Railroad)—branched off from the Great Trans-Siberian to Central Asia. Siberia was now linked by rail not only with the center of the country, but with industrially promising Central Asia. At the same time the industrial development of Siberia's extreme north was started. Beyond the taiga, in the permafrost of the tundra, appeared the city of Norilsk, with its mining and ore-dressing complex.

For some idea of the rigors of this part of the world: The temperature of Norilsk is below zero two hundred days a year, and for a hundred of those days it drops to minus 22 degrees Fahrenheit. The Arctic night lasts for two months.

The Irkutsk Hydroelectric Power Plant on the Angara River was built before the Bratsk project was started. In those same years all the preparatory work for the iron and steel project in Western Siberia was finished and the construction of the Abakan-Taishet Railroad was begun.

In the sixties the Krasnoyarsk Hydroelectric Power Station was under construction on Siberia's longest river—the Yenisei. The first oil gushers started shooting up at the Tyumen deposit, called the discovery of the century. The construction of the world's largest aluminum plant was started in Bratsk. Construction of the largest timber and woodworking industry complex —not only in Siberia, but in the whole world—was launched.

Note this important fact. It is impossible to use the same type of equipment for construction work in Siberia, particularly in its northern region, as in the European part of the Soviet Union or in other areas of the country having a milder climate. Special machines and tools are needed, those geared to permafrost soil and extra-low temperatures, a reminder that the Pole of Cold of the Northern Hemisphere is located in Yakutia, Eastern Siberia.

Siberian construction became a countrywide endeavor and the stuff out of which poetry is made. Yevgeni Yevtushenko, born in the Siberian town of Zima, wrote *Bratsk Hydroelectric Station,* and launched the "Siberian wave" in poetry.

In the seventies the Sayano-Shushenskoye Hydroelectric Station is in full swing. The rate of Siberia's development is rising steadily. Industrial output for the entire Russian Federation grew by 300 times from 1922 to 1972; for Western Siberia it multiplied by 869 times.

The nature of construction in Siberia has undergone certain changes. The country's planning bodies no longer think in terms of individual enterprises for this area, even if they are to be the largest in the given industry. Territorial production complexes are now being planned and built; examples are the Bratsk complex, the Sayano-Shushenskoye complex (to consist of 120 enterprises), and the Norilsk mining and ore-dressing complex. Industrial complexes are interconnected enterprises. Their function is to supply the country, not with raw materials or semi-manufactured products, but with finished goods. The scope of these projects is indicated by this figure: The Ninth Five-Year Plan (1971-1975) projects investments for the development of Siberia in excess of 100 billion rubles.

WESTERN SIBERIA: MOSAIC OF FACTS

Tyumen is the heart of a large gas and oil prospecting development in Western Siberia. In Soviet times it has grown into an industrial and cultural center with a population of 300,000. It has five higher educational institutions, 26 research institutes, 57 general education and 10 vocational schools. More than 1,000 doctors staff Tyumen's medical centers. Building cranes are a constant feature of the city landscape: Residential projects, municipal buildings and industrial plants never stop going up.

There are 30 doctors of science and 460 candidates of science working in Tyumen. Its research and design institutes employ some 5,000 specialists.

* * *

The city has a drama theater, a puppet theater, a philharmonic society, a music college, three children's music schools, a children's art school, a ballet studio, an art gallery, a local-studies museum, 44 libraries and 22 clubs. A circus building seating 2,000 is under construction.

* * *

Tyumen's own TV center broadcasts study programs for young people in remote taiga villages who are preparing for college entrance as well as study programs for part-time and correspondence students. The listening audience for these programs is in the neighborhood of 20,000.

* * *

An institute integrating the economics departments of the USSR Academy of Sciences' Siberian Branch is under construction in Tyumen. The new center will coordi-

HOVERTRUCK

ABOUT A MILE of swamp lay ahead of us. The soil was so boggy that no cross-country vehicle, even with the widest treads, could manage. And the vehicle ready to take off had rather narrow treads.

"We'll cross it in a minute," says engineer Leonid Matskov with a smile. He supervises a special vehicle-testing department at the Western Siberia branch of the Oil Engineering Research Institute.

"Treads don't matter here," he explains. "This vehicle is air-cushioned."

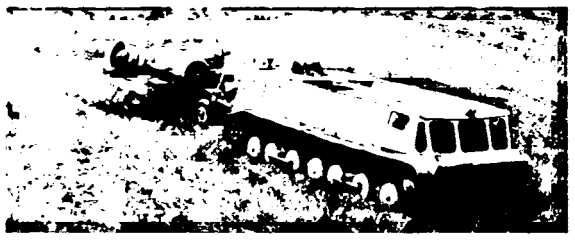
A powerful motor is switched on. The six-ton vehicle rises and, quickly gaining speed, rushes toward the swamp. I say rushes because the hovertruck, doing 30 miles an hour, flops into the liquid dirt pools and, making a slight swing, rushes on.

Then a freight platform with its own engine is coupled to the hovertruck. It carries concrete blocks weighing over six tons in addition to the more than three tons of platform. Powerful air spurts elevate it, and the hovertruck pulls it as easily as a toy.

Ten tons on unstable bogland. Can you figure out a better vehicle for an area that has hardly any roads and where the problem of developing mineral resources is stalemated by the problem of freighting?

People in the Tyumen North say: "If you master distance, you master the North." The large-scale use of hovercraft transport facilities will make it possible to lay oil and gas pipelines the year round, not only in winter when the bogs are ice-covered.

The first cross-country hover vehicle, adapted to Siberia's boggy areas, has already traveled almost a thousand miles over marshes. Another hovertruck model is being readied for testing—it has a carrying capacity of 40 tons. Engineers are now designing big freight platforms and comfortable high-speed passenger vehicles.



nate the work of close to 30 branch-type research institutes and affiliates. Studies will concentrate on the oil and gas industry, construction and agriculture.

* * *

In 1973 Western Siberia became a supplier of electricity instead of a consumer. It now transmits electric power to the Urals and Kazakhstan.

* * *

People of 50 nationalities are developing Western Siberia's oil and gas deposits.

* * *

An experiment is under way: Drilling teams live in Tyumen but commute to work by plane 435 miles to the north. All three shifts in the taiga come home after work to a large and modern city.

The point of the one-year experiment is to find out whether this approach to the opening up of distant fields is practical, especially for workers and their families.

* * *

Siberia's wages are higher than the national average. Retail prices in this geographic belt, however, are the same as in the central areas.

* * *

In spite of the rapidly increasing output of oil, the number of drilling teams in Western Siberia has not changed in the past seven years. Technical modernization of operations is responsible for higher labor productivity.

* * *

In Siberia frost can be a partner. Before the winter builders lay down log and tree-branch roads and cover them with wet earth. The frost cements that kind of road for many months.

* * *

A good deal of the work that goes into developing Siberian oil deposits comes out of the Tyumen computer center. The computers are used particularly to determine the optimum methods for extracting oil.

* * *

Asphalt is not used for paving in Siberian towns located north of Tyumen. Concrete slabs are substituted. Asphalt cracks and breaks up in the water-logged soil.

* * *

Across the main street of Nizhnevartovskiy is a 300-foot-long streamer bearing this prediction, now becoming a reality, by the eighteenth century Russian scientist Mikhail Lomonosov: "The might of Russia will grow from Siberia's contribution."

* * *

Samotlor, the name of a lake and also of an oilfield, in the local language means a birch tree in a godforsaken place. The godforsaken place has turned out to be fabulously rich.

* * *

In Nizhnevartovskiy most of the streets have the name of other Soviet cities. Why? They were named after towns the builders came from.

* * *

Ice fishing is the favorite spring sport of Siberians. Even lakes no more than three feet deep yield hefty perch and pike.

* * *

Siberians themselves think that the so-called Siberian character is largely a literary invention. Even so, it is a generally accepted fact that Siberians are strong and big-hearted. They move around a lot, traveling being an accepted part of their daily lives. The Siberian is not fussy, has plenty of patience and is philosophical about trouble on the road.

* * *

The breakup of the ice in Siberian rivers is nothing less than an event. It heralds spring and the beginning of long-awaited movement on the water. Thorough preparations are made for the shipping season, and the rivers' navigability is of front-page importance in the local papers.

* * *

In Siberia a thrifty approach to nature is prompted, above all, by practical considerations. Everyone here knows that cutting brush in northern areas greatly increases the depth to which soil freezes. No trees grow in permafrost soil.

* * *

Presently known gas reserves in this area exceed 350 trillion cubic feet. But that is not all of this power-producing material. According to estimates of Tyumen geologists, hidden in the northern part of Western Siberia are almost 1.4 quadrillion cubic feet of natural gas.

* * *

The natural gas of Western Siberia is very well situated, geologically speaking, which makes its industrial use very economical. Even with an initial output of one and a quarter to one and a half trillion cubic feet a year, the production costs of Tyumen gas are several times less than the average for the Soviet Union.

* * *

The Western Siberia oil-bearing territory covers 580,000 square miles, an area large enough to accommodate Austria, Belgium, Great Britain, Greece, Denmark, Italy, Ireland, the Federal Republic of Germany and Yugoslavia.

OILFIELD ON FIRE!

This is an on-the-spot account by *Literaturnaya Gazeta* correspondents of an oil well fire in Western Siberia. Oilfield fires are not *unusual*—witness the catastrophic one at the Shell field *in the* Gulf of Mexico area that took 136 days to put out. The blaze in Western Siberia was extinguished in 30 days.

HEAVY AND CONTINUOUS THUNDER rumbled across the blackened and mutilated taiga. A yellow-blue flame with streaks of red towered over the cedars and larches. Men, helmets low over their foreheads, made their way forward, their boots raising the hot dust: They headed straight for the raging fire—it was their shift. For almost a month now, despite the maddening din, they had moved on the inferno, trying to choke it off.

September 15, 1972. It was 11:45 P.M. The driller was pulling up the worn-out bit from the bottom of the well (6,745 feet deep). The lifting operation was almost finished when the well started to "overflow."

For every 30 feet of a well's depth, the pressure increases by one atmosphere. Clay mud with a specific gravity higher than that of water is pumped into the well to balance the rise in pressure.

That day the reservoir pressure of more than 200 atmospheres was countered by a more than mile-high mud column. Suddenly the mud reversed direction and started to spurt and splash, flowing out of the well. A monstrous movement of elemental forces had started deep down.

The driller lost his head. He still had 15 to 20 minutes, the time required for the oil to reach the surface via the long canal, enough time to close the blowout preventer, a special device intended for such emergencies. But he had been taken by surprise, hadn't grasped the situation. When he finally rushed to the preventer, it was too late—the derrick groaned and a 575-foot-high roaring fountain shot up, hurling the pipes out of the well. The metal crashed, sparked, and seconds after its birth, the gusher turned into a lighted torch.

September 16. It was one of the biggest burning gushers in the history of oil extraction. The internal pressure of the eight-inch jet of oil and gas was so great that immediately on reaching the surface it expanded to three feet in diameter, with a consistency as thick as metal. The flame started 16 feet from the ground, its temperature exceeding 3600 degrees. Lenin Prize winner Ivan Girya, a department head of the Tyumen Geological Agency and the commander of the fire brigade, wearing fireproof coveralls, were among the first to make their way through the burnt iron obstructions to the gusher. The jet had shifted the preventer out of place, and now it had to be moved from the wellhead. To do that a gun, ordered by radio, fired cast-iron dummies at it.

September 17. A MI-6 helicopter landed with emergency equipment. A clearing was made by bulldozing hundreds of tons of burnt iron and charred earth. Trees in the way were cut down.

Now there was a chance to look around and, in case of danger, even to retreat from the flames.

September 23. The fish in the nearby scythe-shaped creek were boiled. Somebody tried to eat one, but it reeked of oil. Then food started to drop from the sky—this was the bird migration season. During the day the flocks flew out of the way of the fire. At night, however, they were hypnotized by the torch. Hundreds of roasted ducks and partridge fell to the ground.

Ships with jet fire-fighting installations arrived from Surgut. They were the only hope of cutting off the tremendous flame from the stream of oil and gas. The jets were so powerful that when one of them was accidentally directed at a nearby grove, the tops of several cedars were cut off. It took three tries before the flame was extinguished and the oil gushed sky-high.

But this was only testing. While a special preventer was prepared, the gusher was again set ablaze with a flare pistol. The reason? The extinguished gusher could mean even more trouble: The oil soaks the ground, and the gas clouds that form can explode any second.

September 30. To cap the stream with a new blowout preventer, which would cork the fiery well, a flange, an enormous washer with holes, had to be welded on so it could be "threaded" later by the fiery stream, as you would thread a needle. One of the welders had to do the job at the wellhead, right next to the raging torch. Oleg Varichenko crossed over into the danger zone, methodically laid out his electrodes, a reserve welder's protective mask and gloves. He checked to make sure the flange was lying flat, and only then did he start, without haste, as though it were all routine and he were simply demonstrating seam welding.

It took 50 long, tormenting minutes to do the job. Now the seven-ton preventer had to be placed on the flange. That would choke off the fire.

October 12. At the headquarters meeting there was something new to worry about. Gennadi Makhalin, head of the Tyumen Oil Extraction Agency, put it into words:

"There have been five cases of explosions when blowout preventers were being placed on oil gushers. No one knows the reason; specialists think it might have been electrostatic discharges. Let's hope this doesn't turn out to be the sixth case."

In the morning, with the first light of day, the jet fire-fighting installations went into action. The flames resisted for about 10 minutes, then, with a roar, they flew off the gusher like a plane and vanished in the distance.

A crane lifted the preventer, steel ropes from four winches attached to its corners. It was shifted into the stream until the gusher came precisely from the center of the opening. A simple enough job —the crane operator moved the preventer while the winches handled the steel rope.

Only a few inches of clearance remained when an enormous red column shot up with a bang. Nikolai Grigoryev, the commander of the rescue team, who stood very close to the gusher, was enveloped in the flames.

The "Oh!" from 100 men was drowned out by the roar of the fire.

Makhalin was the first to try to reach Grigoryev, but he tripped on the steel rope. Lying on the ground, he saw Grigoryev, his fire-resistant suit burning, make for the woods. The firemen were on the lookout: Several jets of water hit the burning man in time.

Now that Grigoryev was saved, the blowout preventer had to be recovered. Its seven-ton bulk swayed over the flames. The cab of the crane was already empty; the operator had jumped to safety. In seconds the crane was ablaze. It was then that a man from one of the winches made for the crane.

Makhalin later remembered himself yelling: "Get back! You'll be burned to death!" He knew that the men handling the winches did not know how to operate a crane. The man who had made for the burning machine did not hear Makhalin. No way of helping him—the fuel tank could explode any second.

It never occurred to derrick rigger Gennadi Golovkin that he might be blown up with the crane. The only thing on his mind was to get to the machine.

He felt the heat bite his mouth—his lips crack. He grabbed the handrail of the cab, jumped over the caterpillar track, dived into the burning machine.

Golovkin, an ex-tractor driver (Makhalin was right—he didn't know how to operate a crane) by intuition switched on the burning engine. The crane moved away from the torch. Golovkin could be seen against the blazing background. Behind the crane was the preventer cutting a deep furrow in the parched, colorless earth.

October 16. A meeting lasting several hours was held at headquarters. Again everything was thought out. New places were worked out for the men so that there would be no accidents in case of another explosion.

Once again the flames over the gusher were extinguished. Now it smelled of crude oil. The preventer, already charred, blocked from four sides by steel ropes, was brought to the gusher and slowly lowered into position. That whole day no one left the site.

When only millimeters separated the preventer and the wellhead, the men held their breath, waiting for a spark, a discharge, a blast. These were the most trying minutes.

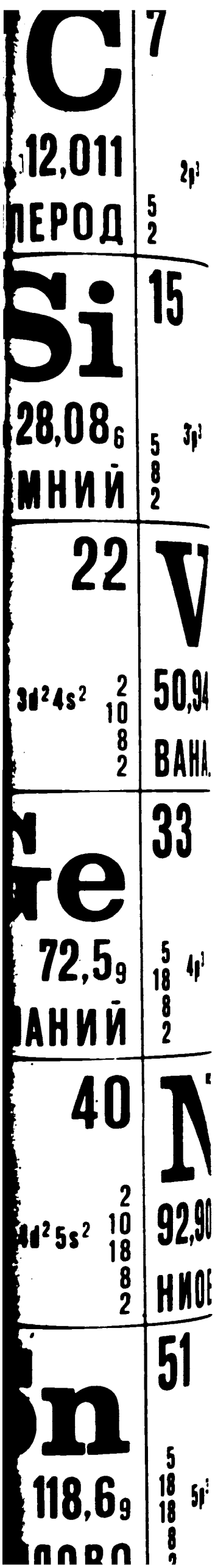
It looked as though it had already come to rest on the flange; but no—the ropes, for a good half-hour, were still tight as strings. And then. . . . Someone joyously tossed up his tank helmet (only tank helmets kept the noise out), someone else threw up his gloves. The ropes had slackened. The preventer had blocked the well.

WHY DID I COME?

Nikolai Grigoryev, 52, expert in oil and gas fire-fighting:

I came here from Eastern Siberia. Two years ago I helped put out the biggest burning oil gusher ever seen in Siberia. The column of flames rose to a tremendous height. I had my share of trouble—I burned my hands and spent over a month in the hospital. Of course, my work is risky, and my wife would like me to change jobs. But it would be hard for me to leave here. I've seen the secrets of Siberia open up before my very eyes. I took part in these events and shared in the joys and sorrows of the geologists, fliers and builders. I came here to stay for a while, but I decided to make it for good. I guess the more work you put into something, the harder it is to leave it.

TOBOLSK
REBIRTH
OF A
SIBERIAN
CITY



TOBOLSK ON THE IRTYSH was once known as the unofficial capital of Siberia. Founded in 1587, it was on the main Siberian trade route until the latter half of the eighteenth century. Thriving trade brought prosperity to the city. However, when the Trans-Siberian Railroad was built in the late nineteeth century, the nearest station was 160 miles away, and Tobolsk gradually declined to a small provincial town.

The city came to life again in Soviet times. It grew into an important river port with a shipyard and food-processing and woodworking factories.

The Directives of the Twenty-fourth CPSU Congress, held in 1971, scheduled one of the country's biggest petrochemical complexes for Tobolsk.

Our correspondent interviewed first secretary of the city party committee Gennadi Shmal:

Why was Tobolsk chosen as the center for the West Siberian petrochemical industry?

The choice was made for good economic reasons. In 1974 Western Siberia will lead the country in oil production. By 1980 it will be producing 45 to 50 per cent of the total output. Its hydrocarbon resources are estimated at 14 to 15 billion tons.

Of course, the raw material could be shipped to the traditional chemical industry centers. But oil processing takes great quantities of power. For instance, to process one ton of crude oil requires three, five, ten or even more tons of fuel. The cost of shipping fuel makes that prohibitive. We expect Tyumen Region to produce two-thirds of the country's total output of natural gas so there is no problem of power shortages there.

Chemical-engineering processes also require a lot of water. Again, in Siberia there's plenty.

Chemical complexes require space. To build a chemical plant elsewhere, we would have to use arable farmland or pasture. Tobolsk has more than enough room for industrial construction.

But all this is true of many other Siberian towns. Why the preference for Tobolsk?

We're well situated with respect to transport. Our location on the bank of the Irtysh links us to every port of the Ob River basin. We also have a railroad. The Ust-Balyk-Omsk oil pipeline is already in operation; it runs only a few miles outside the city. The Samotlor-Almetyevsk trunk pipeline, now under construction, will also be close. No future pipeline, whether it goes west or south, will be any appreciable distance from the city.

Not far from Tobolsk, in Ust-Balyk and Nizhnevartovskiy, we'll be constructing gas works and gasoline plants. Products from those plants are used in chemical engineering.

In addition to all this, an electric power transmission line runs close to the city, delivering power from the Tyumen electric power-and-heat generating plant to the middle reaches of the Ob. When the Surgut thermal power station begins operating, the same lines will carry electricity in the opposite direction.

As you see, all the economic indicators spell Tobolsk. Estimates have shown that the prime costs of Tobolsk petrochemical products will be eight to ten per cent lower than those made in any European area of the USSR. Also remember that our city has a very good climate and fine natural surroundings, which will attract new settlers. Still another point: Tobolsk is the birthplace of the famous scientist Dmitri Mendeleyev, author of the periodic table of the atomic weights of chemical elements. So you see, we are all born chemists here.

Could you give us a general picture of the project?

We see it as a complex of integrated plants that do not duplicate processes. Specialization and concentration of production, centralized maintenance and repair will make possible the use of automated management systems, with considerable savings for the separate production processes and the complex as a whole. The output will include synthetic rubber, plastics, mineral fertilizer and refined products.

The first section will be a central gas fractionation plant, with a planned output six times greater than any currently operating plant in the Soviet Union, and a synthetic rubber factory.

The second section will be a pyrolysis plant, which will produce 650,000 tons of ethylene a year. It will have facilities for processing ethylene into different kinds of plastics for tubes, film, cable insulation, building materials and structural elements.

The complex will have an oil refinery, which will produce high-grade automobile, diesel and aircraft fuels.

These are only the main lines of production covered by the general plan. I'm certain there will be others, for example, a chemical-apparatus factory to make equipment for the complex as well as other plants. The site selected is seven and a half miles from the city limits, allowing for expansion.

How do you envision the new Tobolsk?

We think the population will reach a quarter of a million. This does not mean that the present area will automatically expand in a four to one ratio. We are introducing modern multistory housing developments. Young people will make up the bulk of the population, which means nurseries, kindergartens and apartments for small families. We will increase the number of houses of culture, sports complexes and movie houses. We will have to open a specialized secondary technical school and set up a chemistry department in our pedagogical institute, which will eventually grow into a chemical engineering institute. Several vocational schools giving a complete secondary education will be established too. To put it in a nutshell, the city will train the personnel it will need for its industries and provide the appropriate facilities for living, study and work.

Our plans are to build a beautiful city with all the modern amenities available right from the start; that includes broad thoroughfares and well designed architectural ensembles. At the same time we do not want the tall buildings to squeeze our whitestone kremlin on the high bank of the Irtysh. The citizens of Tobolsk treasure the kremlin; it is the only stone fort beyond the Ural Mountains. Our architects will have to strike a harmonious balance between the city's modern and early architecture.

We intend to call a conference of builders, architects, artists, sculptors and other people who care about our past as well as our present and future. We will discuss projects and proposals, and come up with decisions that will reflect our concerns and implement our plans.

Courtesy of *Smena*

Portrait of Peter the Great
by Ivan Nikitin
(1720)

Resting on the March
by Pavel Fedotov
(1841-1842)

THE RUSSIAN MUSEUM

The world's largest collection of Russian art from the fourteenth to the twentieth centuries

By Marina Khachaturova

AS YOU WALK down architecturally famous Nevsky Prospect in Leningrad, your eye is caught by a magnificent corner building, the Mikhailovsky Palace, built in 1825 by Carlo Rossi. This outstanding architect was brought from Italy to Russia at the age of eight by his ballerina mother. He was responsible for many fine buildings in St. Petersburg, but by all odds his best is the Mikhailovsky Palace, which subsequently became the Russian Museum. He designed everything in it—the ironwork garden fence, the furniture, chandeliers, mirrors, the parquet flooring. The palace is both grand and simple—grand despite the fact that it is only two stories high, and charmingly simple despite its elaborate decoration.

Entering the main vestibule, you look up to see the adage "Architecture is frozen music" confirmed by the rhythmic lines of the dome.

The palace became the Russian Museum in 1898. In this unique repository, with its 430,000 square feet of display area, you are introduced to 10 centuries of Russian art, beginning with icons by unknown masters of the past and ending with paintings by Soviet artists. More than 300,000 works are on display. Aside from paintings, sculptures and drawings, there are samples of handicrafts which have lost none of their freshness through the ages. The rich exhibition includes toys, saltcellars, ladles and other utensils, all made of wood, that favorite material of old Russia. Though highly utilitarian, they have been turned by talented craftsmen into works of art. A whole *izba* (peasant house), embellished with magnificent wood carving, is reproduced on the parquet floor.

So much has been written about the Russian Museum, and so many monographs have been devoted to the artists displayed there that it is an impossible task to do it justice in one short article. I shall therefore limit my account to five painters of different periods in the last two centuries, each of whom made a brilliant contribution to this treasure house of Russian art.

Ivan Nikitin (1690-1741) was the father of Russian portrait painting of the eighteenth century. In the previous 200 years portraiture had consisted of the so-called person paintings—studies of important people that heralded the changeover from icon to secular painting. Nikitin was the first master of the Russian realist school, reflecting society's new emphasis on the individual. Peter I, who singled him out early in his career, was proud of him, and the artist justified this pride.

One of Nikitin's portraits of Peter is dated 1720, five years before the czar's death. A small round painting, it is distinguished for its unusual composition and for the energy with which the image is imbued. This unostentatious portrait, highlighting Peter's qualities with considerable psychological perception, is one of the best portraits made of the czar.

Dmitri Levitsky (1735-1822). His work was the epitome of eighteenth century Russian portrait painting. He brought a distinctive approach to that most popular genre of the age. Few portraits by other eighteenth century artists convey to us the nature of the Russian people of those days with such authenticity. Not only did Levitsky master to perfection the painting of the subtlest shades of silk, the sheen of satin ribbons, the heaviness of brocade and the filmy texture of lace, but his work has a profoundly human touch and an extraordinary knowledge of personality. In 1773 he was commissioned to do a series of portraits of the students at the Smolny Institute, a school for upper class girls of which Catherine II was patron. These works, painted over a period of three years,

Portrait of Glafira Alymova *by Dmitri Levitsky (1776)*

have a special place in Russian art. While unmistakably related, they show considerable individuality. Levitsky found a special composition, a special plot, a special expression for each portrait. One depicts Glafira Alymova, a noted harpist. Her smile is aglow with the poetry of youth, and her fingers, lightly touching the strings, are as lovely as the music of Rameau she played.

Alexei Venetsianov (1780-1847) was the first to make ordinary men and women, peasants, his model. He concentrated originally on portrait painting and won official approval and the title of Academician. But later his work took a radical direction that determined his unique place in the history of Russian art. In 1820 Venetsianov suddenly turned from the city to the village and began doing genre paintings of peasants. With love and respect for the common people, he painted Russian faces that reflected dignity and nobility. He was also one of the first Russian artists to celebrate his own country's landscapes. Without departing from his major direction, Venetsianov later set himself new problems in plot painting, concentrating on psychological portraiture. A case in point is his *Fortune Telling by Cards.*

Pavel Fedotov (1815-1852) was the founder of the Russian school of critical realism. By the mid-nineteenth century genre painting was well established in the country. Fedotov, concluding that his chief mission was to expose the society of his day, introduced into his paintings elements of social protest. He was the first Russian to paint tragic confrontations in commonplace settings, to look at society with a critical eye.

Resting on the March is one of Fedotov's lesser known paintings, done while he was an officer of the Finland Regiment. At the time he was considered a painter of battle scenes.

Ilya Repin (1844-1930) was the greatest Russian painter of the late nineteenth century. His work, brilliant and varied, includes genre paintings, a great many portraits and drawings, and exceptional historical paintings. Repin reflected the Russia of his day, disclosing the spiritual beauty and strength of character of his people. In the early 1870s, while a student at the Imperial Academy of Fine Arts, he painted one of his finest works, *The Volga Boatmen,* now hanging in the Russian Museum. It took him more than 12 years to complete the historical *Zaporozhye Cossacks Writing a Letter to the Turkish Sultan.* The subject is based on legend: In 1675 the Zaporozhye Cossacks, headed by their Ataman Serko, replied with a witty and sarcastic letter to the arrogant message of Sultan Mohammed IV, proposing that they stop resisting and enter the service of the Turks. Repin depicted the Cossacks laughing at their enemy with a fine feeling for character. The painting fairly bubbles with vitality.

Valentin Serov (1865-1911) was an incomparable master of the psychological portrait, an innovator in landscape and historical painting, a fine illustrator and stage designer. His works were the culmination of the brilliant Russian realism of the nineteenth century and a forerunner of twentieth century art. A pupil of Repin, he soon became an important innovator. Serov could characterize his subject by a seemingly inconsequential action, by throwing small details into high relief. Critics compared his style with that of the playwright Chekhov. His *Children,* depicting the painter's older sons on the balcony of their summer home near the Gulf of Finland, is more than a portrait. The wistful look of the children is attuned to the overcast northern day, and this fusion of people and landscape, this sense of expectation give the painting a pensive, elegiac quality.

Fortune Telling by Cards
by Alexei Venetsianov
(1842)

Zaporozhye Cossacks Writing a Letter to the Turkish Sultan
by Ilya Repin
(1891)

Children
by Valentin Serov
(1899)

Ван Дейк.
Автопортрет

ПЕРВЫЙ ДЕНЬ
PREMIER JOUR

ГОСУДАРСТВЕННЫЙ ЭРМИТАЖ

г. Ленинград

ГОСУДАРСТВЕННЫЙ ЭРМИТАЖ

ПЕРВЫЙ ДЕНЬ
PREMIER JOUR

СС★СР
25-X-70
ПЕРВЫЙ ДЕНЬ
PREMIER JOUR
МОСКВА
ПОЧТАМТ
ШЕДЕВРЫ ЖИВОПИСИ

1970

THE HERMITAGE ON POSTAGE STAMPS

By Leonid Fursenko

PHILATELISTS are familiar with the series of Soviet stamps that reproduce the significant sculpture, painting and architecture of various periods and countries. The first of these series, issued in 1966, was devoted to the collection of the Hermitage in Leningrad. In 1970, 1971 and 1972 additional series featuring Hermitage masterpieces appeared.

The memorial postal block (center) reproduces Leonardo da Vinci's *Madonna Litta,* painted around 1490. People come to the Hermitage from all over the world to see two of the great Leonardo's paintings—*Madonna Litta* and *Madonna Benois,* named after their original owners. The *Madonna Litta,* or *Madonna and Child,* has both emotional complexity and a thoughtful, enigmatic quality. The *Madonna Benois,* or *Madonna with a Flower* (lower left corner), was painted around 1478. In this early work the painter rejected the traditional portrait of an austere or pensive Madonna and created a woman's image of wonderful earthly charm.

Leonardo's younger contemporary, Raphael, is represented at the Hermitage by two works. *Madonna Conestabile,* reproduced on the stamp in the upper left corner, was painted in 1500, when Raphael was 17. This early work is evidence of his talent and of the tendency to the lyrical which later became his signature. The painting is among the best in the Hermitage collection.

The museum also owns one of the biggest Rembrandt collections in the world. Reproduced is the master's *Return of the Prodigal Son* (1668-1669), based on the biblical parable that asks us to love our fellow human beings and forgive them their weaknesses.

Apostles Peter and Paul, by El Greco, who painted in the late sixteenth and early seventeenth century, is a work of profound humanist import. Peter, with his gentleness, humility, uncertainty, is contrasted with the strong, passionate, resolute Paul.

Paul Gauguin's *Woman Holding a Fruit* was painted in 1893, during his first stay in Tahiti. The vivid color and strong decorative element are characteristic of him. We might note in passing that the Hermitage has a better collection of some French painters of the turn of the century than France.

Anthony Van Dyck, the outstanding portrait painter and student of Rubens, is represented on stamps by two of his works. *A Family Group,* painted between 1618 and 1621, has an artless simplicity in contrast with the ostentation that distinguishes much of Van Dyck's later work. His creative progress was one of uninterrupted triumph. *Self-Portrait,* reproduced in the memorial block, shows him as fortune's child, gifted and elegant.

The Hermitage has 41 canvases by Peter Paul Rubens, that Homer of painting, as his contemporaries called him. One of the finest is *Perseus and Andromeda* (1620-1621), based on the Greek myth that tells how Perseus, son of Zeus and Danaë, rescued Andromeda from the sea monster. Rubens was the painter of life—glorified, sensuous and hopeful. Perseus' red cape in the center, the white wings of Pegasus on the right and the nude Andromeda on the left create a superlative balance.

The canvases of the eighteenth century French artist Jean Baptiste Siméon Chardin reflect a love for simple people, for the laborer and his world. Chardin's *Washerwoman,* painted in 1737, gives us a glimpse of the domestic concerns of a poor French family. He depicted commonplace objects with great charm.

Nicolas Poussin, founder of French classicism, is represented by his *Tancred and Erminia* (1625-1627). Poussin chose his subjects from ancient history, from Greek mythology and biblical tales. He believed that the artist's mission was to paint not real life but events and people that conveyed an image of perfection. While his work has a certain idealized quality, it does represent man as splendid both in body and in spirit.

The Hermitage has two canvases by Diego Velázquez. His early *Breakfast* (around 1617), reproduced here, is one of the great examples of Spanish genre painting: Both the people sitting at the table and the objects on it are depicted with painstaking artistry. The authenticity of the images, the ability to portray human nature, the simplicity and understatement and the brilliant use of color are all characteristic of Velázquez' work.

The small, exquisitely painted *The Milkwoman's Family* (1640) is by the French realist Louis Le Nain. His works depicted the life of the petty bourgeoisie, artisans and peasants; his images of simple people reflect a strong sense of human dignity. Le Nain was a refined colorist. He knew how to convey light and air, and the landscape in this painting plays a major role, harmonizing beautifully with the figures.

In the Hermitage collection are several of Frans Hals' portraits done in a broad, free manner. His *Portrait of a Young Man Holding a Glove* (about 1650) conveys the subject's fleeting mood; the expression seems to change as you look at it. Hals made skillful use of the subtlest shades of black and white and handled bold color combinations with great authority.

The sixteenth and seventeenth century Venetian painters are well represented at the Hermitage. Eight works by the great colorist Titian are especially prized. Titian's canvases epitomize the Venetian High Renaissance, but the later ones, while retaining the characteristic vitality of that period, take on a note of sadness. The harmonious Renaissance man had changed; a sense of foreboding darkened his outlook. *Repenting Mary Magdalene* was painted between 1565 and 1566, within a decade of his death. For Titian, the image of the beautiful woman is of more importance than the biblical story. She is depicted against a dark, stormy landscape, and the sense of alarm is heightened by a lone tree bending under the wind.

The museum's collection includes a number of eighteenth century French paintings and *objets d'art.* Antoine Watteau, an unsurpassed master of scenes of courtship and love, is represented by the typical small *Capricious Woman* (around 1718), which was chosen for reproduction on a stamp. Here, as in all of his work, Watteau demonstrates his mastery of refined, delicate shading, precise and beautifully executed draftsmanship and keen observation.

The time of Velázquez is called the golden age of the Spanish school of painting. Another of its eminent masters was Bartolomé Esteban Murillo, many of whose works are on view at the Hermitage. Murillo added to the pictorial achievements of Spain's great realists of the early seventeenth century his characteristic idealization. This quality is highly evident in his genre paintings, particularly the one reproduced here, called *The Boy with a Dog* (around 1650).

The works of a number of nineteenth century French painters, graphic artists, sculptors and craftsmen are on display at the Hermitage. Eugène Delacroix, the leader of French romanticism, is represented by two canvases. *Arab Saddling His Horse* was done in 1855, eight years before he died, and is typical of his style. Delacroix was an eminent innovator in color; his tones and halftones have a strong emotional impact. *Arab Saddling His Horse,* a product of his journey in 1832 to North Africa, is authentic observation romanticized.

A final note: The stamps devoted to the masterpieces of the Hermitage were printed by the multicolor offset method on art paper coated with lacquer.

from childhood into the adult world

Put the same question to a teacher, psychologist, doctor or sociologist, to any father or mother: What is a fair description of adolescence? The answer is almost inevitable—a shake of the head, the word "problems," or both. The teens between 14 and 17 present a whole complex of problems; this is the period when a girl or boy is preparing to step from childhood into the adult world, when the teenager is trying to find out who he is, what his relations to his peers and adults are, what to accept in other people and what to reject. How to meet and solve all these problems? Much depends on the opportunities society is ready to offer him, on the moral standards it helps him develop, on whether or not it provides him with an open door to education, a choice of trade or profession, the guarantee of a job, and adequate recreational and cultural outlets. We can pride ourselves on the fact that conditions for study are good in our country. Education is accessible to all. More than that, universal and compulsory 10-year secondary schooling is now being introduced. Wherever the adolescent studies, in the usual general education school, in a vocational or a specialized secondary school, he is guaranteed a broad education and a diploma that makes him eligible to enter a university or institute. Just as important as the opportunity to study is the help the teenager is entitled to when he chooses an occupation. It must be work he likes that will best use his natural abilities. We spend a great deal of time on vocational guidance for our senior students. Parents, teachers and Young Communist League organization are all involved. There are study and production centers where the student learns what the current skills are and where he is taught good work habits. As a practical matter it is more difficult to choose a skill than to learn one since workers are needed everywhere. Enterprises are glad to do whatever is necessary to make a qualified worker out of a novice, even someone with no previous training at all. An experienced worker will be his personal instructor. The YCLers in the enterprise will see to it that he gets to know the community and what it has to offer him, particularly to help him use his talents. The young worker has special privileges, such as a shorter working day, but the same earnings as his adult fellow workers with the same amount of experience, and a paid vacation at any time during the year. He also is high on the priority list for an accommodations voucher which entitles him to a stay at a health or vacation resort or a camp. At his disposal, after school or work and on weekends, are hobby groups and studios, sports schools and special stadiums, young technicians and young naturalists stations. Clubs for teenagers are organized by adults in the city microdistricts. Cultural life is full and varied: There are many theaters, publishing houses, newspapers and magazines catering exclusively to the young. And still adolescence is a difficult period. There is no cut-and-dried technique, no pat answer to guarantee an easy and uncomplicated growing up. But if we keep in mind that every girl and boy is an individual, our approach to each will be sensitive and wise, making these transitional years a good deal easier.

THE ADOLESCENT'S INNER WORLD

By Tatyana Malkovskaya
Candidate of Science (Education)

What kind of person is the adolescent? What interests him? Whom does he admire? What bothers him? What goals does he set himself? What are his dreams, and does he believe they will come true? The scholars of the Herzen Pedagogical Institute in Leningrad are probing the adolescent's inner world. Tatyana Malkovskaya, assistant professor in the Institute's General Educational Science division, describes some aspects of this research.

THE DEVELOPMENT of the adolescent's personality has long interested psychologists and sociologists alike. We might call the period of adolescence a sort of second birth, when young people concentrate on knowing themselves and analyzing their relations with others, when they think for the first time about the meaning of life, develop their system of moral values and search for their place in the world.

For 12 years the institute has been making a study of the adolescent's outlook. We have examined the tastes, needs and interests of 5,000 senior students in the Leningrad schools, using their compositions, answers to questionnaires and talks with us as data.

What interests adolescents most? Their answers to this question fall into four groups. Obligations as a citizen, including the military and labor exploits of their elders, interest 87 per cent of those questioned; moral and cultural values (the meaning of life, the importance of knowledge, the role of literature and the arts in the development of personality, ethical problems), 92 per cent; choice of career, 99 per cent; understanding other people and their behavior (relations with others, attitude toward teachers and young people of the same age, problems of love and friendship), 65 per cent.

Generally speaking, all these problems intermingle and overlap in the seniors' lively compositions and discussions, but the emphasis is clear enough —our young people searching for their place in life demand activity that will be socially useful.

Galya Komarova, an eighth grader at Leningrad School No. 321, is typical. This is what she says: "So many problems interest and even torment me. For instance, what was I born for—what's the purpose of existence? The answer to this question has been clear to me since I was a child—to be useful to people. But how? In some routine job? Or by some heroic act, perhaps?"

They Died So That We Could Live

The adolescents' interest in grand exploits is manifested, first of all, in their efforts to understand the sources of heroism, in their comparisons of the heroic exploits in literature, the films and on the stage with those they learn about from eyewitnesses. Though the Great Patriotic War of 1941-1945 took place three decades ago, it is still inspiring teenagers. This, for example, is from a composition by Lyudmila Khmelnitskaya, a tenth grader, who visited the Piskaryov Memorial Cemetery, where those who defended Leningrad are buried.

"The marble slabs are covered with snowdrops. I can read the inscriptions through the tender green net of flowers. Those who are buried here were 20 years old, only five years older than I. Young, gay and witty, almost as young as we are now, they died rather than surrender.

"I think that the most terrible thing is to die clearly realizing that very soon, in a couple of minutes, you will be no more. Each of them had dreams, desires and plans. They wanted to live as much as we do, and they died so that we could live. I feel a tremendous responsibility to those who died for our socialist motherland, for the life you and I now live."

"Our soldiers performed a great revolutionary exploit," Andrei Mirsky wrote in his graduation composition. "They saved the peoples of different countries from the Hitlerite plague. This principle of internationalism is sacred to us: We are always ready to stretch out the hand of friendship and assistance to any nation fighting for its freedom and independence."

Why Do They Join the YCL?

The Leninist Young Communist League admits to membership young people 14 and over. Almost all seniors apply, in many cases explaining that they wish to be in the same youth organization of which the famous heroes of the past, romantic personalities, were members.

When adolescents join the YCL, their development as citizens is accelerated—they begin to appreciate their responsibility not only to their parents, teachers and friends but to the whole of society. They become more interested in the political life of their own and other countries—98.6 per cent of those in our study showed some knowledge of domestic and international affairs. Their sources of information are newspapers (95 per cent), radio broadcasts (85.4 per cent), political programs on TV (75 per cent) and political magazines (47 per cent). For explanations of political news they go to their teachers (one out of every two), parents (one out of every three)

and their friends of the same age (one out of every five).

YCL activities at schools are based on comradeship, friendship. These relations are developed and tested in community activity. YCLers help those who fall behind in their studies, assist the teachers councils. For example, together with the teachers, the members of the YCL committee of School No. 397 in Leningrad keep track of their fellow students' progress in school. The reports they make at the teachers council meetings are always very concrete and principled. This joint activity gives them a sense of independence in tackling problems out in the world and at the same time a feeling of ownership in the school.

There are other forms of community work—participating in hobby clubs and sports, leading Young Pioneer groups, planning trips. All this enlarges the adolescents' contact with other people, teaches them how to organize activities and how to be socially useful.

Seniors speak with special enthusiasm about the youth summer camps, where recreation is combined with work on construction sites or at a collective farm. "What made you go?" we asked 300 Leningrad teenagers who had just come back from such a camp. "We wanted to do something tangible for our country," 50 per cent of them answered.

Searching for the Meaning of Life

The data gathered from Leningrad students in the last 10 years show that 90 per cent of the seniors have definite ideas about how they want to live. Most of them think in terms of self-improvement, continued study, creative work, an interesting and meaningful life.

Almost all of them, in one way or another, relate their personal plans to the nation's. "My country is building the bright edifice of communism. My friends and I believe that the purpose of our life is to do everything we can to bring this glorious future closer," Kolya Sviridov, an eighth grader, writes.

Most of the young people are confident that their plans are realistic.

Interest in Learning

In analyzing and appraising the world around them, the seniors proceed from certain moral standards they have adopted.

"I have never felt more grownup than now," Fyodor Prokhorov, an eighth grader, says. "I realize with satisfaction that I am not just listening, looking or reading. I can tell the bad from the good, the sincere from the false, the useless from the useful. I am able to evaluate other people's behavior and, what is more important, my own."

Seniors are quick to find answers to the provocative questions. Eighty-seven per cent of the 5,000 thought it was a book that first sparked their interest in man's inner world, in the nature of human relations. About 50 per cent regard literature as the textbook for life. They believe that their understanding of concepts like unselfishness, love and friendship is largely the result of their reading experiences.

Adolescents are interested in the problems still unsolved by science, in fields of knowledge they know little about (such disparate areas as the cultures of ancient peoples, oratory, the secrets of the folk artist's skill).

Studying the fundamentals of science, the seniors learn about major discoveries in different areas and about the courage these discoveries involved. The pioneers in various fields take on a romantic aura for them, and they name distinguished scientists they want to emulate. Their heroes are such luminaries of Russian science as Mikhail Lomonosov, Konstantin Tsiolkovsky, Dmitri Mendeleyev, Ivan Pavlov, Igor Kurchatov and Sergei Korolyov. They appreciate the splendid attributes of these men—their readiness to sacrifice themselves for science, their purposefulness, foresight, persistence, will power, love of work and, most important, their struggle for progress and their refusal to tolerate apathy and indifference.

Children and Parents

Those who are close to adolescents, their parents primarily, have a great influence on their development. We compared our data for 1961 and 1973 and discovered a significant trend: Seniors more and more want to be like their parents and are trying to develop the qualities of their mothers and fathers.

What do the adolescents appreciate in their parents?

	1961	1973
	Per Cent	
Love of motherland	20.1	25.4
Dedication to their work	19.9	21.6
Consideration for people	15.3	17.0
High principles	6.7	6.7
Kind and understanding attitude toward their children	10.0	10.0
Love for each other	3.0	6.0

It is easy to see that adolescents do not make much of their parents' attitude toward them. They do not regard parental care and affection as anything unusual—it's taken for granted. They are much more interested in their parents' attitude toward society, their work and the people around them.

Anatoli Lunacharsky, the first People's Commissar of Education of the Soviet Republic, once said that the education of a happy man was that of a collectivist. A man has to understand that to make himself happy and to make other people happy, he must realize all his potentialities.

What was a look into the future in the twenties is becoming more and more the real meaning of life today. The inner world of our adolescents is proof of this.

PROBLEM CHILDREN

By Lyudmila Ivanova

WE ARE in the juvenile delinquent room at militia headquarters in a district of Moscow. A three-year-old who got lost in a department store is sitting in a corner. He is still sobbing, but he's beginning to cast sidelong glances at a brightly colored hobbyhorse. In another corner a disheveled youngster is looking up at the ceiling with affected nonchalance (he was caught red-handed in the same store cutting off telephone receivers). In charge here is senior inspector Tamara Ganina, an educator by training.

Any number of innocents come Tamara's way: lost youngsters, third graders who ran away to sea or to the Indians, a dedicated 10-year-old dog lover or pigeon fancier brought in by a cranky neighbor ("He picked up a stray pup, and it whines all night. The walls are thin, and I can't get any sleep."). There are a good many such cases, and Tamara handles them efficiently and with a smile, finding a way to the heart of the Indian, who chose the life of a vagabond, and his bawling companion, who was talked into it.

But it's much more complicated with the centaurs—that's what the inspector calls the real juvenile delinquents.

"That's a perfect name for them," says Tamara. "A youngster at that age is sometimes two people in one—the first social, the second hostile and aggressive. It's our job to help him become an integrated human being.

"Our primary function is to prevent adolescents from breaking the law. Of course, crimes are committed and we have to deal with them, but our major effort is directed toward prevention."

"And how is this prevention accomplished?"

"Cooperation is the key. The militia is concerned with problem children—I would even say not the militia as much as the City Soviet of Working People's Deputies (it has a special committee for juvenile affairs), the schools, and the party and Young Communist League organizations.

Every militia juvenile delinquent room, like this one, has a volunteer council. Ours is made up of highly respected people—a well-known athlete, an honored worker, a popular actor, for example. The friendship of a person like that with a teenager can do wonders. Take the Molniya teen club in a district near here. It's headed by Lev Yashin, former goalkeeper of the national soccer team. You can imagine how the teenagers feel about him.

"In 1970 we ran a citywide drive called Adolescent. Hundreds of YCL activists called at the homes of teenagers who were registered with the juvenile delinquent room, visited secondary and

vocational training schools and factories, checked on the activities of patrons, clubs, hobby groups and sports schools.

"Teachers were assigned to get to know teenagers whose lives were not running smoothly (school dropouts, children whose parents didn't get along, and the like).

"Frequently the adult would become the youngster's closest friend, an authority figure he could look up to."

"We're speaking of prevention, but what is the actual incidence of juvenile lawbreaking? What's the most common offense in your precinct?" I asked.

"Ours in particular? As a matter of fact, all the districts in Moscow are alike: We have no such thing as poor and rich areas, so our precinct is typical.

"Here, for instance, is a listing of a single day's offenses: Igor Nikolayev, 16—a fight causing bodily injuries; Pyotr Ivanov, 17—theft. Really, 80 per cent of what we term lawbreaking is petty crime. That, by the way, is consistent with the statistics for the country as a whole. In the three years I've been with the militia, not a single case of manslaughter was registered with our precinct. Not one armed robbery. You know, of course, that the sale of arms is prohibited by law, so we have practically no cases of armed robbery. I might add this: Juvenile delinquency throughout the country is half what it was in the prewar period (1940). That doesn't mean we're sitting back and relaxing; we'd like to get rid of even petty hooliganism and just plain discourteous behavior."

Militia lieutenant Tamara Ganina works with juvenile delinquents in Moscow.

"This nice boy from a good family cost me many a sleepless night," says the lieutenant. She is in charge of the children's room at a militia station.

These older offenders aren't very easy to handle either. But once Tamara, an educator by training, finds a point of contact, her job is at least half done.

In the complex process of shaping character, we often fail to consider the youngster's own motivations. There is a period in his development when he eagerly looks to authority, seeks his place in life and among his peers. Movies, television, books and the street he walks on stimulate and also confuse him. He is looking for standards.

In the eyes of a youngster, a coach walks around with a halo shimmering above his head. He knows the answer to any question. But is the coach ready for discussions on ethics? Will the child get a thoughtful response when something bothers him? Too often this mentor cannot spare the time. In the unending succession of competitions and trips, it is easy for him to forget that a personality is being shaped and guidance is very much needed.

We Young Communist League members of Akademgorodok, the Siberian science center, decided to see how we could help fill the breach. To be specific, we tried, within the four walls of a children's sports school, to give them the values they were seeking, through a program of activities both physical and cultural in nature.

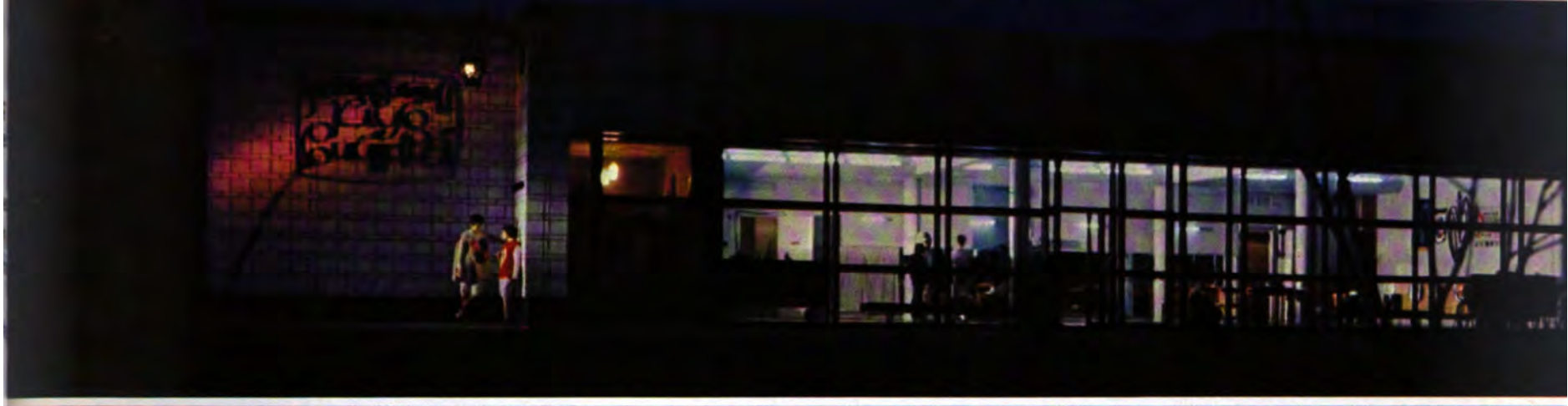
The idea of creating a children's fencing club was enthusiastically received. And really, who could object to a club where the children would get lessons in French and rhythmics, listen to music, attend lectures on the history of literature and the country, as well as learn how to fence?

We were given great credit for our generous impulse although people thought it was too good to be true. However, when we announced our opening in the local newspaper and several hundred children registered at the club, the public's attitude changed. Children responded not only from Akademgorodok, but from all of Novosibirsk and its other suburbs. Our club was housed in two new schools. The children themselves gave the rooms a thorough cleaning, put everything in order and began to learn the elements of fencing, polishing up their martial profiles even though they had no foils.

Pavel Kondratenko agreed to coach our boys, in spite of the fact that he had his hands full at the adults club. The children gave him a noisy welcome; they took to this friendly, cheerful man right away. In the coldest weather he would travel from the outskirts of Novosibirsk to the center of the city, then come 20 miles by bus to Akademgorodok. He would burst into the club all covered with hoarfrost and unable to utter a word. Ten minutes later, sufficiently thawed out, he would run into the hall calling, "Hello, young musketeers!"

We believed in our success, in victory,

The Victory Club on parade. Top: Besides fencing, members study martial history.



We are musketeers

By Karem Rash
President of the Board of the
Victory Fencing Club
Photographs by Yevgeni Sakk

and so we called our club Victory. A month after the opening, Academician Mikhail Lavrentyev, honorary president of the club, signed an order for the May Day demonstration: "The musketeers are to come in sports uniform and wear swords." That May Day morning our white column, with sparkling blades, headed up the parade. With their rapiers held high, the children marched past the stands, proud to represent their club.

They threw out the words group and monitor as being colorless and without spirit, and the detachments took heroic names: d'Artagnan, Cyrano de Bergerac, Robin Hood, Oleko Dundich (in honor of the famed hero of the Civil War), Peresvet (after the legendary Russian warrior of the fourteenth century). Each detachment chose its captain and herald. The latter keeps a record of everything the detachment does. A board composed of the best captains is responsible for all the club activities; it elects a president and

Those who make the grade—in fencing, in their schoolwork—and meet the club's very stringent code of honor are sworn in as musketeers. Opposite page: Group match and a rooters bench. Bottom: The modern day version of the musketeer's trusty steed.

meets every Sunday. Only those who have been initiated as musketeers are full-fledged members. The choice of candidates for initiation is the prerogative of the Board of Captains.

Initiation into the musketeers is everyone's goal, but the road to it is thorny. A musketeer has the right to wear the club badge, a personal foil and a cloak with a golden V. To earn all this, you must not only get a rating in fencing, but

keep it for a whole year. You also must do well at school, observe the honor code to the letter and be sponsored by two musketeer seconds. Neither the coach nor the president may expel a club member—this is the exclusive province of the Board of Captains.

The tenth rule in the musketeer code of honor is also the musketeers' oath, which is taken by all initiates. "I solemnly pledge to cherish, respect and protect my name, the reputation of my coach, the colors of my society and the banner of my country."

The day we organized our club, the boys filled out a questionnaire, which we had drawn up with the help of Akademgorodok sociologists. The answers to 20 questions gave us an idea of the youngsters' characters, their interests, their ambitions and abilities. They didn't disappoint us. What we found was insistence on the truth, a freshness of perception and an uncommon curiosity. The answers to one question "What traits of character would you like to develop?" were almost uniform: integrity, will power, courage, fairness.

But the best of questionnaires has its limitations—we had to have direct contact with the boys. None of us were professional teachers. With professors from Novosibirsk University, long before the first training session, we worked out an educational program to run for several years. We did our best to make it absorbing, instructive and still not duplicate what the children got at school. Instead of inspirational lectures, we decided to have talks and discussions. The goal of the program, which emphasized the ethical and cultural, was a rounded, harmonious human being. Not athletic prowess, but moral development was what we were after.

Fencing, of course, was not forgotten. A whole code has grown up around it, perhaps, more so than with any other sport. The symbol of the romantic combat weapon fits easily into the boyish imagination, meets the need for self-assertion.

It's true, there was a moment when fencing swayed on its pedestal. At the sports camp our boys got into a passionate argument with other boys—boxers and wrestlers—who extolled the bouts in the ring and on the mat and made fun of knights of the sword. The slender musketeers looked at the mighty biceps of their opponents, and some of them considered dropping out of the club. Not many, but enough to make us anxious. We decided to bolster the weakened position of our fencers. Our patrons, the students of Novosibirsk, agreed to lead a class in boxing and wrestling. Our members lost their apologetic stance.

The club is now five years old. It has cycling and skiing facilities available. Our quarters, besides the fencing hall, house a music room, a library and classrooms for gymnastics and body movement.

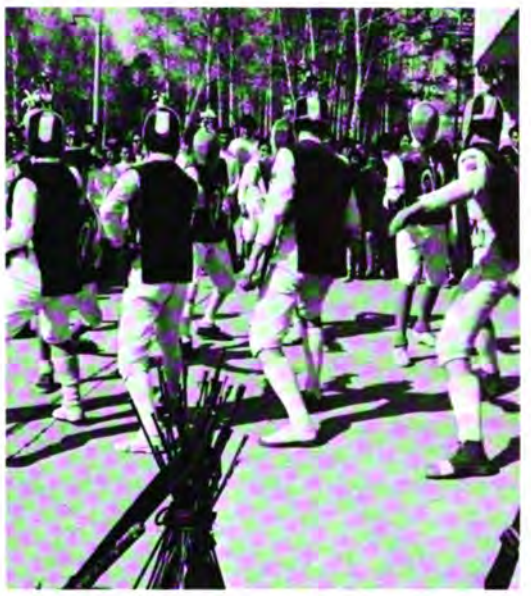
The Victory Club has regular contact with the parents and teachers of all its members. It is financed by the YCL and includes a strong YCL group. Over the years, the romanticized pedagogical idea we started with has materialized into a full-fledged children's sports school. Some of our former members have made the USSR fencing team. And of the 10 young people who organized the club, eight now are Candidates of Science.

The experience of our group is no longer a unique one—similar children's sports schools are being set up in Kharkov, Leningrad, Yakutsk and a number of other cities. And we are developing a system out of our experience which can be applied to other sports.

The school has a responsibility to nurture in youngsters the desire to achieve by opening up new horizons, by teaching them purposefulness and persistence. In 1971 we sent 50 of our musketeers to the world championship in Minsk—not to participate, of course, but to get the feel of the big victories.

From the point of view of education, ours is a club not for children, but of them. The dominating concepts are self-government and self-education. All the club's activity is built on the initiative of the children.

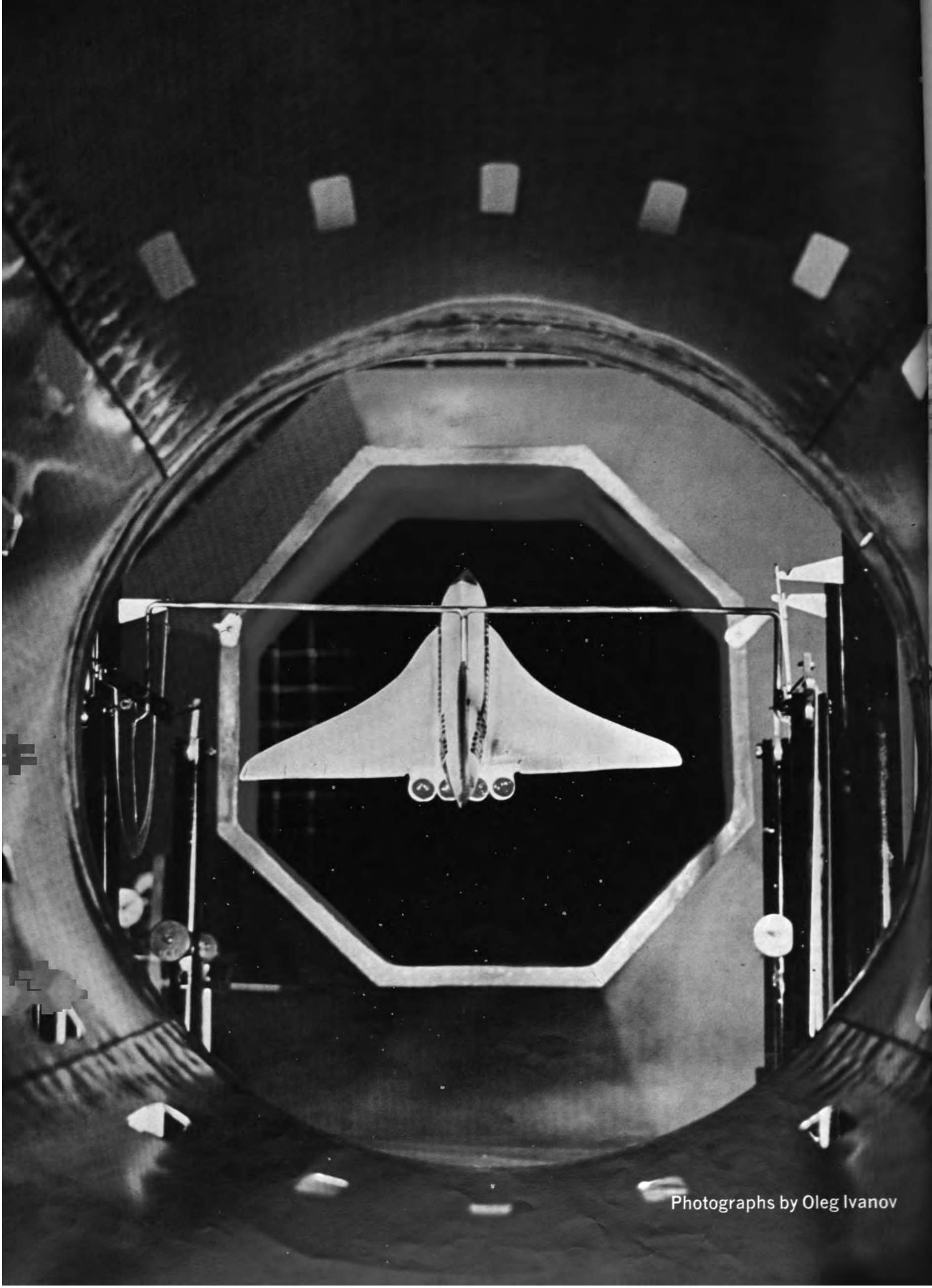
That goes for patriotic education as well. We used to salute the heroes of Alexandre Dumas; that was paying homage to the romance of one's childhood. We focus now, in our ceremonies, on the history of our country. For instance, we have three traditional annual competitions. In March there is a tournament dedicated to the victory of the citizens of Novgorod over the crusaders, on Lake Chudskoye in 1242. In May, a tournament memorializing the Siberians who fell on the fronts of the Great Patriotic War of 1941-1945. In September, a tournament in memory of the Battle of Kulikovo (1380), in which the Russians inflicted a decisive defeat on the Tatars.



These competitions are organized by the children themselves, and the rules are strict—our musketeers insisted on it. They know that once something difficult is learned, applying it is no particular problem.

There is no question that first-class sportsmen will emerge from our club, but —it bears repeating—it is their character, not their records and their medals, that is our real concern.

Courtesy of the magazine *Smena*



Photographs by Oleg Ivanov

After the first test flight, December 31, 1968. Opposite page: This early model of the TU-144 is now a visual aid in aerodynamics classes at the Voronezh aviation school.

SOVIET SUPERSONIC PASSENGER PLANE:

PRODUCTION UNDER WAY

Correspondent Arkadi Simonyan reports from the Voronezh Aircraft Plant, where the TU-144 supersonic passenger plane is in production. The newest Soviet jetliner will attain speeds of more than 1500 miles per hour.

MANY of the planes designed by Academician Andrei Tupolev were built right here," I was told by Boris Danilov, Hero of Socialist Labor and manager of the Voronezh Aircraft Plant. "Way back before the war a Tupolev plane built here in Voronezh flew non-stop to America across the North Pole."

The jetliner era in civil aviation began with the TU-104. It was followed by the TU-114, TU-124, TU-134 and TU-154. Now, with the TU-144 we can fly at supersonic speeds of more than 1500 miles per hour. It will bring people all over the USSR close to each other. An 1800- to 3,000-mile flight will be like a train ride to the suburbs.

The TU-144 presented metallurgists, engineers, electronics experts, navigators, technologists and production managers with new problems.

In flight the skin of a supersonic aircraft heats up to 265-300 degrees Fahrenheit. The fuselage has to withstand a pressure of more than 1,640 pounds per

The Tupelovs, father and son. Andrei Tupelov (1888-1972) helped shape an entire epoch in Soviet aircraft design. Alexei is chief designer of the supersonic TU-144.

square foot. Supersonic flight demands foolproof automatic and manual navigation and control systems, each completely independent of the other.

New titanium and aluminum alloys had to be developed for parts and even whole sections of the plane. A new method of precision vacuum casting produces thin-walled parts of various shapes that require almost no additional mechanical finishing.

Mass production of the TU-144 called for a number of organizational and technical changes. Intensive professional and psychological preparation of the staff was necessary.

Production is well under way, Danilov went on to say. Plant engineers and test pilots are working closely with the designers group headed by Alexei Tupolev, son of the late Andrei Tupolev.

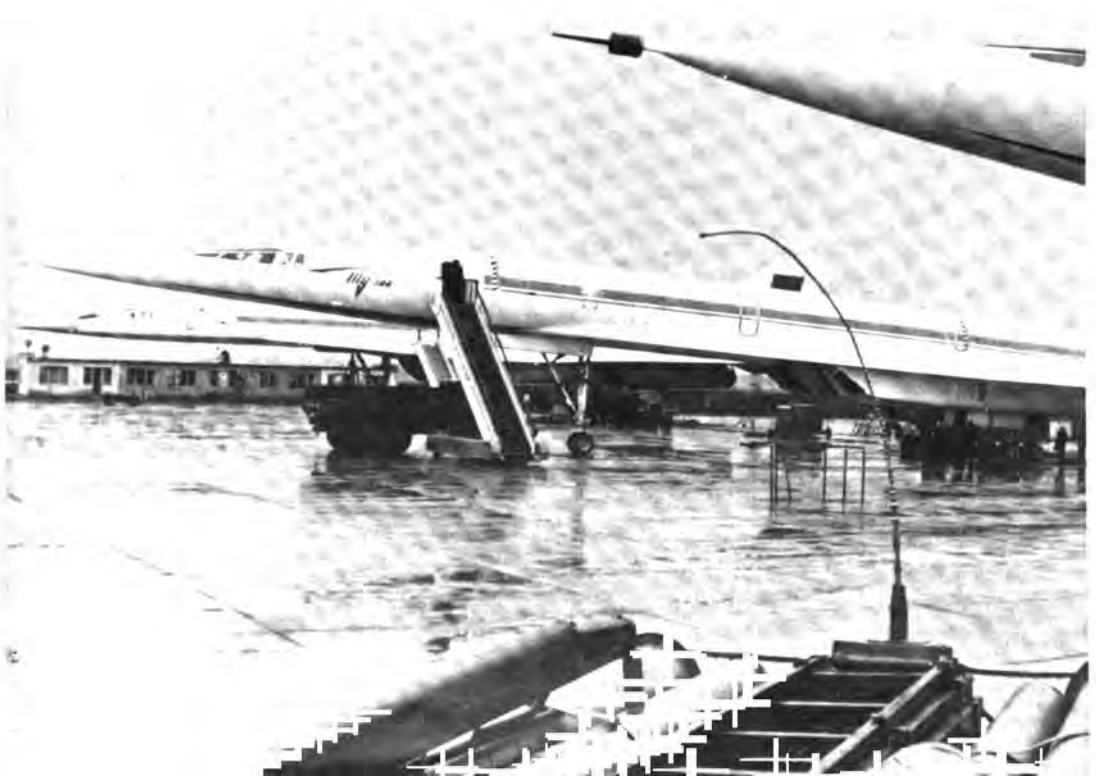
The plant itself, with its light-filled working areas, the white and blue overalls, the snow-white gloves, has the look of a modern academic laboratory. But the standard machine parts, the neatly stacked aluminum and titanium plates, the bright red and yellow traveling cranes and the modern machine tools tell us that planes are in mass production here.

The TU-144 has a number of unique features. Its panels are joined with a variance of a few ten-millionths of an inch. To achieve this precision, to plan the delivery of materials, movement of parts, assembly and quality inspection, computers are indispensable. The plant built its own information and computing center, which receives all the required data from the main sections, processes them instantly and recommends optimum production methods.

But neither electronics nor automation, however perfect, can replace the human element. Although manual operations have been reduced to a minimum, skilled programmers, mechanics and experts in the thermal and galvanochemical treatment of metal are still essential. The typical staff member at the TU-144 plant studied at an aviation or polytechnical school in Voronezh, or a university in Kazan or Moscow, and is about 30 to 32 years old.

Opposite page: The big supersonic plane in production. This is about midway in the final assembly line at the Voronezh Aircraft Plant.

The manufacture of the TU-144 necessitated changes in technology and a specially trained staff. The plane's panels are assembled with a variation of a few ten-millionths of an inch. Note the elegant lines.



By Pyotr Neporozhny
USSR Minister of Power and Electrification

SOVIET-AMERICAN COOPERATION IN POWER ENGINEERING

POWER is the backbone of modern industry. The power available per worker is a measure of a country's technical level of production, and the spread of electrification is an indication of its economic potential. It is not fortuitous that the USA and the Soviet Union, the two most powerful industrial states, also generate the largest volume of electricity. Cooperation between our countries has improved as a result of the visit of the President of the United States to the Soviet Union in 1972 and CPSU General Secretary Brezhnev's visit to the United States in June 1973, facilitating closer relations in power engineering as well.

In the last half of 1972 a group of American power experts traveled to the Soviet Union to see our high-voltage transmission lines. Soviet scientists and engineers made a return visit to the USA for the same purpose. American firms are now showing greater interest in our power equipment. Detroit Edison Company, for instance, bought a large power transformer from us.

Last October the Joint Soviet-American Working Group on Electric Power held its first meeting in Moscow. At this conference the two sides coordinated the major directions of power engineering cooperation for the next several years. They include the exchange of information and technical documentation; reciprocal visits by individual experts and groups; bilateral working conferences, seminars and the like; and, finally, joint and parallel development projects.

As outlined by the Soviet-U.S. Joint Commission on Scientific and Technical Cooperation at its March session, these are the main areas for pooled effort:

the design and operation of thermal and hydroelectric power stations;

the development of systems to protect the atmosphere from pollution by the noxious wastes from heat and power plants;

A.C. and D.C. superhigh voltage transmission;

the use of solar power.

These are areas in which both the United States and the Soviet Union have gathered a significant body of experience.

In both countries more than 80 per cent of the electricity is generated by thermal stations. That will probably hold for the immediate future as well. More economical operation of these stations is quite obviously of prime importance. This can be done by increasing per unit and station capacities and by converting to higher steam parameters, which will cut per unit investment and per unit consumption of fuel. There is already serious concern about limited fuel resources.

The USA has started operation of units with capacities of one million kilowatts and more incorporating boiler, turbine, generator and transformer. In the Ukraine we have two units of 800,000 kilowatts each, with twin-shaft and close-coupled turbines operating at supercritical steam pressures. In the next decade we plan to set up the first close-coupled turbine units of 1.2 million kilowatts. In short, there is a very wide field for cooperation here.

Both our countries have a record of achievement in constructing hydroelectric power stations. For a long time Boulder Dam was considered the peak engineering project, but today the world's biggest generating units, 12 with capacities of 500,000 kilowatts each, are in operation at the Krasnoyarsk station in the Soviet Union. In the near future 640,000-kilowatt units will be mounted at the Sayano-Shushenskaya project currently in construction. We have something to share in this field as well.

Because of the growing capacities of thermal and atomic power plants, the water supply is becoming crucial. To have large units operate dependably and effectively, whole rivers have to be channeled into turbine condensers. Then these masses of water have to be cooled. The discharge of hot wastewater pollutes the environment. Rows of cooling towers of increasing complexity and cost have to be built. If we could evolve an economically acceptable solution, with more sophisticated, preferably closed, heat exchange systems, we could make very considerable savings.

An average 350,000-kilowatt heat and power plant working on fuels with a sulfur content discharges about 75 tons of acrid sulfurous anhydride plus another five tons of ash into the atmosphere every 24 hours. Power experts are now studying ways and means of cutting down air pollution by preheating fuel. However, the installations devised are still very cumbersome and costly. We hope Soviet-American cooperation will come up with the optimum solution. We must also devise methods for computing and controlling the permissible content of noxious agents in discharge gases.

Since both countries are so big territorially, electricity has to be transmitted over great distances. The greater the distance and volume of power transmitted, the higher the voltage. The Soviet Union currently operates more than 8700 miles of 500-kilovolt A.C. lines. Incidentally, the first such line was strung up in 1959, five years earlier than in the USA. In 1967, we began operating a unique 750-kilovolt line between Konakovo and Moscow. Another such line, 930 miles long, is now going up. Similar work is being done in the United States.

Of late there has been an increasing interest in D.C. lines, which can transmit more power with minimal loss although they present more difficulty in tapping electricity en route. We in the Soviet Union have built the world's first such line. A 1500-mile line is in the design stage.

Soviet power engineers have amassed considerable experience in the development of large power grids. We have 11 in the Soviet Union, eight of which have already been integrated into a unified grid. Our experts also contributed signally to the design of the Peace Grid, which integrates the power systems of the member countries of the Council for Mutual Economic Assistance.

We admire the work of our American colleagues in this field, especially in the computerized design and control of power systems. The principles of mathematical modeling involved, programs providing the most rational systems of power station operation, and a knowledge of each other's dispatcher services are all promising fields for cooperation.

A number of the projects involve scientific and technical problems of exceptional interest, on which a great deal of work has yet to be done.

Since power, chiefly electricity, consumption is swiftly mounting—doubling with every decade at present rates—the time will obviously come when even superhigh voltage lines will prove inadequate. Besides, we cannot raise the voltage carried endlessly because the insulating properties of air are limited. One way out is superconductivity: At very low temperatures approximating absolute zero some substances lose all electrical resistance. This means that, in theory, we can transmit the power of an entire grid along just one cable.

With no room here to analyze the scientific and technical aspects of the problem, I shall merely note that in principle we can manufacture such cables. Work along those lines is being done both here and in the United States. Coordination of research and exchange of information would be very helpful indeed.

The same is true of large magnetohydrodynamic power stations. In their generators the fuel burnt is converted directly into electricity, and with a very high efficiency factor of 50 to 60 per cent instead of the 40 to 42 per cent that we get at conventional thermal stations. Experimental MHD installations have been operating for a number of years in both countries; the Soviet Union has a 25,000-kilowatt generator. Joint work would expedite commercially exploitable projects and save scores of millions of tons of fuel.

Far more problematical at present are the practical uses of solar energy and subterranean heat. But if scientists and engineers were successful, the results would be immeasurably valuable. No wonder both sides believe cooperation in this area desirable.

Thus far, Soviet and American power experts are taking only the first steps in cooperation. The scale, however, seems large enough. On the Soviet side some 20 big enterprises and institutions are invited to work on the problems chosen for cooperation. The Soviet side will honor its commitments and expects the American side will also. Our cooperation has no ulterior motives. Its purpose, as was indicated in the joint documents adopted, is to pool efforts in crucial fields with a view to expediting scientific and technological progress for the benefit of both countries and all the rest of the world.

Fyodor Ovchinnikov, director of the Novo-Voronezh atomic power station, shows a group of American power specialists around.

american power specialists' visit

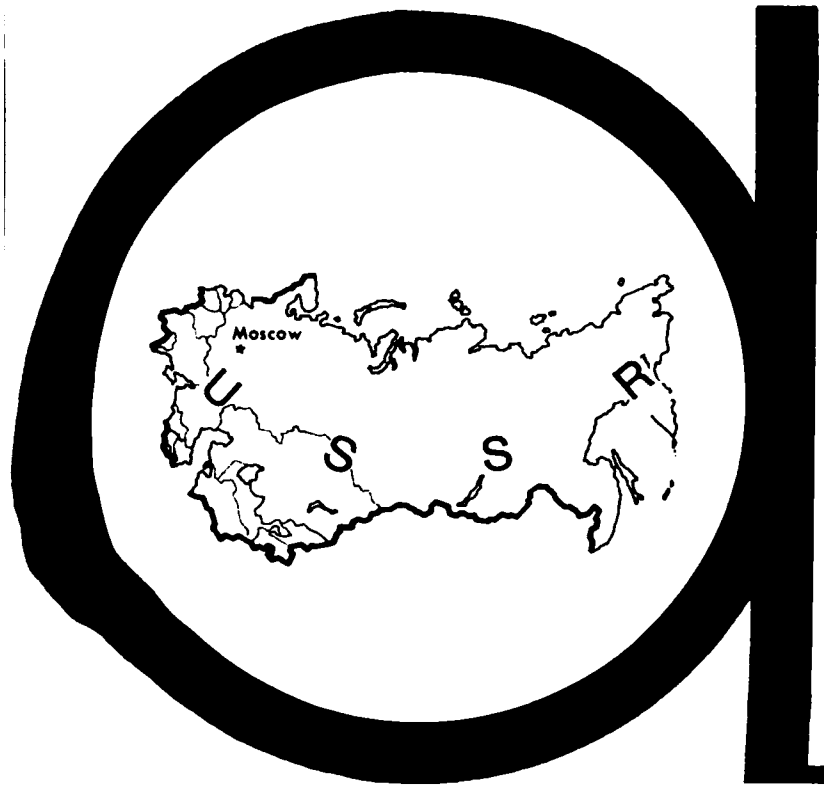
AMERICAN power specialists visited the USSR from June 10 to 20, 1973. Led by Donham Crawford, president, Edison Electric Institute, New York, the delegation included Donald C. Lutken, president, Mississippi Power and Light Company, Florida; Wendell Kelley, president, Illinois Power Company; Gregory S. Vassell, assistant vice president, American Electric Power Service Corporation, New York; William Kuhns, president, General Public Utilities Corporation, New York; John Hayward, chief engineer, New England Electric System, Massachusetts; Vincent Boyer, vice president, Philadelphia Electric Company, Pennsylvania; Earl Dille, executive vice president, Union Electric Company, Missouri; Floyd R. Smith, vice president, Gulf States Utilities Company, Texas; and E. F. Thomas, director of Power Production, Tennessee Valley Authority.

The American visitors were shown through various research institutions in Moscow, the Konakovo thermal power station, the Leningrad metal engineering plant that manufactures steam and hydraulic turbines, the Leningrad Elektrosila plant, which specializes in the production of electric generators, the Slavyanskaya thermal power station in Leningrad, with Europe's largest units of 800,000 kilowatts each, and the city of Voronezh with its famous Novo-Voronezh atomic power station, one of the largest in Europe.

They found the visit to the Novo-Voronezh atomic power station most interesting. Director Fyodor Ovchinnikov and construction chief Dmitri Prozorovsky, State Prize winner, showed them around. The friendly and businesslike talks touched on common power-engineering problems: the safe operation of steam generators, reactor protection systems, radioactive waste disposal and the like.

The Soviet and American specialists agreed that the visit and the exchange of views had been most useful and expressed the hope that cooperation of scientists of the two countries in the peaceful uses of atomic energy would develop and grow.

Around the Country



TWENTY-FIVE YEARS OF MARINE RESEARCH

It is a quarter-century since the research ship *Vityaz* put out to sea on her first expedition.

During that period the *Vityaz* has made 54 voyages and covered about 600,000 nautical miles —the equivalent of circling the globe 28 times. Participants in the work have included staff members of 65 Soviet institutes and universities and their counterparts from 14 foreign countries.

The *Vityaz* expeditions have discovered at depths of more than 33,000 feet a new class of Pogonophora which includes more than 10 species. It was thought previously that the ocean could not sustain living organisms below 20,000 feet. The echograms obtained during the voyages have made possible significant modifications in the relief map of the Pacific and the Indian ocean beds. Undersea mountain ranges, vast valleys and deep faults have been discovered by the *Vityaz*. More than 40 underwater mountains and a number of new depths have been spotted and mapped. An example is the 36,160-foot depth in the Marian Fault, the maximum thus far registered.

A NATURAL MUSEUM

A team of speleologists from Vladivostok in the Soviet Far East recently spent 160 underground. They explor Giant and White palaces, th largest and most scenic ca southern Primorye Region. than 50 caves have been in this area. The most recent covered turned out to b table museum of pa specimens: It hel a mammoth, a hyena.

GREEN BELT

A plan has been appro to develop a forest-p protective zone around Mosc The green belt will be an portant source of clean air.

It will also prevent the capi from sprawling out to merge w the 11 cities around it, from coming a huge congested a like so many other large cit

MAGNETIC FIELD BOOSTS CROP

Using a simple generator, Georgian scientists have designed a unit for treating seeds, before they are sown, in a magnetic field. The result is an increase in the yield of various farm crops averaging 15 per cent and more. For example, an the Zhemchuzhny State Farm in the Soviet Far East, the average productivity of magnetized seeds was 3,240 pounds per acre as against 2,640 far nonmagnetized varieties.

Anather invention by the Georgian scientists; a method of applying mineral fertilizer to the seeds, complements the first. Fertilizer in powder form is mixed with the seeds and, in a magnetic field, penetrates their outer layer.

Where 220 pounds of fertilizer was conventionally used for every 550 pounds of wheat seed, with the method suggested by the Georgian scientists, 1¾ to 2 pounds is sufficient. The difference in yield between the treated and untreated seeds can be as high as 27 per cent.

NEW CARBON

Moscow scientists have isolated a new crystalline form of carbon. It has been named carbine.

Until recently it was thought that there were only two crystalline forms of the element—diamond and graphite. This third type was derived synthetically from acetylene during investigations of new polymers.

Carbine is a black, powdery substance differentiated by the chain structure of its molecules. It has a much greater thermodynamic stability than graphite.

OIL IN THE ARCTIC

Fountains of oil are now gus ing at the new Salyukin d posit discovered right at the Ar tic Circle in the northeast Eur pean part of the country. Th first well is producing more tha 5,000 barrels of high-quality ligh oil a day.

Five more wells are to be sun

BLUE STADIUM

Serebryany Bor, a port on the Moscow River near the capital, has a rowing channel 7500 feet long and 410 feet wide.

The new installation might be called a water stadium. It does, in fact, resemble the oval of a race track, except that it is blue. The channel is divided in half by a green island, so that rowers can make a full circle and return to the starting point without interfering with the movement of oncoming boats.

Stands accommodating 3400 spectators line the course, and high above it rises a referee tower, complete with television equipment.

Directly behind the stands is a press building that contains an international telephone station, a teletype room and a telegraph and post office. On another floor are an automatic telephone exchange, a clinic and other services.

The new stodium was first used in August 1973 for the European rowing championship.

STAMP ISSUE

The Soviet Union has issued two new series of stamps. The first is a block dedicated to the tenth anniversary of the flight by Valentina Nikolayeva-Tereshkova, the world's first—and thus far only—woman cosmonaut.

The second consists of four stamps and a block devoted the 1973 World Student Game

The Nikolayeva-Tereshkova s ries includes three designs: the co monaut in a spoce suit, with he doughter and at on internationc meeting.

The series commemorating th World Student Games pictures different events in which 4,00 young athletes competed in Mos cow.

EXHIBIT OF U.S. BOOKS

The USSR Library of Foreig Literature recently held an ex hibit titled Books from the Unite States. Over 800 items from th library's collection were on dis play, reflecting America's econ omy, science, technology and cul ture.

A large section was devoted t books by American writers pub lished in the Soviet Union.

GAGAUZ NATIONAL LANGUAGE

A new book of poems entitled *A Man's Day* by poet Dumisi Tanasoglu has recently come off the press. The verses are in Gagauz, a language spoken by only 150,000 people.

Most of the Gagauz lived in what used to be called Bessarabia (now the Moldavian Republic) before the Revolution. They were an oppressed and economically backward people then, facing the threat of extinction.

With their liberation they acquired a written language of their own, and Gagauz writers began to publish in the native tongue. This is the seventy-fifth language of the peoples of the USSR (more than 40 had no written language before the Revolution) in which national prose and poetry are now published.

FORESTS OF THE FUTURE

The Timiryazev Agricultural Academy in Moscow is experimenting with the creation of programmed forests for the future. The goal is to grow not any trees, but specific types for such purposes as lumbering, protecting bodies of water or providing recreational areas. In each case the choice of trees, their growth technology and their distribution in an area will vary in order to take optimum advantage of climatic conditions. The first of these woodlands are planned for the Moscow region and some central areas of the country.

AIRBORNE PROSPECTING

Geologists from Komi, an autonomous republic in the Soviet Far North, are mastering a new means of mineral prospecting—gamma spectroscopy. An instrument installed in a plane picks up radiation from the mineral bed and determines the dimensions of the deposit. The Ukhta geophysical expedition is already using the technique.

FOLK ARTISTS OF THE NORTH

Over 300 works by 215 Yakut, Nenets, Khanty, Mansi and Aleut craftsmen were recently displayed at a Moscow exhibition of folk art of the Far North and Far East.

Among the exhibits were vases made of mammoth bone, on which the artist's chisel carved a Yakut epic; engravings on walrus tusks; assorted toys reflecting the life and customs of the peoples of the Far North; and panels made of deer fur.

DESALTED SEA WATER

Fresh water is in short supply all over the world. To help meet the need, a new thermochemical method of processing sea water has been developed at the Petroleum and Chemical Institute in Baku, the capital of Azerbaijan. Various chemicals and ion-exchange resins extract a considerable part of the salt content of sea water. The salts obtained are valuable, in fact they almost cover the cost of the operation.

Once processed, the sea water is suitable for industrial purposes. The Severnaya regional hydroelectric plant near Baku is already using it.

various depths. Geologists say that the gigantic Khoreiversk depression, in which the deposit lies, is a practically bottomless oil source.

A pipeline to connect the oil-bearing regions with the center of the country is now under construction 62 miles from the new deposit.

LONGEVITY IN SIBERIA

Life begins at 80, they say in Yakutia—only half in jest since the republic now has 4500 people of that age and older. More than 150 Yakutian men and women are centenarians.

All these elderly people live in settlements near the Arctic Circle. Scientific studies show that the aging process there is delayed by such natural conditions as the large number of sunny days per year and the healthful air filled with the aroma of pine and other trees.

PARK IN THE DESERT

In Shevchenko, a young city in Kazakhstan, a large green park now flourishes where there was once only desert. It was planted by the schoolchildren of Kazakhstan, assisted by children from other union republics who sent them thousands of saplings of drought-resistant trees and large quantities of flower seeds.

ACQUISITION FROM THE U.S.

Moscow's Pushkin Museum of Fine Arts has added to its collection the *Triumph of Amphitrite*, a painting by the famous French painter Raoul Dufy. The American businessman Armand Hammer was the donor.

LETTER FROM ANTIQUITY

A letter sent 2500 years ago has been presented to Leningrad's Hermitage Museum.

The lead plate rolled up into a scroll dates back to the sixth century B.C., making it the earliest ancient Greek epistle ever to be unearthed. The find was made on the shores of the Black Sea.

The letter, from a Greek named Achillodor, asks his son to settle certain problems related to the father's commercial operations. It supplies hitherto unknown information about ancient Greek society.

This rare discovery has been carefully restored and added to the Hermitage collection.

NO ICING

Regardless of temperature, there will be no snow on the 1,600 square feet Festival Street in Moscow. Until now the city has heated only the stairs of pedestrian underpasses, and some sidewalks. This is the first effort to heat whole streets.

The heating will be done by electricity. The street will be covered by an electrified metal grill, insulated with an enamel lining. Over it an asphalt paving will be laid, and over that one more grill—grounded for protection—and another layer of asphalt.

FAIRY TALE FOREST AT HOME

A visitor to the apartment of artist Victor Shveikin finds himself in a forest museum. Dead elm and mulberry trees are reincarnated in his home in Ashkhabad, Turkmenia. He has transformed roots and branches into works of art.

NEW HOME FOR RARE DEER

Khangul, which means royal flower, is the name of the Bukhara deer. There are only several hundred left on the globe, about 250 of them in Tajikistan.

A decade ago there were even fewer of these animals locally. They could be found only in the Tiger Ravine, a unique reservation in the southernmost part of the republic. And this only because their ancient hunting grounds were in impenetrable groves known as tugai. Eventually zoologists decided to move the animals to the mountains. But the deer had always been plain dwellers; nobody had ever seen them in the highlands. The first group of young deer were brought in the Tiger Ravine eight years ago. Nine of them were moved to the mountain reservation of Ramit, on the slopes of the Gissar Range. At first they lived in a specially prepared corral so that keepers could see the animals and help them adapt to the new conditions. When the deer became acclimatized, they were set free. They did not leave the mountains but stayed in the reservation area. In summer they moved to remote gorges and when winter came, went down into the valley. In time they acquired properties suitable to the new conditions: The color of their fur changed (it is now the same as the rocks around) and they learned to move quickly on steep slopes.

A recent deer "census" at Ramit counted more than 110 animals.

CITY UNDER A ROOF

Leningrad architects have completed work on the Ponui housing project. The Ponui is a small river in Western Siberia, the site of a compressor station of the Northern Gas Pipeline. Designed for the station personnel, the complex will include a housing devlopment, a kindergarten, school, restaurant, swimming pool, gymnasium, library, post office and a variety of shops. In the center of this microcity will be a winter garden. A huge transparent dome will cover the whole city to protect it from the vagaries of the weather. Similar complexes are planned for other regions of the Far North.

EARLY SMELTING CENTER

Fellow scientists call historian Otto Bader the luckiest archeologist. He has explored several dozen settlements dating back to 2000 B.C. and found highly interesting material proving the existence in the Western Urals (northeast of the European part of Russia) of one of the earliest smelting centers of the Copper-Bronze Age. It has proven to be just as rich and old as the Scandinavian center, well known in Western Europe.

In the past half-century, Bader has published dozens of books and hundreds of scientific papers on archeology and has made a large number of discoveries. At present he is trying to prove a hypothesis related to migration from Asia to America across the Bering Strait. Bader hopes to find traces of prehistoric man in the northern-most areas of the Soviet Union.

SAVING LIVES

The heart stops—and death switches on its metronome, giving physicians only five minutes to save a life. The technique they use is known as reanimation. Recently Yaroslav Kulik, a Soviet surgeon and inventor, designed a new compact reanimation apparatus consisting of an artificial ventricle and a pump with synchronizer. The surgeon places the apparatus in the heart cavity and switches on the pump, which does the work of the left ventricle. That is enough to get the right ventricle working by itself. The whole operation takes three to four minutes.

The athletes—American and Soviet—in action, and a camera's-eye view of some of the 65,000 spectators at the Minsk USA-USSR track and field meet, the eleventh in the series.

The 100-meter sprint: Galina Mitrokhina, Martha Watson, Nedezhda Besfamilnaya and Jackie Thompson.

USSR-USA TRACK AND FIELD MEET

Photographs by Yuri Ivanov and Vladimir Chistyakov

CCCP

rint. He is a potential medalist for the next ympics in the 400 meters; the sprint gives n a good basis for running a single fast lap. for other runners of this caliber, I didn't see y on the American team. Evidently their nous sprint school is undergoing a genera- n change. I'd say the biggest sensation, and very pleasant one, was the performance of ry Decker. That spurt of hers on the home etch in the 800-meter run proved that tough ining started in childhood opens up com- tely new speed limits to young runners.

"The search for top-ranking sportsmen is, course, a search for talent. I believe that

ung girls from Minsk
national dress
sented the awards.

mpic javelin
mp Janis Lusis (USSR)
Cary Feldmann
SA) talking technique.

national teams of both the Soviet Union d the United States have that kind of talent. ong the Americans I liked javelin thrower ry Feldman and jumper Mark Lutz; among Soviet athletes, Nadezhda Kolesnikova in 400 meters and Nadezhda Tkachenko in pentathlon."

Louis L. Tyrrell, producer of TV sports shows r Marvin H. Sugarman Productions, Inc., said at the communications service impressed him. e day before the match he got a connection New York from Minsk in three minutes. His lleagues, too, had good steady service. The mericans enjoyed working with Soviet cam- ramen on a telefilm of the meet. They said onditions were better than in Munich; in Minsk he judges were more accessible and not so ough: They let the cameramen shoot closeups f the most dramatic moments.

Tyrrell also said that Minsk's excellent facili- es for the meet were a pleasant surprise for e Americans.

Igor Ter-Ovanesyan, former holder of the orld long-jump record, participant in nine JSSR-USA meets, assistant senior coach of the JSSR Sports Committee:

"There were many surprises, for which some f our juniors were responsible. Gratifying, of ourse. And the Americans' showing was very ood.

"Why didn't Valeri Borzov do well in Minsk, articularly when just before, he had clocked great 20.5 seconds in the 200 meters? As I ecall, after the Munich Olympics Valeri told s that he wanted to take it easy in 1973, that e wasn't going to try for top physical fitness.

"Being a sports veteran myself, I understand im perfectly. We must remember that from 969 to 1972 Borzov took part in top-level eets without suffering a single defeat. He just ecided to take a breather, that's all.

"The post-Olympic season is for the young, or whom we are on the lookout now. Our ob today, as I see it, is to develop them so e can strengthen our weak spots tomorrow."

Bill Toomey, former holder of the world ecathlon record and television commentator or Marvin H. Sugarman Productions, Inc., thought the athletes of both countries were earning from each other and that this experience would lead to more exchange. The American system of decathlon training, he said, cedes the palm to the Soviet Union's though there are talented sportsmen in both countries.

The tournaments and championships in the Soviet Union show that it is moving in the right direction. Toomey thought it would be mutually beneficial to hold separate decathlon meets of Soviet and American athletes. If such matches did come off, he would leave television and become a coach because he is eager to train young decathlonists. His feeling was that with more contact between Soviet and American decathlonists, the top men of both countries could compete at Montreal on the 8500-point level.

Kathy Hammond, who ran in the 400-meter race, was disappointed at her showing in Minsk, it was far from her best time. She hadn't really got hold of herself, she said. Next year, under the guidance of her coach, she is going to train according to an entirely new program. She was reluctant to talk about it in any detail since she doesn't know how it will turn out, but she hopes to crack the world record.

Nadezhda Kolesnikova, Kathy's rival:

"Kathy is one sportswoman I greatly admire so that I am honestly sorry that her run in Minsk was not up to the mark. I did get myself tuned up for the struggle against Kathy, which is probably the reason I managed to do so well in the 400 meters.

"As for the world record, I hope to come closer this year to the 51.0-second limit. I would be glad if I managed to do that along with Kathy."

Rick Wohlhuter, holder of the world record in the 880 yards, runs the two classic distances—the 800 and 1500 meters—with equal ease. This time he didn't do very well. He said that it wasn't anything to be concerned about, he would give it some thought later. He feels that in general a stagger rhythm is a good idea, that it's exciting for spectators and stirs up the runners. He was all for it, he said, but that kind of running takes staying power as well as speed.

Yevgeni Arzhanov, Munich Olympics silver medalist in the 800 meters:

"The records in the sprints and the middle distances are so high now that they won't be broken easily. Record runs take powerful rivals. There was no such competition in Minsk. Perhaps because Wohlhuter has passed his peak already while I'm only approaching mine."

Ludmila Bragina, 1500 meters Olympic champion:

"Different sportswomen have different tactical plans. Some are trying to reach new heights by going right after the records, others are advancing at a slower pace, taking a rest on the way up. So far I haven't set myself a top goal, but in 1974, for the European championship, I'll be thinking about it. I expect a real struggle there in the middle and long distances. In Minsk I wanted to get into the heat with Francie Larrieu. However, she didn't take part in the 1500 but in the hors concours program, the 3,000 meters, which did not count in the scoring. She won it in good time, 9:30 flat. Next year this event will have official status at the European championship. And after that the new Olympics will be coming up."

NEXT ISSUE

The Ural Mountains stretch more than 1200 miles from north to south, dividing Europe and Asia. This richly diverse area of frozen tundra, dense forest, grassy plains and deep lakes and rivers is one of the country's leading industrial regions. It has enormous stocks of minerals, including some that were first discovered there. For a long time the Urals specialized in mining and metallurgy; its families of metal craftsmen were famous throughout the world. A group of articles describes how science and industry are expanding the region's multibranch economy.

What distinguishes Soviet television broadcasting? Which programs are most popular with the viewers? How are relations shaped between Soviet TV and the sports clubs, theater companies, film studios? Sergei Lapin, Chairman of the State Committee for Television and Radio Broadcasting, describes the range of programs offered by his agency, from news commentaries to motion pictures. A related article deals with the Central Television Youth Department, whose contest section includes talent and sports competitions. Young people produce many of the programs themselves, at schools and clubs.

The Moscow School of Choreography, which recently celebrated its bicentennial, offers ballet training plus a full range of academic subjects for girls and boys between the ages of seven and seventeen. Many of its graduates are members of the Bolshoi ballet company, the school's sponsor. The faculty includes such famous ballet masters as Pyotr Pestov, whose pupil Vyacheslav Gordeyev won a gold medal last month at the Second International Ballet Competition in Moscow. Students of the school came to the United States last spring for a series of performances. A story about these talented youngsters and their teachers.

An article about the Buryat Autonomous Republic on Lake Baikal, which recently celebrated its fiftieth anniversary. Before the Revolution this region was a desolate stretch of steppeland and forest, inhabited mainly by horse breeders, shepherds, gold prospectors and poor farmers. There was no written language. Typical of the republic today is ethnographer Sergei Baldayev, who has recorded more than 168 epics of the Buryat people.

Last August the population of our country passed the 250 million mark, which means that only China and India now have more inhabitants than the USSR. About half of all Soviet citizens were born in the postwar years. Victor Perevedentsev describes these and other population changes.

A record number of participants—some 4,000—came to Moscow for the World University Games last August. Their performances included some surprises, like the emergence of a new Soviet sprinting star and a top-notch U.S. basketball player. An article by our sports commentator.

COMING SOON

Soviet women

Satire in the fight for peace.

Mituei Katayeri, Japan.

PEACE

1973

LILA•ANTON REFREGIER

U.S.A.

Yulian Bogdanovich, Poland.

Konstantin Ivanov, USSR. "Get out!"

Kagarov Farouk, USSR. "We want a clear sky"

SOVIET LIFE

February 1974 • 50 cents

VOTERS AND DEPUTIES

THE URALS: NATURE, SCIENCE, INDUSTRY

THE 250 MILLIONTH CITIZEN

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World University Games

250

A new
historical
entity—
the Soviet
people—
has emerged
in the USSR.

MILLION

FEBRUARY 1974, No. 2 (209)

SOVIET LIFE

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LETTERS TO THE EDITOR

I especially enjoyed your articles on the Soviet political and economic system, as well as those pertaining to USA-USSR exchanges in the field of health. My wife enjoyed the articles on the Ukrainian SSR where her grandparents came from just prior to the 1917 Revolution. I feel we have both benefited from an understanding of the USSR and its people. I also wish to thank you for the additional material on the Soviet electoral system which you arranged to have sent to me through the Embassy of the USSR.

Robert C. Starratt
Pittsburgh, Pennsylvania

I have enjoyed reading the interesting and informative articles in your magazine. I have always felt that the United States and the Soviet Union have more similarities than differences, and a heritage and population as diverse and varied as the two are deserves to have the excellent representation that your magazine provides. I encourage the continuation of your efforts and can only hope that the scenes of life that you provide can continue to inform and enlighten us all.

Barney D. Lamar, III
North Augusta, South Carolina

I find that reading your magazine is a pleasant and informative experience. Congratulations on putting together a fine magazine.

In today's world the burden of preserving peace, freedom and independence for all peoples rests largely on the shoulders of the world's two most influential and powerful nations: the United States of America and the Union of Soviet Socialist Republics. Only through a better understanding of each other, their history, people, language and customs, can these two countries endeavor to work together for the benefit of mankind. SOVIET LIFE is an example of a successful attempt to bridge the gaps between the American and Soviet peoples. It has had an enlightening effect on all those whom I know that have read it.

As an athlete I have a special interest in the role of sports in everyday Soviet life. I am most especially interested in the successes achieved by the USSR's weightlifting team. I look forward to seeing an article on the Soviet team. I fervently hope that one is forthcoming. I must admit that light heavyweight (82.5 kg.) Gennadi Ivanchenko is my "favorite."

It is my sincere hope that you keep up the outstanding work you are doing and that more Americans will come to know the land and peoples of the USSR through reading SOVIET LIFE.

Hugh J. Kebly
Oswego, New York

QUERIES FROM READERS

QUESTION: What provision does the Soviet Union make for old people and invalids?

ANSWER: Our social security system covers both groups. All factory and office workers, people in the professions and farmers are entitled to old age pensions: men at the age of 60 after 25 years of work and women at 55 after 20 years of work. Those who have not accumulated the required number of years receive pensions in proportion to their work records. The minimum length of service required is five years. The size of the pension is not less than 50 per cent of the worker's last full earnings and may be as high as 80 per cent for people in the lower pay brackets.

For many categories of workers the pension age is five to ten years lower, depending on the nature of the job. Among those eligible for retirement at 50 are miners, and women with a 15-year work record who have raised five or more children.

People who go on working after they reach retirement age get a full or partial pension in addition to their wages.

War invalids, disabled workers and people suffering from serious chronic diseases are also entitled to pensions. If they wish to and are able to work—a medical commission establishes that fact—they are employed at light jobs. In that case, they get their pension plus wages. They can even work at home—the factories deliver the necessary raw materials and instruments and take back the finished products.

Like all Soviet citizens, invalids and old people get medical treatment free of charge. Those with serious or chronic diseases receive their drugs free as well.

Most people who need them are given prosthetic appliances without charge. If they have to travel to the place where these appliances are made, their fare is paid. Invalids also get full pay when they are hospitalized.

A special home service for the aged is available. Doctors and nurses make regular visits to old people, check on their health and give preventive treatment.

The Soviet Union has many homes and pensioners clubs for old people and invalids. Besides providing room, board, clothing and medical treatment, they offer work therapy facilities. The old people and invalids are paid for the work they do in shops or on household plots. Those who have no relatives receive part of their pension even if the maintenance cost at the home is more than the pension.

QUESTION: Where are foreign languages taught?

ANSWER: Foreign language study begins in the fifth grade. English, German or French are usually offered, though there are schools that teach other foreign languages. In some schools a foreign language is introduced in the second grade and is the language of instruction for several other courses. In all specialized secondary schools and colleges foreign language study is compulsory. Knowledge of a foreign language is also required for graduate work. Besides this, there are many adult education courses for people who want to learn a language.

QUESTION: What is the status of religion in the Soviet Union?

ANSWER: The Constitution of the USSR guarantees all citizens freedom of religious worship and freedom to conduct antireligious propaganda. That propaganda, however, must be directed at religious ideology, not at the services of a church, mosque or synagogue or the religious rites of believers. Discrimination against believers is punishable by law.

On January 23, 1918, the Soviet Government published a decree proclaiming freedom of conscience and separating the church from the state and the school from the church. The privileged status of the Russian Orthodox Church was eliminated, and all churches and denominations became equal.

The Russian Orthodox Church has the largest number of adherents in the Soviet Union. The other religions include Moslems, Roman Catholics, Evangelical Lutherans, Buddhists, Jews, Evangelical Christian-Baptists, Seventh Day Adventists and Mennonites. All of them are free to profess their beliefs.

The state requires all religious people and organizations to observe the same laws as all other citizens. At the same time the state protects its citizens from a number of sects whose rites violate the laws of humanity. Sects that require the mutilation of their members are banned.

Believers may and do form voluntary congregations and organize religious centers. Armenian believers, for instance, are united in the Armenian Gregorian Church with its headquarters at Echmiadzin, near Yerevan, capital of the republic. At Echmiadzin, the residence of the Supreme Patriarch-Catholicos of All Armenians, there is a seminary and a printing house.

The Buddhist, Georgian Orthodox, Reformed, Methodist and other churches have guiding centers also. The center serves only those congregations that recognize it, and any congregation has the right to act independently.

The Roman Catholic Church has several centers in the Soviet Union. The Evangelical Lutheran Church has religious centers—consistories in all the Baltic republics and autonomous associations in other areas. Both Catholics and Lutherans have seminaries to train their priests and ministers.

The religious centers publish theological literature and prayer books. Thus, the Moslem Religious Board has reprinted the Koran and publishes a journal *Moslems of the Soviet East*. The Russian Orthodox Church issues an annual calendar in Russian and Ukrainian. The internal life of the church, its foreign relations and similar matters are treated in the monthly *Journal of the Moscow Patriarchate*. The Ukrainian metropolitan's office publishes the *Orthodox Herald* in Ukrainian. Collections entitled *Theological Works* are issued periodically by the Moscow patriarchate.

Religious organizations in the Soviet Union are active in the struggle for world peace and understanding.

QUESTION: Would you describe the Siberian city of Tomsk?

ANSWER: Tomsk is situated on the right bank of the Tom River, 35 miles from its confluence with the Ob. The population of 360,000 includes Russians, Khanty, Evenks, Selkups and others. In the center of the city rises Voskresenskaya Hill, on which a fortress was built in 1604.

Tomsk today is a large industrial and cultural center. One of its factories supplies Siberian enterprises with program-controlled machines. Tomsk bearings are used by tractor builders all over the country. Its measuring instruments are exported to 60 nations. The Tomsk pencil factory supplies cedar wood to all other pencil factories in the Soviet Union.

The city is also a science center. Alexei Kulyabko and Nikolai Burdenko got their training in Tomsk. Kulyabko reanimated the first human heart, and Burdenko was one of the pioneers in neurosurgery. The world's first esophagus operation through the abdominal cavity was performed in Tomsk. The city's scientists discovered the so-called phytoncides —bacteria-destroying plants.

Every hundredth resident of Tomsk is a scientific worker and every sixth is a student. The city has six institutions of higher learning, including the university, one of the oldest in the country; it opened in 1888.

Many new residential areas have gone up in Tomsk in recent years. The center of the city is being rebuilt, as are the embankments of the Tom and Ushaika rivers. The monuments of ancient architecture are being preserved.

250 MILLION

THE GROWTH OF BIG CITIES

By Victor Perevedentsev
Candidate of Science (Economics)

The population of big cities is growing much faster than that of medium-sized and small ones. In the 13 years after the 1959 census alone, the number of big cities (over 100,000 people) increased by 50 per cent, from 148 to 231. Their population almost doubled, and their share in the urban population more than doubled. Every third inhabitant of the country now lives in a big city.

The Soviet Union has in fact become a country of big cities. The signposts of technical and social progress, these cities often grow up around the construction sites of big industrial complexes. A case in point is Bratsk, which started in 1950 as a small settlement on the construction site of the giant hydroelectric power station on the Siberian river Angara and of an enormous aluminum plant and timber complex. Togliatti on the Volga has become one of the most dynamic cities in the country: It has the biggest automobile plant and several related industries.

The continuing growth of big cities is concomitant with the growth of industry, science and everything that serves them —specialized higher education and transport, for example. From 1960 to 1971 alone, the relative number of those employed in industry and construction went up from 32 to 37 per cent, while the percentage of those in agriculture dropped from 39 to 26.

Here are a few more significant figures:

—The number of those employed in industry during the same 11-year period rose by almost 9.5 million. More than half of this increase was in the engineering industries, those basic to the development of the entire economy.

—The number of those employed in the engineering industries went up by 72 per cent during these years.

—The most rapid employment growth, however, was registered in science and related services—more than 90 per cent in the 11 years.

All these changes in the structure of employment serve to make a more efficient and more mobile economy, creating the foundation for accelerated scientific and technical development and constructing the material and technical basis for a communist society.

IN AUGUST 1973, the population of the USSR passed the 250-million mark, a figure approximately 50 million more than before the Second World War (1941-1945), in which our country suffered enormous losses.

The 250 million translates into several general observations:

—Ours is the third most populous country in the world after China and India, outnumbering the USA by approximately 38 million.

—Almost half the population was born in the postwar years and 83 per cent after the October 1917 Socialist Revolution.

—As the war years recede, the disproportion between the number of men and women steadily diminishes. The normal ratio now prevails through the age of 46. The differential no longer plays a significant role in marriage and the birth rate.

Population growth and change reflect more fully and clearly than any other individual process a country's economic and social development. By comparison with the prewar years the qualitative changes have been far more dramatic than the quantitative ones.

To begin with, prior to the war the country was still essentially rural. Two-thirds of its people lived in the countryside. Today the villages account for no more than two-fifths of the entire population, with the percentage of city dwellers continuing to grow rapidly and of rural inhabitants decreasing not only relatively but absolutely. In the three years after the 1970 census, the urban population rose more than 10 million and the rural population went down more than three million. The change was brought about by the country's accelerated industrialization and the growth of critical branches of the national economy, whose facilities are located mostly (sometimes exclusively) in the cities.

THE GROWTH OF EDUCATION

These economic and technological developments obviously produce corresponding changes in cultural standards. Illiteracy has, for all practical purposes, long been eliminated. The direction today focuses on the undereducated. In the current five-year plan period (1971-1975), the USSR is completing the shift over to compulsory secondary education: no more young people without a complete secondary education (10-year general education school, a specialized secondary school or the equivalent). There is also a countrywide network of evening schools for adults.

By 1972, of every 1,000 people employed, 697 had a higher or secondary (including incomplete) education. The overwhelming majority of those who did not have that much schooling were elderly. According to the 1939 census, only 123 of every 1,000 employed in that year had at least an incomplete secondary education. A decidedly higher rate of growth is shown by the population group with specialized—higher and secondary—education. In 1959, the country had 13.2 million specialists; by 1972 the figure was 27.3 million. Over the 13 years the number had more than doubled. The general conclusion is:

By the time the 250 millionth citizen of the USSR and his coevals reach adulthood, most people will have had a secondary or higher education.

The occupational structure is also undergoing rapid change. With technical progress, a great many new professions and trades are born and some old ones disappear.

By the time the 250 millionth citizen of the USSR and his coevals reach adulthood, most people will have had a secondary or higher education.

DEMOGRAPHIC CHANGES

It goes without saying that these structural changes affect every aspect of life, including those specifically demographic—marriage, birth rate, life span and others.

We have reason for satisfaction in this most telling demographic statistic: The average life span in the USSR rose from 32 years at the end of the last century to 47 years in the 1920s to 70 years today.

A primary factor in the change is the drop in the death rate of younger groups, especially in infant mortality (up to one year). At the end of the 1800s about half the babies died before they were one year old. And even in 1940, 182 out of every 1,000 did not survive their first year. In 1971 only 23 infants per 1,000 died before they were a year old. This very happy achievement of our medicine is, of course, a result of the country's economic and cultural progress.

One of the characteristics of population growth in the USSR since the 1917 Revolution has been the drawing together of the more than 100 peoples of the country. Many nationalities live in every Soviet republic, region and big city. A new historical entity—the Soviet people —has emerged in the USSR. It is, as Leonid Brezhnev pointed out, "a sort of general result of the economic and sociopolitical changes that have taken place in our country during the half-century."

It is understandable that in a country so vast and multifaceted as the USSR, the processes of population growth and development vary widely in different places. The Central Asian republics and Azerbaijan, to take two examples, have a very high natural growth of population; in Russia, the Ukraine, Latvia and Estonia, on the other hand, it is comparatively low. A migratory influx of population is characteristic of the southern regions of the USSR, an outflow of the central and several of the eastern regions. In some places population drops, in others, where rapid economic development is taking place and previously unpopulated regions are being settled, there is a phenomenally large increase. A typical example is furnished by the middle reaches of the Ob in Siberia, whose population during the past 10 years has increased several times over owing to the development of the giant reserves of the Tyumen oilfields.

BIRTH RATE AND EMPLOYMENT

The USSR's birth rate and population growth fell in the 1960s. From 1970 they began rising again. In the period 1967 to 1969 some 4.1 million babies were born annually, in 1971-1972 the figure rose to 4.4 million. This rise is due to the fact that the babies born in the 1950s, an unusually large number, are now entering the peak of child-bearing age, and those born during the war years, a very small number, are passing that age. This trend will continue. Generally speaking, it should be mentioned that typical of the population structure of the USSR is an alternation of numerically large and small generations. At present we are once again on the rising tide of the demographic wave.

This tidal movement is important for many reasons; one is manpower. There are now a great many young people able to work and comparatively few older ones about to enter the pensionable age group.

The Soviet Union, as we know, has a very high level of employment in the national economy. According to the 1970 census, more than 92 per cent of the able-bodied were employed by the socialist economy. The number of persons who did only household chores or worked solely in their personal kitchen gardens or small orchards (rural inhabitants) dropped by 12 million during the 11 years since 1959.

URBANIZATION OF THE COUNTRYSIDE

Along with administrative and technological advances, important qualitative changes are taking place in the countryside, bringing it closer to urban living in all respects—economic, cultural, housing, recreation facilities.

POPULATION SHIFTS

All aspects of the USSR's demographic development and related processes are enormously influenced by population movement. In recent years about 15 million people annually have been involved in migratory change. The urban population has been growing rapidly at the expense of the rural, and big cities are expanding because medium-sized and small ones are shrinking. The net migratory growth of the urban population in the 11 years between the 1959 and 1970 censuses averaged 1.5 million annually and, more recently, two million. The overwhelming majority of migrants are young people mostly 15 to 25 years old. People with a higher level of education are more inclined to move to cities than those with little education, people with trades, more than the unskilled. The movement of the rural population in the central regions of the USSR as well as in Byelorussia, the Urals and Siberia is much greater than, for example, in Central Asia: In 1970 the net exodus from the Central Asian countryside was only five persons per 1,000 but from the Western Siberian, 35. It is clear that these differences have a marked effect also on the age structure of the rural population in different regions. In the country as a whole migration makes cities "younger."

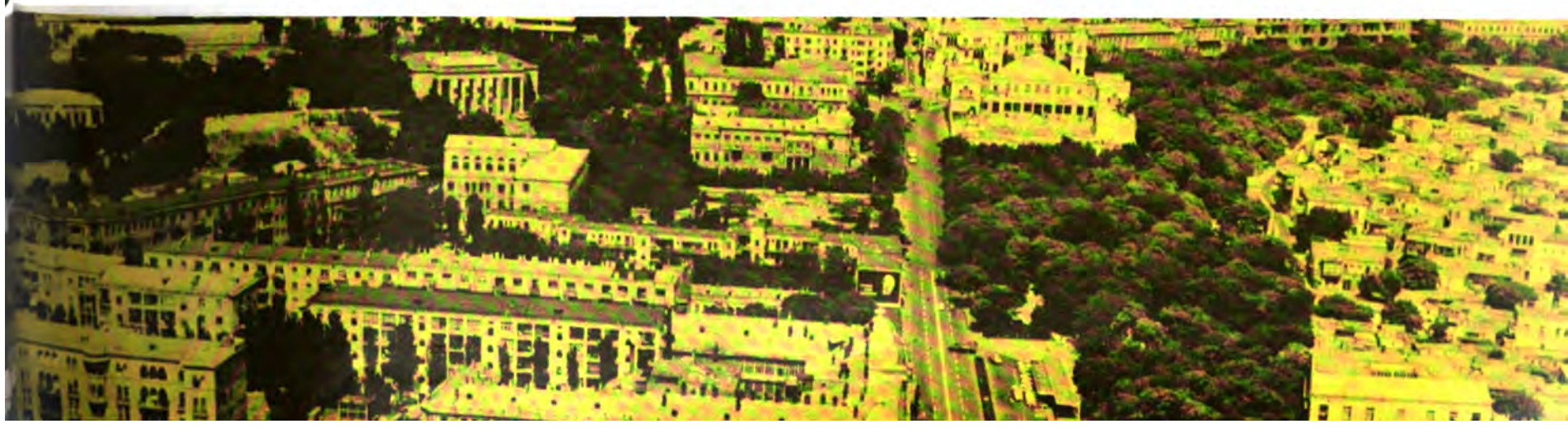
As in the past the countryside serves as a reserve of population for the cities, and agriculture is a reserve of manpower for all nonagricultural branches of the national economy. While before the war agriculture engaged half the country's labor reserves, today the figure is one-fourth, and further rapid decrease in the share and number of those employed in agriculture is realistically expected. More farm machines and better technology and work organization are the major contributors to this change.

Along with administrative and technological advances, important qualitative changes are taking place in the countryside, bringing it closer to urban living in all respects—economic, cultural, housing, recreation facilities. In many areas towns of urban type and appearance have already been built, and various kinds of dwellings are undergoing experiment to determine what is best.

As in the cities, there is a concentration of population: The number of inhabitants in the big villages is growing (often more than 5,000 in one village), and the number in the small ones is falling. Some become ghost villages, their people go on to larger, more promising towns and villages. This movement is encouraged and stimulated in every way since it helps give rural people living conditions which more closely approximate those in urban areas. In large villages it is considerably easier to provide bigger and better schools, shops, modern wide-screen movie houses, libraries, palaces of culture. It is easier and cheaper to build water mains, sewer systems and central heating plants.

As regards the social processes most characteristic of the Soviet countryside today, the term urbanization is not inappropriate. Life in the countryside is becoming more like life in the city, the urban way of living is spreading to the villages. For example, there is specialization of farm work (the farm laborer becomes a tractor driver, a cattle breeder, an agronomist; they are no longer the peasants who did the whole range of traditional work in the village). Production is organized on the urban pattern—fixed working hours, days off every week, annual paid vacation, two shifts where needed. The importance of farming to supplement the family food supply sharply decreases, more people buy their foodstuffs. Everything adds up to a countryside gradually changing to an economy approaching self-sufficiency. With more free time today, rural inhabitants pursue essentially the same activities as the urban population—books, films, TV, sports engage their interest.

To sum up, the traditional rural ways of life are fast being replaced by the urban. The process is very complicated and sometimes contradictory. The general trend, however —the countryside coming closer to the cities—is undeniable.



A LOOK INTO THE FUTURE

The birth of the 250 millionth citizen of the USSR is a significant landmark; it impels us not only to look back to the past but forward to the future as well. The population of the Soviet Union has grown by 50 million in the past 17 years —from mid-1956 to mid-1973. How many years will be needed for another 50-million increase? When will our 300 millionth citizen be born? Demographic forecasts are complicated, affected by a great many interacting factors, especially the birth rate. Because it makes many mistakes, demography has even earned the uncomplimentary description "a graveyard of forecasts." Without venturing to prognosticate in the strict sense of the word, let us see what will happen to the Soviet Union's population if the present age group correlations between birth rate and mortality operate for the future. In other words, let us assume there will be the same number of births per 1,000 women of a definite age group and the same number of people as in recent years will die per 1,000 men and women in each age group. By the year 2000 the population of the USSR will be 305 million, and our 300 millionth citizen will be born in 1997.

Soviet society, however, with its planned economy can influence demographic processes. No Soviet specialist questions the inevitability of a further decline in the death rate in each age group and a longer average life span. A higher birth rate is also a real possibility.

Our 300 millionth citizen will be born in 1997.

250 MILLION

Exhibition of American Apparel

An exhibition of goods by 17 members of the American Apparel Manufacturers Association was held in Moscow recently at the big Moskvichka clothing store. Among the firms represented were Cable Industries, Inc. (Boston), Cluett, Peabody International (New York), Kayser-Roth International (New York), Washington Manufacturing Company (New York), Work Wear Corporation (Cleveland) and Jim White Manufacturing Company (Wilmington).

This was the first trade mission to the Soviet Union from the American apparel industry, and it attracted considerable interest. Many directors of Moscow textile enterprises, heads of various services and experts from the Ministry of Foreign Trade and the Ministry of Light Industry attended the exhibition and sale. They welcomed the exhibit's emphasis on practicality and on casualwear.

For most members of the American delegation, this was the first visit to Moscow, and they combined business with sightseeing.

"Of course, three days are very little for getting acquainted with this huge and highly interesting city," said mission director Stanley Nehmer.

"What were the results of the business negotiations?" Nehmer was asked.

"Our chief aim was to explore the possibilities for mutually advantageous transactions. And I feel we accomplished a great deal."

Visit from an American Writer

When the news got around that Erskine Caldwell was coming to meet his Soviet readers in person, the auditorium at Moscow's Foreign Literature Library was jam-packed with people. Caldwell is one of the best known and admired American writers in the USSR, many of Caldwell's 50 books and numerous stories have been translated into Russian. This 1973 visit was his fifth to the Soviet Union.

"A writer is expected to be an intellectual giant who knows everything and whose every word is a pearl of wisdom, but that is not true in my case," Caldwell began wryly, then proceeded to tell the humorous and very dramatic story of his 50-year writing career, which started with his odyssey through the South. A big heavy typewriter accompanied his travels.

The secret of his success, the novelist mused, was his interest in people and their actions and his sense of being one of them himself.

"Writing books," he said, "is like having children: You love them all or none of them."

Despite Caldwell's self-deprecatory warning, he was bombarded with questions and he had a lot to say, especially about East-West relations today.

"People are coming together in cultural ways all over the world, and they're understanding each other better now. This is generating a closer union. It's what the world needs because we've been too far apart intellectually much too long."

When he talked about Soviet writers he had met and the need to promote friendship, Caldwell spoke of Mikhail Sholokhov, the prominent Soviet novelist; their acquaintanceship, he said, was one of very long standing. They first met during the Second World War in Moscow when Caldwell was writing *All Night Long*, a book about Soviet guerrillas based on his experiences as a correspondent in the Soviet Union in 1941. Of the will of the Soviet people to defend their country against the nazi invaders, he wrote, "They were determined to fight right down to the last inch in order to keep their freedom."

"I hate war, I don't want to have anything to do with war," he went on to say. "It should no longer be necessary to fight wars because people all over the world have developed a mentality, an intellect and a mind that should obviate the possibility, that should not allow the murder of people to happen again. Problems should be settled across the table, and people should talk their differences out instead of killing one another, as they did in a primitive society. I hope that the relationship between the Soviet Union and America and the whole world is in a new phase and that friendship will prevail from now on."

"SOVIET DEMOCRACY IS THE PARTICIPATION OF MILLIONS IN RUNNING THE STATE"

That is how KHRISANF NESHKOV, Secretary of the Presidium of the Supreme Soviet of the Russian Federation, answered the question "What is the meaning and content of Soviet democracy?" asked by a Novosti Press Agency correspondent.

"All citizens of the USSR," Neshkov continued, "have equal rights, irrespective of sex, nationality, religion, education, social origin, property or official status. No individual can own factories, railroads or banks and by virtue of that have power over others. Everyone can elect and be elected to the Soviets of Working People's Deputies and thereby help run the state. All adult members of our society make use of that right."

Q: You are talking of the more than two million deputies who are elected to the Soviets on all levels, from the rural Soviets to the Supreme Soviet?
A: It's not only the deputies I'm thinking of. Every deputy to a rural, town, city or regional Soviet is assisted by hundreds of people who, though they are not elected deputies, nevertheless take an active part in the work of these legislative bodies. Some 1,780,000 volunteer organizations assist the local Soviets in the Russian Federation alone (there are more than 27,000 Soviets in the republic)—house, street and block committees, volunteer public order squads, comrades' courts, parents' committees at schools, women's councils and other such groups. Sixteen million citizens are active in these organizations.

The following procedure is also evidence of the breadth of our democracy. In the course of each election campaign the nominees get specific instructions from their electors. These are not the usual suggestions, requests and complaints addressed to legislative bodies, but mandates embodying the specific demands of all or most of the inhabitants of the city, district or village. The instructions become a major part of the elected Soviet's program.

Q: How are these instructions carried out?
A: Let us consider a typical situation. As a city grows, it begins to have insufficient hospital facilities, and the electors instruct their deputies to build an outpatient clinic. If there is a real need for another clinic, the request is included in the city development plan. The Soviet will thereupon assign priorities and inform the electorate when the new clinic will be built.

In Moscow, for example, the local Soviets carried out 834 such instructions in the past three years alone. Eighty-eight million rubles were spent on just one: the construction of the first stage of the Krasnaya Presnya section of the subway.

Q: Instructions are, I should imagine, not the only way the electorate has of influencing governmental bodies.
A: At one of the sessions of the Supreme Soviet of the Russian Federation Deputy Nikolai Kulikov, a team leader at the Maganak mine, in Kemerovo Region, talked of the need to renovate the old coal pits of the Kuznetsk basin. The deputy's proposal was examined in detail. The USSR Ministry of the Coal Industry and the USSR Ministry of Construction of Heavy Industry Enterprises took concrete action. Eleven coal pits are now being rebuilt.

Formally the proposal came from the deputy, but he was expressing the opinion of his teammates and of hundreds of Kuznetsk basin miners. In form, the session supported the deputy's proposal; actually it carried out the mandate of the voters.

Q: What, apart from looking into proposals and carrying out the voters' instructions, are other responsibilities of the deputy?
A: Deputies have regular office hours for personally talking to constituents and answering their letters. Many of them contain suggestions and complaints. The law requires deputies to respond and take appropriate action on each one.

The overwhelming majority of Soviet deputies are not government officials. They are factory workers, collective farmers, teachers, doctors, engineers, writers, servicemen and artists. They serve as deputies and work at their regular jobs. They therefore are in close touch with the everyday needs of the people, and their judgments reflect those of the working people generally.

Q: What happens if a deputy does not carry out the instructions of his or her constituents or ignores their wishes?
A: Such cases are rare. Working collectives and public organizations know the people they nominate. But if it does happen, citizens have the right to recall their deputy. In the past seven years citizens have recalled 1,555 deputies from the local Soviets of the Russian Federation. If we consider that more than one million deputies are placed in office in each election campaign, the percentage of those recalled is not big—0.15 per cent of the total.

Q: Besides the elector-deputy-Soviet relationship, in what other ways is the public influence brought to bear on the solution of a problem?
A: I've mentioned the direct voluntary participation in the work of the Soviets. Implicit in that is a broad discussion of the agenda of meetings of the local Soviet. Besides that, citizens can express their opinions on the question under discussion to a deputy, to the executive committee of the governmental body in question and in the press.

In addition, the working people run the country not only through the Soviets, but through their mass organizations. Trade union organizations, for example, help plan the work of factories, state farms, institutes. They are responsible for the living and working conditions of Soviet citizens, for their well-being.

This is the essence of our democracy.

people and events

New Flights to Mars

Two years after launching the first stations to Mars, the Soviet Union has fired new probes—Mars 4, Mars 5 and Mars 6. 1972 was an unfavorable year for flights to Mars. In the interval Soviet science was probing Venus.

The first missions of interplanetary probes —both Soviet and American—show that Mars has a carbon dioxide atmosphere with a pressure of no more than eight to nine millibars on the surface, that the polar caps are nothing but frozen carbon dioxide, and that the dark color of the indeterminate Martian seas must be attributed to something other than plant life.

From a relatively close distance the Martian surface seems to look much like the lunar surface: It is furrowed with craters, huge mountain ranges and deep canyons. The Martian satellites, Phobos and Deimos, are huge crater-dotted masses of rubble-like rock.

Besides Soviet scientific equipment, the Mars 6 probe carries devices made by French specialists for joint Soviet-French experiments. They study the radio emission of the Sun in the meter waveband and the characteristics of solar plasma and cosmic rays.

The new probes will help explain processes on Mars and give us a better understanding of the origin and evolution of the solar system.

Soviet-U.S. Building Symposium

The State Committee for Construction of the USSR Council of Ministers and the Bechtel Corporation of San Francisco recently sponsored a Soviet-American symposium of builders. Experts exchanged opinions on the planning, organization and management of construction.

"We believe," said Ivan Ganichev, vice chairman of the committee, after the symposium, "that Soviet-American cooperation in this field has decided advantages for both sides. The Moscow symposium has opened the way to businesslike cooperation which will be mutually beneficial."

This view was shared by Mr. J. W. Komes, president of the Bechtel Corporation, who said that although design solutions differ in the USSR and USA, there are many opportunities for contacts between Soviet and American experts. The most promising, Mr. Komes believes, is the exchange of experience in the construction of petrochemical plants, pipelines and in civil engineering.

There was agreement to work along three main lines: management of construction and the use of computers; construction of plants for the extraction and processing of oil and gas; construction of mining installations, iron and steel plants and nonferrous metals plants. Three groups of experts are to exchange visits in 1973-1974.

Junior Athletes Compete

A track and field meet of Soviet and U.S. junior athletes was held at the end of July in Odessa on the Black Sea coast.

The first day of the match showed that none of the contestants had any intentions of coming in second. The Americans made an excellent showing, mostly in the running events; they won the 800-, 400- and 200-meter heats.

The Soviet athletes fared better in the high jumps; Vladimir Kashcheyev did 7 feet 7¾ inches. In the javelin throw Soviet athletes made a winning mark of 245 feet 3¼ inches.

The competitions revealed a number of serious contenders for the '76 Olympics.

Mill 3600 in Operation

Rolling mill 3600 went into operation at the Azovstal works in Zhdanov, the Ukraine. It is one of the most important construction projects of the ninth five-year plan (1971-1975).

With respect to productivity and technological sophistication the mill is a great advance over earlier complexes built in the Soviet Union. Steel sheets and plates one-fifth of an inch to 7⅞ inches thick, 9 feet 10 inches to 13 feet 1½ inches wide and up to 92 feet long will be subjected to heat treatment, thereby substantially increasing the metal's strength limit. A minimum number of workers will operate this installation: The entire production process is automated.

New Soviet Film Star

The portrait of Turkmenian actress Maya Aimerova has been gracing the covers of the most popular Soviet film magazines since the release of *Daughter-in-Law*. The film critics loved it.

Ogulkeiik, the heroine, and an old shepherd, her father-in-law, live in the sand dunes and wait for her husband to return from fighting the Nazis. We know that the young man has been killed.

The war is never shown, but it is nevertheless an antiwar film. The tragedy of war leading character.

In all the roles are reflected the customs, attitudes and traditions of the Turkmenian people.

For Maya *Daughter-in-Law* is more than just another film. It is the life story of her mother, of all Turkmenian women and the long way they have traveled from age-old backwardness to equality in a Soviet society.

The actress is working in a new Turkmenian film, *When a Woman Saddles a Horse.*

SCIENCE AT THE SERVICE OF THE PEOPLE

By Sergei Snegov

DESCRIBING the achievements of Soviet science and technology is getting more complex and yet simpler from year to year.

More complex—because progress in our country is swift. To cite Mstislav Keldysh, President of the USSR Academy of Sciences, "You can hardly name a major scientific field in which studies of Soviet scientists have not played a significant role." Soviet scientists are credited with many of the findings that have come to be called "discoveries of the age."

Simpler—because the Russian words "sputnik" and "lunokhod" are now in the dictionaries of all peoples. Peak achievements in the peaceful uses of atomic energy and the study of elementary particles, in controlled thermonuclear fusion and in mathematics are associated with the names of Soviet scientists, Soviet cities and such unique research instruments as the Serpukhov proton accelerator.

Soviet scientists and engineers have a worldwide reputation and are in contact with colleagues in nearly all countries. Their achievements are common knowledge. Today more often than "What achievements?" the question asked is: "How did the Soviet people manage to make the great leap from primer to lunik in so short a time?"

Was it really from primer? Russian scientists and inventors made a weighty contribution to the development of world science in the last century and the beginning of this one: Nikolai Lobachevsky, Dmitri Mendeleyev, Konstantin Tsiolkovsky, Ivan Pavlov, Alexander Popov. Although this generation has begun to develop some of the ideas of these eminent scientists, only our descendants will be able to cope with many of them. But no matter how brilliant these scientists were, no matter how ambitious their projects, in czarist Russia their efforts were inevitably isolated.

The working people who took power for the first time in history had to begin from the bottom to master the available knowledge, to acquire new knowledge and to move science ahead to new frontiers.

In prerevolutionary Russia there were some 300 research institutions, as a rule small, poorly financed and equipped. Today there are almost a million Soviet scientists and experts. Every fourth scientist in the world is a Soviet citizen. No other vocational group in the Soviet Union shows such a high growth rate.

Science is a profoundly social phenomenon which exerts a many-sided impact on society. There is an inverse dependence too. The progress of science and the practical application of its findings demand specific social conditions. These conditions are provided in the Soviet Union. Under socialism scientific discoveries are the basis for raising the productivity of labor and increasing the commonly owned wealth, for improving the living and cultural standards of the whole population.

Science created by the people serves the people. The Soviet Government does not stint on funds. In the past three decades, including the years of the Second World War and postwar reconstruction, expenditures for science increased by about 40 times. The 1971 budget for research and development was 13 billion rubles; in 1972 it rose to 14.4 billion.

Science Centers

The pivot of Soviet science is the USSR Academy of Sciences. It includes more than 370 institutions employing more than 34,000 experts in a variety of disciplines. In addition, there are 14 academies in the union republics and five specialized academies: the USSR Academy of Medical Sciences, the USSR Academy of Pedagogical Sciences, the USSR Academy of Arts, the RSFSR Academy of Municipal Economy and the All-Union Lenin Academy of Agricultural Sciences. The USSR Academy of Sciences is a member of 140 nongovernmental international organizations. It has a large and active program of productive scientific and technological cooperation with foreign countries.

A powerful factor behind the progress of science, technology and culture in our multilingual nation is the Leninist nationalities policy. With that as a foundation, peoples who had been oppressed under czarism moved from poverty and illiteracy into the mainstream of contemporary economic and cultural endeavor. The international language of science has long been demonstrating its value as a force for progress.

In the thirties branches of the USSR Academy of Sciences were set up in the union republics. At first they concentrated on problems related to the development of the local economy. Over the years, they became involved in basic research and grew into independent academies in the republics. That Armenian scientists, for example, have done significant research in the exact sciences is not accidental. It derived from the great changes that have taken place in the republic, in particular, the development of engineering, electrical engineering and mechanics. The Armenian school of astronomy has an international reputation.

A division of labor among the republics is a special quality of Soviet science. Each republic takes responsibility for the countrywide organization of work on a specific problem. This is a safeguard against duplication of efforts and a guarantee that there will be no delay in applying the findings where they will produce the maximum results. For example, the academies of the Central Asian republics concentrate on scientific problems connected with growing and processing cotton, seismology, the deserts and their economic possibilities. The titles of three national journals—*Differential Equations, Journal of Applied Spectroscopy* and *Journal of Engineering Physics*—published by the Byelorussian Academy adequately describe the areas studied by scientists whose fathers and grandfathers were often illiterate.

On a map of Soviet science dotted with circles indicating the academies in the republics and their branches in the autonomous republics, a new symbol has begun to appear to mark science centers. Socioeconomic considerations created these centers, which include many research institutions. Today science is a direct productive force, and the location of its research centers follows the country's general policy on the distribution of all its productive forces.

A few years ago, when a broad program was charted for the exploitation of the natural resources of Siberia, a major research complex was built near Novosibirsk, the Siberian Branch of the USSR Academy of Sciences. From basic research to specific Siberian problems—that is the range of problems tackled at Akademgorodok, the science town near Novosibirsk.

Science complexes, including the Ural and Far Eastern centers, are being formed. New meridians and parallels are woven into the grid of science coordinates that covers our vast country.

Uniform State Technical Policy

The current emphasis is not on individual brilliant achievements, but on the high scientific and technical level of all production. Modern trends in science and technology indicate that the synthesis of different fields is most fruitful. New scientific branches and disciplines are emerging. The need is for more qualified specialists and larger allocations for research.

"Realization of the possibilities of the scientific and technical revolution demands ever greater outlays," said Alexei Kosygin, Chairman of the USSR Council of Ministers, at the Twenty-fourth CPSU Congress held in March-April 1971. "However, at every stage of its development the state has at its disposal definite resources which it can use for these purposes. Hence the need for choice and for preferential development of the key lines of scientific and technical progress, and the formulation and consistent implementation of a uniform state technical policy."

How to make the right choice? An error can have serious consequences. Applied sciences are simpler to deal with, and what about basic research? History tells us that it is basic research that has brought and is bringing revolutionary changes in technology and production. One example is sufficient: Not a single branch of science can do without mathematics.

Socialist society free of cankerous competition has enough reliable ways to make the right choices. They include carefully worked-out research programs coordinated with the five-year plans of national economic development and based on scientifically validated forecasts. Their foundation is the efficient cooperation of science and production, concentrated and intensified research and the most effective ratio between purely theoretical investigations and applied studies.

THE SCIENCE OF THE GREATER URALS

Ural scientists are doing research on problems that range from metal physics to soil fertility.

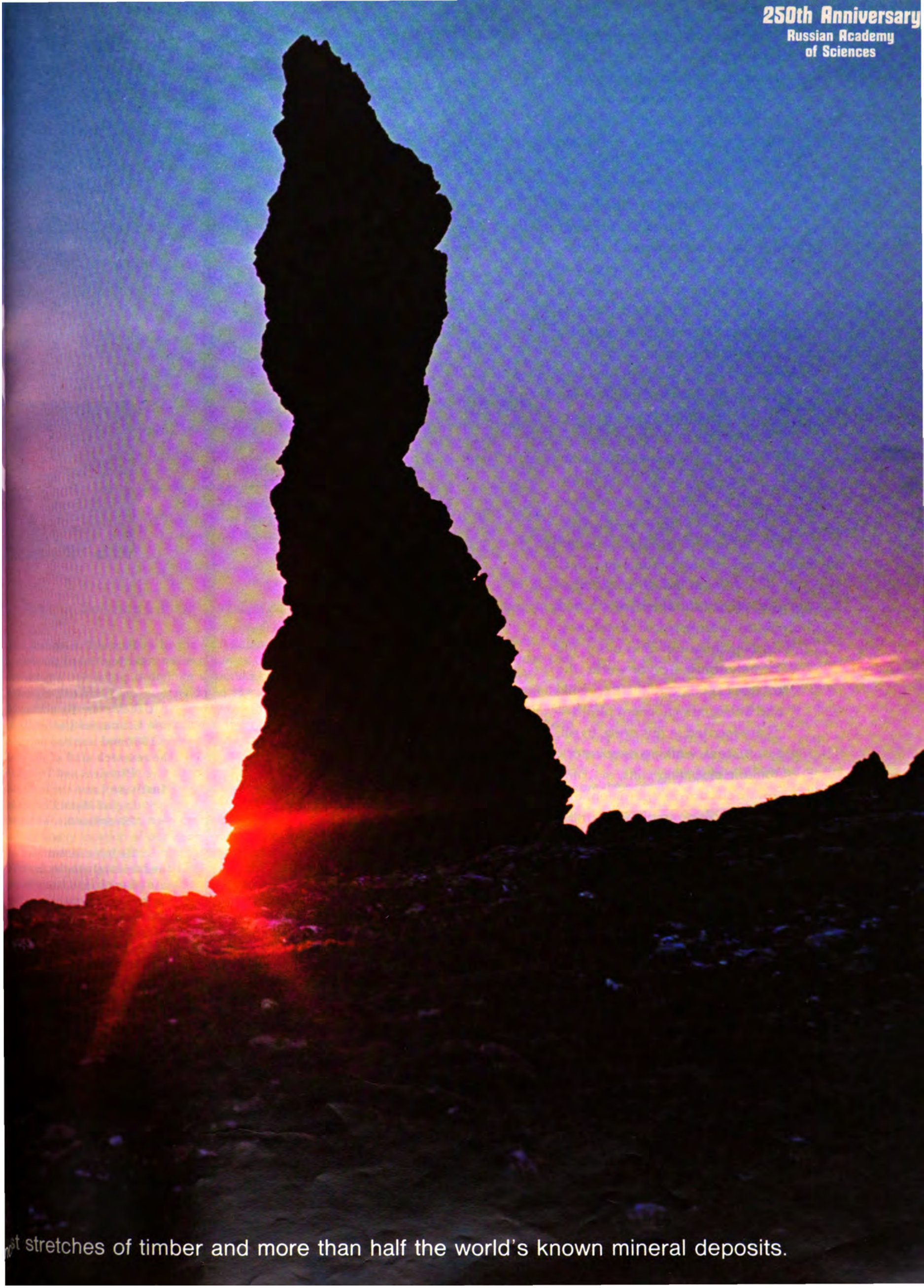
The Urals are more than a mountain system separating Europe from Asia. This vast region stretching from the Arctic seas to the arid Kazakh steppes has long been crucial to the Soviet economy. The GOELRO * Plan, the country's first long-range program for economic development, declared: "The interests of the national economy as a whole . . . push the Urals into the foreground. The position of the Urals on the boundary between European Russia and Siberia and its immense prospects for development imperatively dictate the fullest possible utilization of its resources."

Nature has been generous with this land. Its geographic zones run the gamut from glaciers, perennial snowcaps and tundra to untouched evergreen forests, countless lakes and rivers, birch groves, feather grass plains and hot dry winds. It has enormous stocks of minerals:

* Russian abbreviation for the State Commission for the Electrification of Russia, organized on Lenin's initiative in 1920, during the Civil War.

The natural wealth of this mountain region include

250th Anniversary
Russian Academy
of Sciences



t stretches of timber and more than half the world's known mineral deposits.

metallic ores, oil, bauxite, gold, coal, peat, potassium—over 12,000 deposits in all. Half the minerals known are to be found here, including some that were first discovered in the Urals and bear related names: uralite, ilmenite, vishnevite. For a long time the Urals specialized in mining and metallurgy. Its families of metal craftsmen were famous throughout the world. In the years of Soviet power the region has developed both multibranch industry and intensive agriculture. Still one of the country's major metallurgical centers, it is also known for its machine building, oil refining, electrical engineering and instrument making.

The Greater Urals economic area consists of five regions—Sverdlovsk, Perm, Chelyabinsk, Orenburg, and Kurgan—plus the Udmurt Autonomous Republic. It covers more than 260,000 square miles and has a population of more than 15 million.

Our famous industrial giants—the Magnitogorsk, Novo-Tagilsk and Chelyabinsk metallurgical complexes, the Ural machine-building plant, the Chelyabinsk tractor works, the Ural truck plant, and the Berezniki and Solikamsk chemical plants—are located in this area. Its oil, pig iron, steel, walking excavators, automatic blooming mills, machine tools, power equipment and chemicals go to all parts of the country and abroad.

Science in the Greater Urals keeps abreast of economics. Prior to 1917 there was only one school of higher education in all of the Urals. Now 30,000 scientists work in the region's 220 academic and research institutions. One of the country's largest research complexes, the Ural Science Center, is now being built, with 30 million rubles budgeted for its development in the Ninth Five-Year Plan period (1971-1975) alone.

The Ural center is investigating a wide range of problems: cybernetics, ecology and the biological protection of forests, physical metallurgy, grain yields and soil fertility, among other things.

The articles that follow are reprinted from the magazine *Znaniye-Sila*.

THE SCIENCE OF THE GREATER URALS

Sergei Vonsovsky, 63, a distinguished theoretical physicist, was born in Tashkent, capital of Uzbekistan. He graduated from Leningrad University in 1932 and was appointed to the research staff of the Ural Physical and Technical Institute (now the Institute of Metal Physics in Sverdlovsk), where he still works.

He has concentrated on fundamental studies in solid-state physics, and has written a great many papers on the multielectron theory of metals and semiconductors, the theory of metals in the transitional groups and the theory of ferro- and antiferromagnetism.

In 1953 Vonsovsky was elected a corresponding member of the USSR Academy of Sciences and in 1966 a full member. Since the Ural Science Center was founded in 1971, he has served as president of its presidium.

TAPPING THE RESOURCES OF THE URALS

Interview with Academician Sergei Vonsovsky, Hero of Socialist Labor, President of the Presidium of the Ural Science Center

The Ural Science Center has been doing fundamental and applied research in areas vital to the region's economy.

Q: Could you tell us why the Ural Science Center was set up?
A: Science today can make progress only if researchers work in teams and within a definite structure of research organizations. A center like ours is considered the best form of organization at the present stage. That is why the Russian Federation first set up Akademgorodok, the science town near Novosibirsk, then the Far Eastern Science Center and, two years ago, the Ural center.

Q: What are your major functions?
A: We have four. The first and most important is to encourage fundamental research.

The second is to help develop the region's productive forces. The very location of our center, in an area with a great many big industrial plants and mines, largely defines the type of research we do. Our work has strengthened the traditional ties between Ural scientists and the national economy.

Our third job is the coordination of research throughout the Greater Urals. Currently, the center includes 11 research affiliates of the USSR Academy of Sciences engaged in fundamental investigations in the natural sciences, the Ilmen State Preserve, and about 40 institutions of higher learning. In addition, there are more than 170 research institutes attached to the various ministries and departments doing related work. We try to avoid duplication and concentrate effort in the decisive fields. For this purpose the Ural Science Center has a coordinating council that includes representatives of the academy, colleges and research institutes. We are responsible for all the research being done in the Ural economic area.

Finally, our fourth function is to train skilled personnel for the center proper, as well as for the other research bodies.

Q: What research projects are being tackled?
A: I cannot hope to describe or even to list all the research projects being tackled by the center, projects which have earned recognition at home and abroad. I can mention a few.

The structure of the Earth's crust and upper mantle are being investigated by the Institute of Geophysics. Its staff members have discovered the helium "respiration" of the globe and worked out a technique based on it for detecting and assessing deposits of minerals.

The institute has also developed its own system for the study of complicated coal seams and designed special equipment for the purpose. The technique has been introduced at most coal mines in the country and has saved 100 million rubles a year. Wide use is also being made of the magnetic well prospecting method elaborated by Ural geophysicists. It has led to the discovery of new iron ore deposits in the Urals, North Kazakhstan and Tajikistan.

Important research is being done by the Institute of Metal Physics in the theory of solids, the physics of magnetic phenomena, growth of crystals and superconductivity. The practical applications are new magnetic and structural materials for use in industry. The institute is developing new techniques for processing metals and for checking the quality of metal and semiconductor items.

The Institute of Mechanics and Mathematics has done a great deal of work on processes for the control of production and on other problems. The Institute of Metallurgy, investigating the all-round utilization of raw materials, has developed a method for increasing the production from ore of a valuable alloying element —vanadium—dubbed by metallurgists the steel "vitamin."

The center is studying the rich flora and fauna of the Ural region. The Institute of Plant and Animal Ecology is concerned with people's attitude toward the environment, with the rational use and augmentation of natural resources. Its staff members have been working on such problems as forest growth and biological purification of water.

The Institute of Economics, founded quite recently, has worked out a 10-year plan (1971-1980) for development and distribution of the productive forces of the Ural economic area. A similar plan is now being elaborated for 1981-2000.

Not too long from now we will be setting up our own design office and building our own plants to manufacture the equipment recommended by the institutes.

ECOLOGICAL PROBLEMS OF AN INDUSTRIAL REGION

ENVIRONMENTAL PROTECTION IN THE URALS

The Urals today are a composite of smoking factory stacks and virgin taiga forests, pointed slag heaps and cornfields, blue rivers and lakes and harmful industrial wastes. This complex system is being studied by the Ural Science Center's Institute of Plant and Animal Ecology. A short while ago Academician Stanislav Schwarz was awarded the Severtsov Prize of the USSR Academy of Sciences. It marked the Academician's own contributions as well as the research done by his Institute of Ecology of Plants and Animals at the Ural Science Center.

THE SCIENCE OF GREATER URALS

Interview with Academician Stanislav Schwarz

What is your institute working on? What are its relations with the other institutes of the Ural Science Center?

We do research on the widest possible range of ecological problems.

Human beings are constantly changing the environment. Anyone who says nature can be left untouched is talking nonsense. There is no stopping technical progress; on the contrary, we need it if we are to free mankind of poverty. It's the job of ecologists to balance the needs of industry with those of the environment.

Actually, the prospects for achieving this aim in the Urals are good. This has been an industrial region for many years, and whether we like it or not, we are steadily changing it by the way we use the rivers, forests, mines. The long-term task of the ecologist, therefore, is to make environmental protection a part of the general plan for the development of the area. But to do that, we must have accurate scientific information.

How would you describe the institute's approach?

Just as the structure of the universe is determined by the structure of the atom, the functioning of large biotic systems depends on the laws, phenomena and processes of the molecular and even submolecular and subcellular world. The aim of the institute is to study the peculiarities of biotic systems by analyzing their microstructure.

Could you cite a research project to illustrate this?

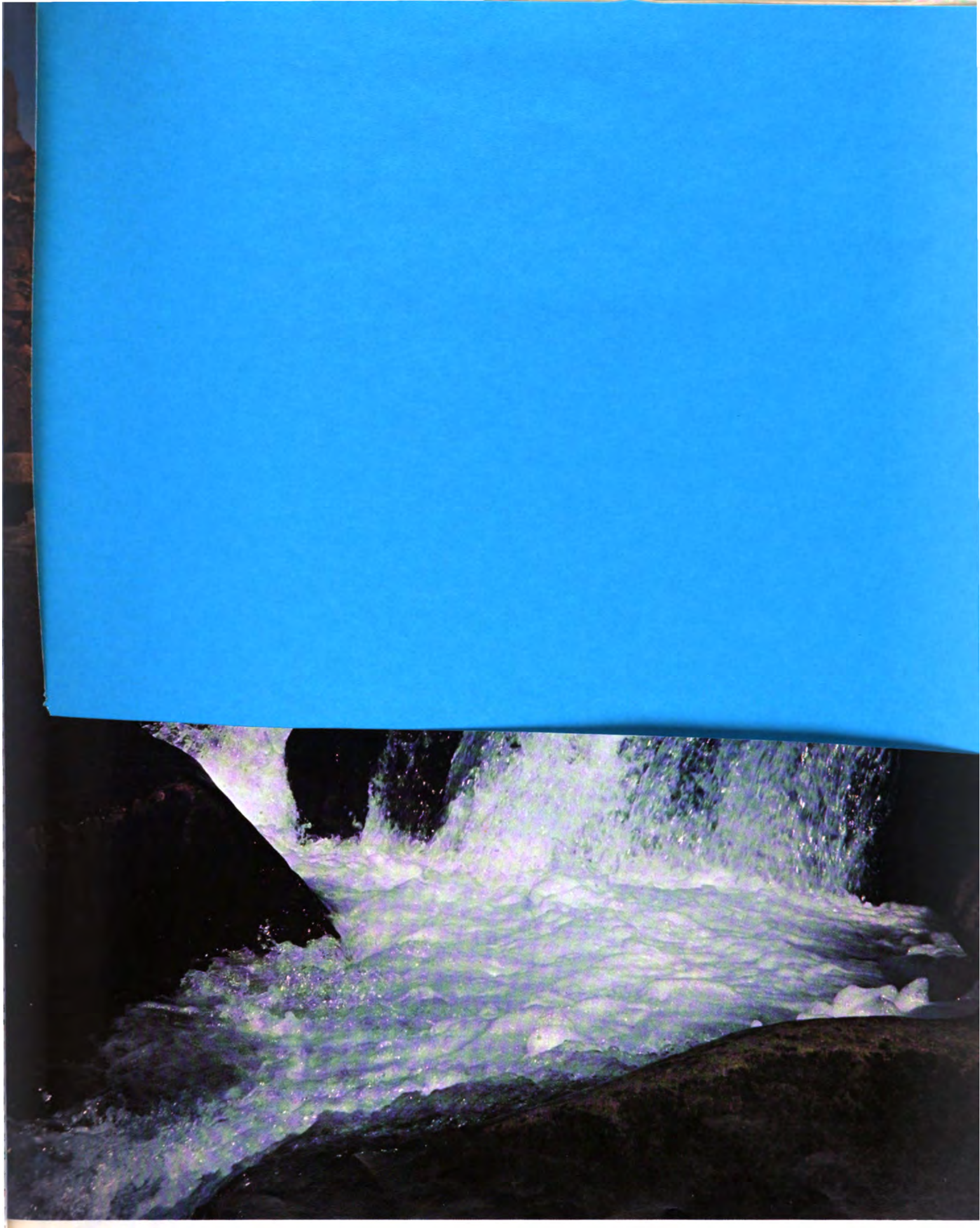
One of our most interesting areas of research is population ecology. Let me tell you about a project we have been working on for several years now: an investigation of the common tadpole.

We started with an established fact, the presence in tadpoles of chemical messengers that retard their growth as their numbers increase in a given body of water. We assumed that the products of the tadpoles' vital functions must affect their cellular processes, since the development and growth of an organism is determined by what is happening inside its cells. A group of biochemists did a number of experiments which proved conclusively that metabolites—the products of metabolism—affect the processes not only at the cellular but also at the molecular level.

This comprehensive research shows that we cannot understand the functioning of the whole—a population under study—in isolation from the processes that occur at various levels of life. The sequence that emerges is as follows: the population—individual organisms—cells—intracellular structures that affect the intensity of oxidation and reduction processes. As you see, we approached the study of nature from both sides.

What practical application might the institute's work have in the future?

I'll answer that with another question: Do you know of anything that yields more practical applications than theoretical research? If we establish the nature of chemical messengers that control the growth and development of animals, messengers that affect either an entire species or a particular genetic variant, we will have a powerful and subtle weapon with which to fight harmful and undesirable organisms.



Photograph by Sergei Petrukhin

If the tundra's biological productivity could be tapped, it would give us additional farmland equal in area to the Moon

the most important to the Ural economy is our silviculture laboratory. We also have two botanical laboratories — one specializing in ecological plant geography and the other in experimental ecology and acclimatization of plants. Then there is the laboratory of animal population ecology, where I work. Two other research groups deal with bioenergetics and with ichthyology and the ecology of fish and aquatic organisms.

Aside from these laboratories which study the structure of nature and analyze various organisms, we have others that deal with general problems of ecology. One is the laboratory of radiation biology, the other the laboratory of biophysics and radiation biogeocenology. Thus, our scientists are interested in radiation biology of both plants and animals. Researchers in these two fields account for a considerable part of the institute staff. This

of the tundra as part of the International Biological Program. What contribution is the institute making to this field of ecology?

Many of our laboratories are concerned with the ecology of the Far North.

Our studies have led us to a paradoxical conclusion. Obviously we were mistaken in assuming that the tundra has a low biological productivity.

The animals and plants of the Far North are so perfectly adjusted to local conditions that they can yield a huge amount—this is no exaggeration—of biological products during the six to eight weeks of the cold polar summer.

It seems possible that herbaceous plants can be cultivated on some large areas of the tundra now left to Bryophyta. By carefully selecting the plant and animal species for certain regions, we could turn much of the Far North into a fertile region. Such an accomplish-

I believe that within 20 years people will have developed scientific guidelines for protecting the environment in the age of universal industrialization.

I also foresee some changes in the outlook of ecologists within the next decade. We will probably learn to use more sophisticated methods of investigation, methods that make it easier to apply our ideas in practice. For instance, electrophoresis of the proteins of blood plasma will permit us to define population limits quickly and accurately, and the technique of hormonal analysis will make it possible to forecast numerical growth of the species.

As for the next few years, we must think of training new kinds of scientists—biological engineers, you might call them. I think that by 1980 the institute will have such experts. We need them badly if progress in ecology is to be more than temporary and local.

A series of experiments at the Institute of Mechanization and Electrification of Agriculture in Chelyabinsk has revealed an unexpected correlation between electricity and food growing.

By Yuri Yarovoi

CCIDENTAL—or seemingly accidental—scientific breakthroughs are fairly mmon. The most recent ample is the discovery at electric corona treatent can affect the quality grain seeds. Professor natoli Basov of the Chelabinsk Institute of Mechaization and Electrification Agriculture stumbled on his phenomenon while hecking quite another idea: he use of electric fields for orting and cleaning grain.

A few words about corona nd what it is. In the dark a luish halo can be seen round electric conductors -this is high-voltage coroa, caused by the intermitnt ionization of the air urrounding the conductor.

Air, especially when it is ry, serves as an insulator or electric current just as orcelain does. But only up o a certain voltage. The igher the voltage, the tronger the electric field. ventually, the energy of he field is great enough to urn the neutral atoms and olecules of the gases that ake up the air into ions—ectrically charged partiles. Since the ions are onductors, an electric curnt begins to flow through e air.

The movement of elecons in the corona field is asy enough to notice under boratory conditions: All ou have to do is introduce small quantity of dust—will immediately move from one electrode to the other, the electrons having "saddled" the dust particles. The principle of transportation of small particles by electrons is applied widely in painting components in special high-voltage chambers; the electric field is used to remove dust from the air. Corona is also applied in ore-processing plants. There the electric field not only cleans the ore of dust but also does the sorting, separating ore particles from dirt. Some 15 years ago Basov suggested to an academic council of the institute that seeds could be cleaned of dust and vegetable matter and grain could be sorted by weight and size in a corona field. The principle was only relatively new, in the sense that no one had ever applied it to agriculture. The first question the council asked was why it had not been used before for grain cleaning and sorting, one of the most labor-consuming operations in farming. Was it because the method hadn't occurred to anyone, or because it might destroy the embryo in the grain?

The council decided that before the idea could be approved, it was necessary to rule out the possibility that electric treatment might injure the grain.

THE TEST

As soon as the shoots pushed their way through the soil, it was obvious that some of the plots sown to "electric" grain yielded much denser and more vigorous growth than the controls. But not every plot. When the records were collated, it turned out that the best germinating capacity was displayed by seeds passed through the treatment machines a week and a half before sowing.

No one noted this specially at the time—more important was the fact that the "electric" seeds had sprouted at all. But when the control plots were harvested and the yield measured, it was found that the largest grain and the best yields came from seed treated a couple of weeks before sowing. Obviously a regular principle was involved. The 10 per cent rise in germination and the 15 per cent increase in yield indicated that high-voltage electric fields need not always be deadly.

The institute's academic council thereupon approved Professor Basov's novel idea for electric grain machines.

His department designed several types—a drum-shaped container followed by a chamber, a belt and a conveyor. All these machines winnowed, cleaned and sorted the grain in an electric field. The final product was a machine called Elektrosemya (Electric Seed), which incorporated the best features of the earlier ones. In addition to cleaning and sorting, it gives the seeds preliminary treatment.

"ELECTRIC" CROPS

The Ural Agricultural Research Institute undertook to check the idea. Its studies confirmed Basov's suppositions: The seeds of soft wheat treated in a corona field show abrupt signs of biological activity on about the tenth day—they have a higher germinating capacity, produce a larger crop and are more resistant to frost, heat and drought. The activity lasts approximately a week, with a peak on the 16th to 18th day, followed by a drop. By the end of the month the treated seed hardly differs from the controls. If, on the other hand, it is sown at its peak, its yield is up to 25 per cent higher than that of the controls.

Having found the answer to one question, the scientists came up against another: It turned out that corona treatment had a different effect not only on the different cereals—wheat, oats and rye—but even on various types of wheat. In soft wheat the peak of biological activity occurred on the seventeenth day. In hard wheat, on the other hand, the active phase did not begin till the thirtieth day, and it reached its peak immediately. Why this dissimilarity? Biophysicists shrugged their shoulders—a mystery.

But the mystery had its unpleasant side: What guarantee was there that the corona would not damage some varieties? A test involving at least 250 acres was needed.

In 1965 experiments were carried out simultaneously on four state farms in Chelyabinsk Region and at a training farm for agricultural specialists. All told, 600 acres were sown to treated seeds.

That summer there was not a single rainfall; it was the worst drought in 20 years. One state farm harvested only a fourth of its usual crop. But oddly enough, on the state farm that was hit hardest by the drought, the treated seeds had a better germination rate and a 41 per cent higher yield than the average for conventional seeds planted there in previous years. The other farms showed the usual increase in yield—about 15 per cent.

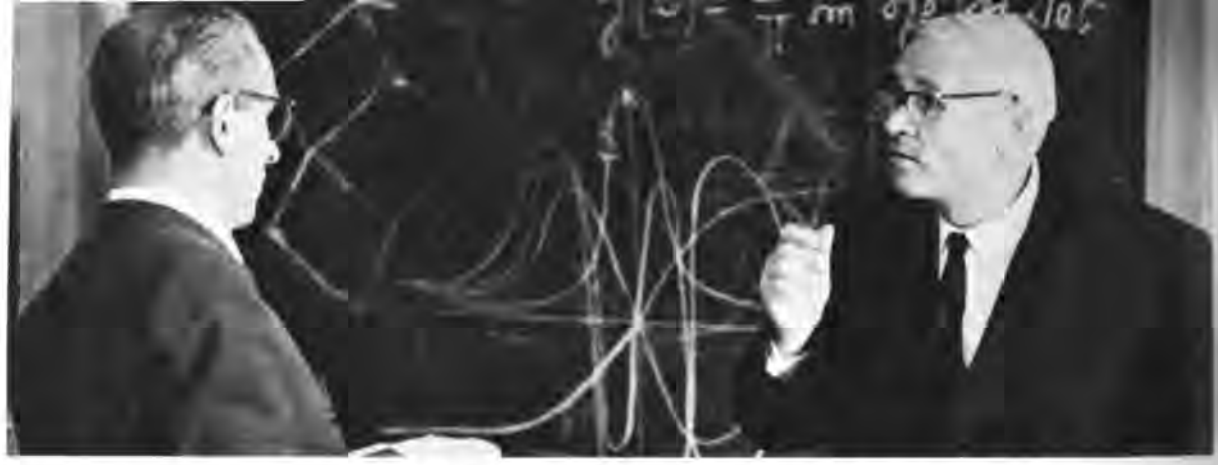
It was a convincing victory. But new worries popped up—that electric treatment might affect the grain's baking properties, its protein and gluten content especially.

A LOAF OF BREAD

The USSR has an institute of baking which has catalogued some 700 recipes for bread, rolls and buns, all based on two properties of grain—its protein and its gluten content.

Continued on page 22

THE SCIENCE OF THE GREATER URALS



THEORY IS THE MOTHER O

An Interview with Professor Mikhail Mikheyev, Director of the Institute of Metal Physics, Ural Science Center

Your institute must have set the pace for much of the Ural scientific research.

So it seems. The institute was organized by the famous Leningrad Physics and Engineering Institute on the initiative of Academician Abram Ioffe, who believed that science should be brought to the industrial regions instead of being concentrated in the capitals.

During the first five-year plan periods the institute expanded rapidly. At first there were only 60 of us, but those 60 were the nucleus that attracted other scientists who wanted to work on problems important for the country.

From the first months we deliberately limited our investigations to a branch of solid-state physics—the physics of metals. But in this field we kept track of every significant development.

We started with two main lines, the physics of magnetic phenomena and the physics of strength; the choice was carefully considered. The country's electrification required new magnetic materials for generators and motors, and all industry needed high-strength metals. Only our institute was prepared to tackle these questions—specialists who came to Sverdlovsk from Leningrad had studied similar problems under the direction of Academician Ioffe. In addition, we were strongly motivated by our daily contact with Ural industrial workers.

It is this approach—concentration on a few key phenomena of nature and on problems whose solutions are urgently needed by the country, as well as cooperation with factories—that has become our trademark.

Our scientists have done important work on the theory of mechanical, magnetic, electrical and superconductive properties of metals. They have advanced a theory of thermomagnetic phenomena in metals and semiconductors in a strong magnetic field, have made detailed studies of the propagation, absorption and transformation of ultrasound in magnetically polarized media and have proposed a general quantum-statistical theory of nuclear magnetic resonance in ferromagnetism and antiferromagnetism.

I cite only some of the large-scale projects. But I wanted to mention at least these central lines of inquiry, because all the practical applications we have been able to make are the result of years of scientific research. The scores of authorship certificates and patents issued here and abroad were possible only because of the theoretical foundation laid at our institute. It is no accident that the two scientific journals we publish—**Physics of Metals** and **Metals Science and Fault Detection**—are translated into English abroad as soon as they appear.

Would you describe some of the practical applications?

Four of the studies done by our institute have won state prizes. Our staff people created nikosi, termekhvako, fekhko, new and original magnetic alloys used widely in the electrical engineering industry. They also developed permanent magnets that are five times stronger than the best previously used. They synthesized new magnetic semiconductors, for instance, on the basis of compounds of the element europium. The institute has given industry any number of materials with valuable and often unexpected properties.

We not only create new materials for industry, we devise methods for machining them. Just as new magnets can be developed only after an exhaustive exploration of magnetism, improved methods of machining are the result of theoretical studies in the field of metals strength and plasticity. By working out better metal-processing techniques, we reduce the labor required to machine components and improve the quality of the finished product.

We have learned to finish metals in various ways, including liquid pressure and exposure to a magnetic field. A metal compressed on all sides by liquid requires no additional machining. More important still, using these same techniques, we are able to work with materials that are almost impossible to machine otherwise. Tungsten and molybdenum, for example, can be pressed or forged only at a temperature above a thousand degrees centigrade. With the new methods we obtain any shape required at ordinary temperature.

To mark the fortieth anniversary of the institute, we arranged a small exhibition that included tungsten and molybdenum rods tied in knots. For anyone familiar with these metals it was an incredible sight since they are extremely brittle. Subjected to the all-round pressure of a liquid, the molybdenum and tungsten increase their strength and become so plastic they can even be twisted.

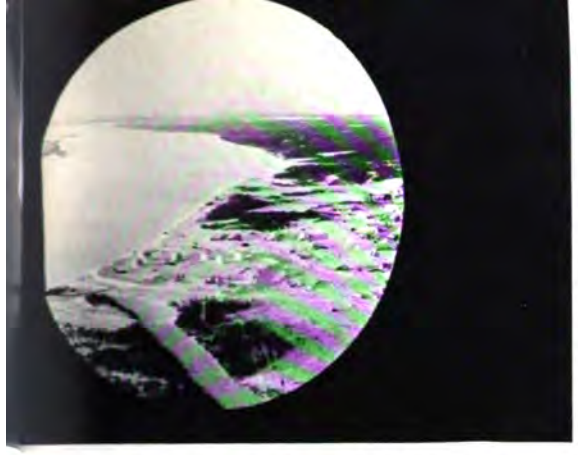
A third direction of our work that has yielded any number of practical applications is nondestructive testing.

This is based on connections we have established between the mechanical properties of metals and their magnetic and electrical properties. We have accumulated a wealth of experience in this field, and now we have begun to see results. Many plants are checking the quality of their products with fault-detecting devices we have developed—fast, reliable, precise, and harmless to the metal.

The next step is checking the quality of nonmagnetic materials with eddy currents. Such fault detectors have already been built.

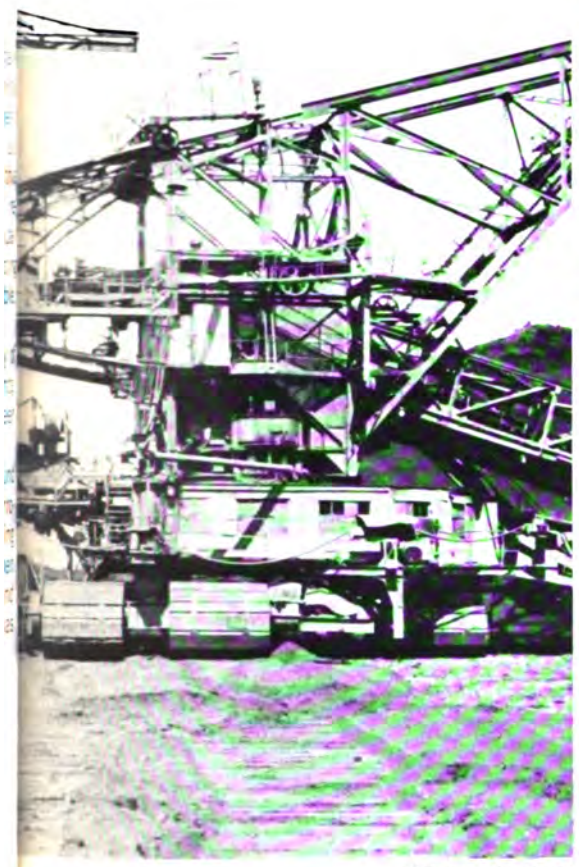
Oilmen are monitoring underground pipelines, doctors are using the ferroprobe method, builders are determining strains in various structures, railwaymen are checking the condition of rails—and all this with techniques our institute has developed.

The Institute of Metal Physics is one of the oldest scientific establishments in the Urals. This year it celebrated its fortieth anniversary. It has a staff of a thousand, more than any other institute in the Ural Science Center complex.



Factories throughout the country have been checking the quality of their products with instruments and devices developed By the Institute of Metal Physics in the Urals. Based on the relations between the mechanical properties of metals and their magnetic and electrical properties, these devices are reliable, precise, do not destroy the metals and give immediate readings. Techniques worked out by the institute permit oilmen to inspect buried pipelines, physicians to use ferroprobes, builders to find flaws in structures, railroads to monitor the rails.

RACTICE



"From the first months we deliberately limited our investigations to a branch of solid-state physics—the physics of metals. But in this field we kept track of every significant development."

THEORY IS THE MOTHER OF PRACTICE

Continued from page 19

The protein content of grain is only seven to eight per cent, but protein is one of the most valuable constituents of bread. Every additional per cent of it that we can add means a tremendous nutritional gain.

As for gluten, it shows up in the baking. Why don't some breads taste as good as others? It depends not so much on the variety of wheat as on the flour. "The flour has lost its gluten," bakers say.

The effects of electric treatment on protein would have to be checked by a field test, and its effects on gluten content by an experiment in a grain elevator. Again experimental and control plots were sown, and three electric grain machines were installed at the Chelyabinsk elevator to treat the grain that was later milled into flour.

Gluten proved easier to cope with: It has long been known that the poorest quality bread is baked from grain that has lost its germinating power. Therefore, it was logical to expect that the baking properties of grain treated in a corona field would be better than those of the controls. The experiments at the Chelyabinsk elevator confirmed this assumption. Grain that would ordinarily have been the poorest choice for baking, when treated electrically and kept until its biologically active phase, produced first-quality bread. No one could believe that two loaves—one dark, heavy and unappetizing and the other one-third larger—had been baked from the same grain, from the same quantity of flour, in the same oven and by the same baker. The difference, of course, was that the grain for the first loaf was untreated.

PROTEIN

It was somewhat harder to determine what effect electric treatment had on the protein content of grain. At first the experiments were successful: The early samples of the "electric" crop contained half of a per cent more protein than the controls—a sizable addition! But later specimens of the same harvest showed the opposite results—a decline in protein. Why?

The scientists began looking for reasons. Apparently the grain had been passed before sowing through different machines, which imparted different charges—either negative (it was the negatively charged seeds that yielded a 0.48 per cent rise in protein) or positive (these seeds showed a decrease in protein content). In some still unexplained way, the corona treatment plays the role of protein regulator.

It has been established that the electric field has a beneficial effect on wheat, oat, barley, rye and rice seeds and other cereal crops. The success of the Chelyabinsk machine was so resounding that the Committee for Science and Technology of the USSR Council of Ministers decided to hold a special conference on the application in agriculture of similar equipment and of electric ion technology in general. It was held in the Chelyabinsk institute where the idea originated. Specialists came from all parts of the country.

Here is a sampling of the places where Professor Basov's idea has been applied, and the results: In Tashkent, capital of Uzbekistan, it was found that corona treatment stimulates the biological activity of cotton seeds. In Kirghizia and the Kuban (Northern Caucasus) area sugar beet seeds were treated electrically; the result was a 20 per cent increase in yield and a higher sugar content. In Georgia excellent results were obtained with grapevine saplings. Machines designed by Professor Basov have even been adapted to sorting potatoes. By the most conservative estimates, the work done by the institute will increase the country's grain production by millions of tons without opening up new lands, without additional fertilizers or irrigation.

THE URALS' GREEN RICHES

Photographs by Victor Brel

THE URALS run straight down the 60th meridian as though lifted by some giant hand. They are represented on the map by a long, even stroke of the brown used to identify mountains; curves appear only at the extreme north and south. Almost all the climatic zones in our country cross this range.

The Ural area is fabulously rich in natural resources. Since ancient times it has been the source of iron ore, rare precious stones, timber and fur. In the last two centuries industrial development has transformed this region.

What will the Urals be like in the future? The question is serious. More than esthetics is involved—at issue is the preservation of the natural environment.

Green cover—especially woods—is the most crucial element in the biosphere. The forests are no longer important principally as a source of timber, although the Urals still yield some 2.5 trillion cubic feet of it, almost one-fifth of the country's total. Now the Ural forest is evaluated in terms of water and soil conservation, regulation of river flow and influence on climate, rather than of cubic feet and rubles. Thousands of streams and rivers—tributaries of the Kama, Ural and Tobol— originate here. Their flow, directly dependent upon the condition of the mountain forests, determines water supply for the entire Ural economic area, where water is the scarcest natural resource, and for neighboring regions as well.

The forest zones have still another, imponderable, value as a recreational area, a refuge from the noise and pollution of industrial towns. In short, the forests near Ural industrial centers must be thought of as a health resource.

There are now four nature preserves in the Urals. The Ilmen, a mineralogical treasure house unique for its variety, was established way back in 1920. Ten years later the Pechoro-Ilychsky and Bashkir preserves were set up in order to protect the Ural sable. The newest Ural preserve is the Vesimsky, located 125 miles from Sverdlovsk. It appeared on the map only two years ago.

The Urals are beautiful everywhere, from the Arctic north to the parallel ranges of the south. It is our responsibility to keep them that way.

The Ural
fabulously rich in
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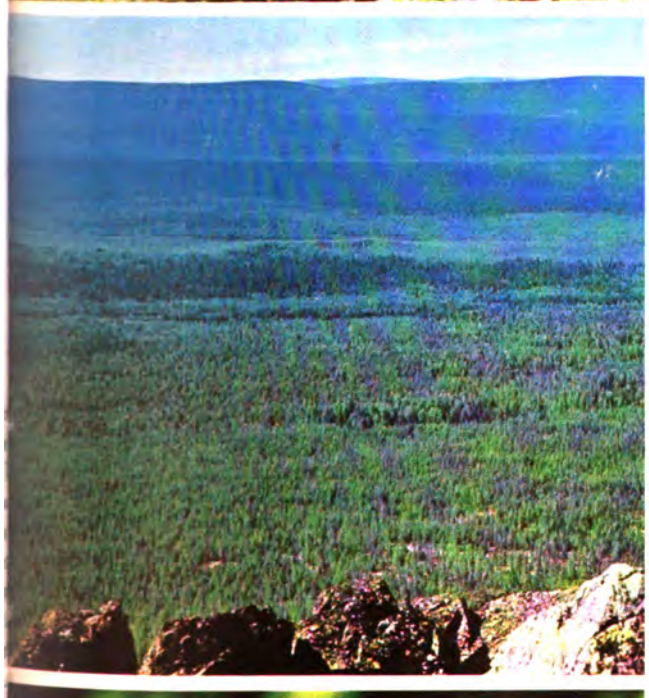
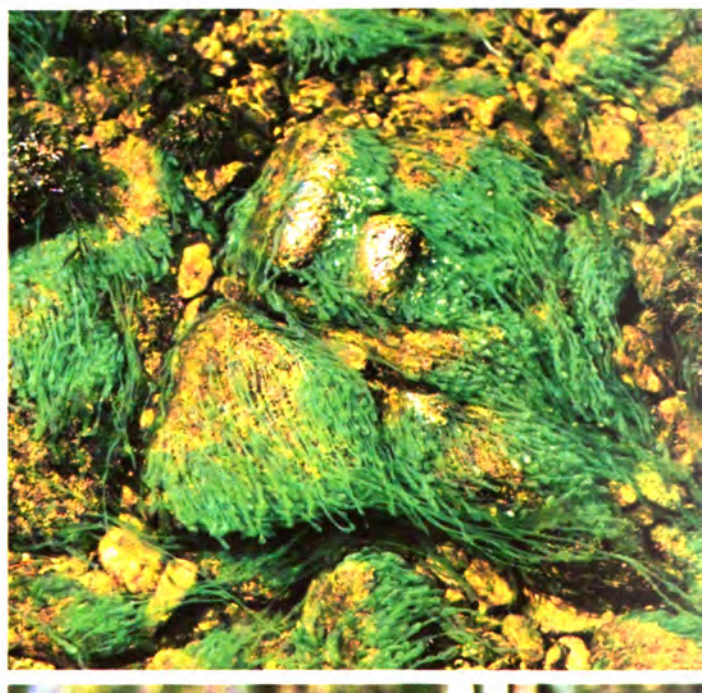
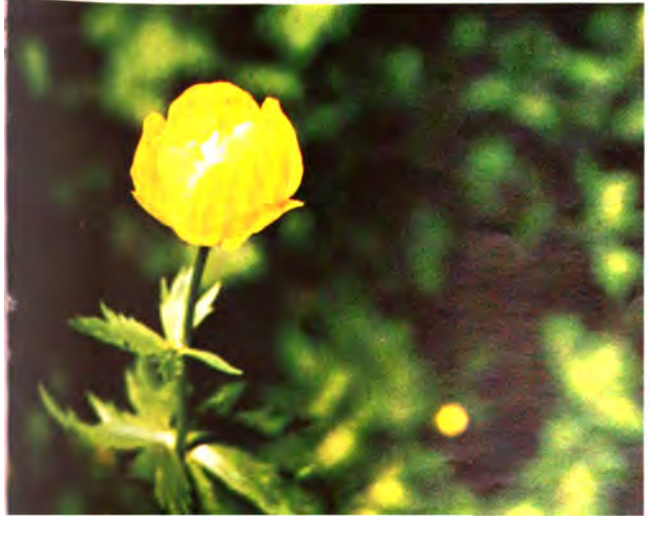
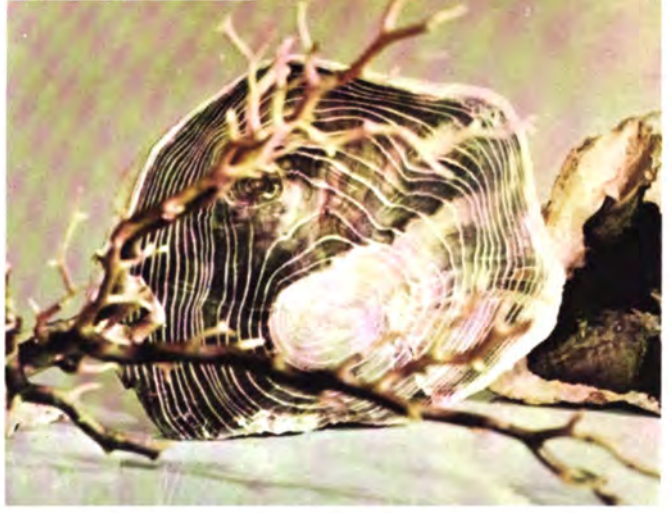




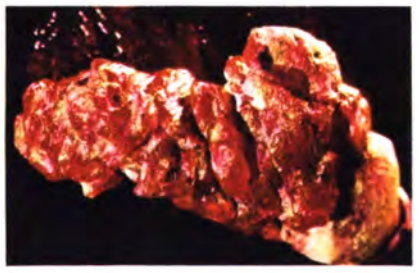




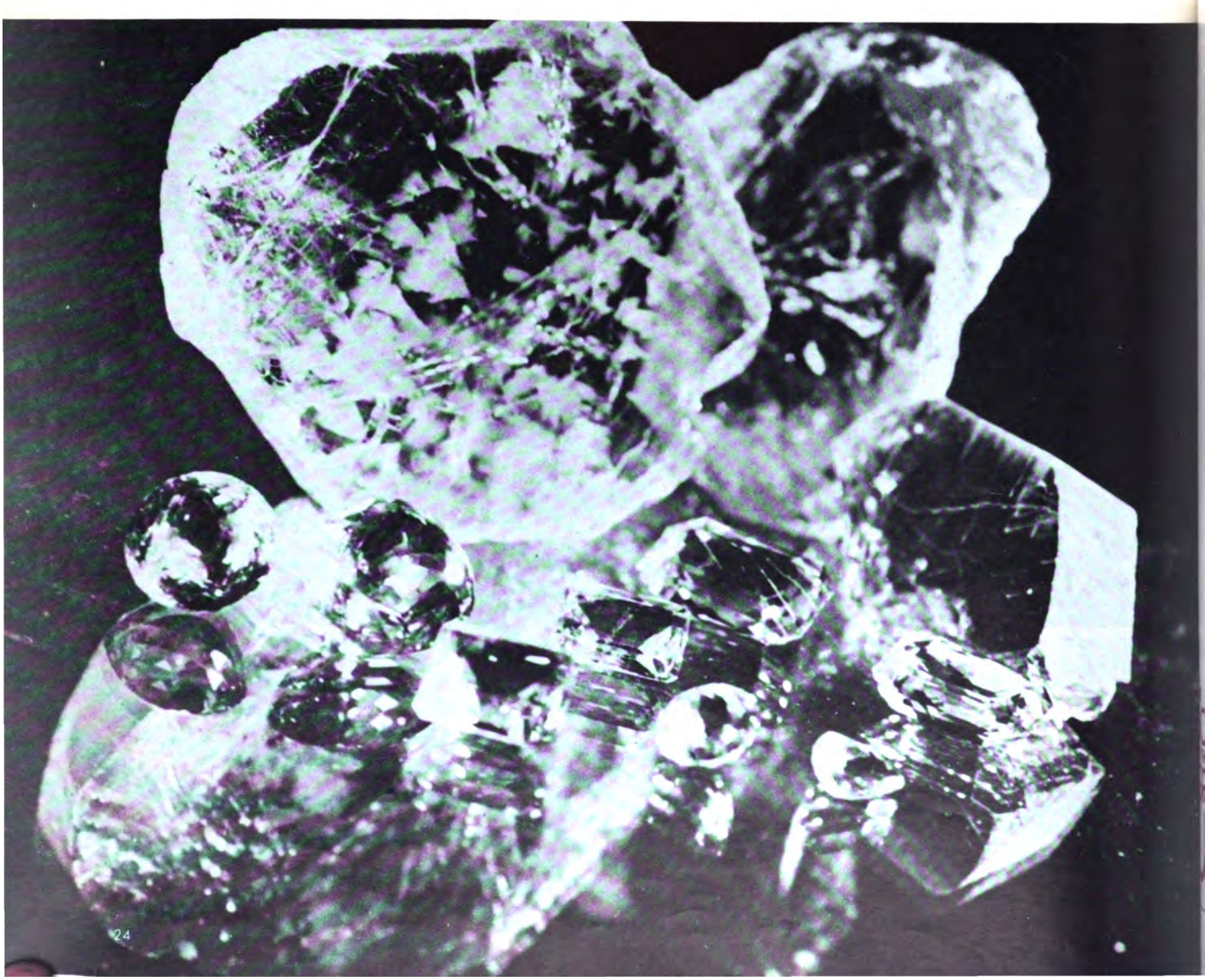
Lapis lazuli, rhodonite and quartz. Below: Cornelian, a variety of chalcedony, is a popular material for cameos. Bottom: Topaz, polished and unpolished.

Photographs by Alexander Shipinev

Agate and (in the background) amethyst, a type of quartz. This sample is an unusually delicate violet. Top center: A branch and a polished cross section of a petrified tree.



URAL GEMSTONE



Nature has been generous with this area: Besides its valuable industrial ores, it is a treasure house of gemstones. The jewelry and *objets d'art* made by the Urals craftsmen are exported to all parts of the world. Some come in hundreds of different shades.

ARTISTS

THE SCIENCE OF THE GREATER URALS

The Russian Gemstone Studio in Sverdlovsk is one of the oldest such workshops in the Urals, having recently celebrated two hundred forty-seven productive years. Its creations have invariably won the highest prizes at Russian and foreign exhibitions. At the 1900 Paris World's Fair the craftsmen's semiprecious-stone map of France was a center of attraction.

For its map of the Soviet Union, made of precious and semiprecious stones, the studio won the Grand Prix and a gold medal at the 1937 World's Fair in Paris.

Correspondent Lyudmila Butorina made a visit to the Ural studio recently.

YEVGENI VASILYEV, chief artist of the Russian Gemstone Studio, placed several small boxes on the table.

"We specialize in souvenirs," he said, "but we also make traditional pieces—vases, chests and inlaid pictures—we're famous for those."

He showed me a powderbox of delicate pink rhodonite, a tiger-color stone flower vase and a candlestick, the last two fashioned from jasper. Some 200 shades of this uniquely colored stone are found in the Urals.

Lazurite, dark blue with white flecks, has a quality peculiarly its own and can transform the plainest article into a thing of beauty.

Serpentine, amazonite, mountain crystal and jasper are used for semiprecious-stone landscapes done in Russian inlay style. Vasilyev creates many of these.

Probing the Stone

Gray, inert and unexpressive, stone blocks lay around in the stock area, where Vasilyev took us.

"The first thing we have to discern is the stone's intrinsic beauty," he explained. "You see the pattern here? The stonecutter has to guess how it develops naturally below the surface so that he doesn't spoil it. The idea is, in cutting up the stone, to emphasize that pattern."

Artists and stonecutting designers then sketch the pieces to be made. But the sketch on paper, no matter how good it looks, doesn't always carry over to stone. Some stones are too hard; some are too brittle. Still others refuse to take on the form desired. In a word, every mineral has its own peculiar characteristics. That is why the best stonecutters are also designers.

They recently produced some originals, prizes "Izvestia" awarded to international hockey tournament winners. Now designers Victor Molchanov and Victor Sargin are working on an inlaid portrait of Yakov Sverdlov, the first Soviet president, after whom the city was named.

Technology and Art

Semiprecious stones are milled, ground and polished on a variety of machines in a spacious and well-lighted section of the shop.

"For decades people have argued against mechanization in art crafts. Machinery, they think, standardizes art, strips it of individuality. In their opinion machinery limits imagination."

"And what do you think?"

"I'm also for preserving the originality of old Ural art, but machinery is not a barrier to creation."

At a turning lathe Vasilyev picked up a half-finished vase.

"A fine job, isn't it? So what's the point of turning it by hand?"

Diamond tools and ultrasonics also help the stonecutter. Ultrasonic equipment is most efficient for cutting reliefs and engraving. The work used to take weeks, even months; a machine does the job now in minutes.

There is no question, however, that skilled hands and artistic intuition and taste have to remain the basic elements.

Training Craftsmen

The Sverdlovsk Vocational School trains craftsmen for the Russian Gemstone Studio. Its three-year course covers mineralogy and crystallography, mechanical drawing and stoneworking technology, drawing and watercolor painting, modeling, composition and esthetics.

Vasilyev showed me a list of foreign countries where the Russian Gemstone Studio has been invited to exhibit: the German Democratic Republic, Yugoslavia, Czechoslovakia, Greece, Algeria, Syria, Turkey, Poland, the Federal Republic of Germany, Hungary, Egypt, Libya and others.

SECRETARY WEINBERGER'S VISIT TO THE USSR

FOR LONG-TERM

By Georgi Murzin

Last autumn a telex line between the USSR Ministry of Health and the U.S. Department of Health, Education and Welfare was opened.

The first message it carried was a joint communiqué from U.S. Secretary of Health, Education and Welfare Caspar Weinberger and USSR Minister of Health Boris Petrovsky. At the invitation of Minister Petrovsky a delegation led by Secretary Weinberger was visiting the Soviet Union at the time to discuss the implementation of the Agreement Between the Government of the USSR and the Government of the USA on Cooperation in the Field of Medical Science and Public Health.

In Moscow Nikolai Podgorny, President of the Presidium of the USSR Supreme Soviet, received Secretary Weinberger.

OUR CONTACTS and mutual work in the prevention and treatment of the most complicated and dangerous diseases seem to be very promising," Boris Petrovsky said when the joint communique' was signed.

Secretary Weinberger noted that the joint work done to coordinate technical methods and comparable units of measurement by Soviet and American medical workers in accordance with the agreement laid a solid methodological foundation for collaboration. "Implementation of our plans will now proceed much more rapidly."

The talks at the USSR Ministry of Health selected 15 of the most important problems within the three main areas of cooperation—cardiovascular diseases, oncology and environmental health. There was a decision to add the study and treatment of arthritis. The areas of cooperation will probably be expanded to include influenza. During the talks both parties agreed that joint work here would be helpful.

Secretary Weinberger said he was gratified at the inclusion

A telex line now connects the United States and the Soviet Union for rapid communication on one of the most vital of a

At the Academy of Medical Sciences Secretary Weinberger is greeted by the Academy's president Vladimir Timakov.

The Secretary, in his speech, made the point that cooperation on medical research should be planned on a long-term basis.

At the Institute of Obstetrics and Gynecology. Left to right: Institute Director Leonid Persianinov, Assistant Secretary of Health Edwards and medical institute rector Mikhail Kuzin.

At the Moscow City Soviet with First Vice Chairman Vasili Isayev (pointing).

...spar Weinberger,
...S. Secretary
...Health, Education
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...rport in Moscow by Boris Petrovsky,
...nister of Health of the USSR.
...e communiqué on the visit noted
...growing cooperation and the
...vances achieved as a result.

COOPERATION

of arthritis, "a disease that has caused so much suffering to so many people all over the world."

During his stay in the Soviet Union he visited several scientific centers, among them the Institute of Cardiology, the Institute of Clinical and Experimental Surgery and the Insitute of Oncology. In an interview he said he had been very impressed with the high level of research in these centers, especially in cardiology and oncology.

At the Moscow Institute of Cardiology Soviet and American scientists discussed research work on the causes of atherosclerosis and the development of infarction of the myocardium and methods of treatment for infarction used in the USA and the USSR. "It should be noted that we approach these problems differently," Dmitri Venediktov, USSR Deputy Minister of Health, said. "American surgeons, in our opinion, are overenthusiastic about surgical treatment for this malady and operations on blood vessels of the heart, while we prefer the more active and at the same time less painful therapeutic methods. Soviet and American doctors are busy now drawing an objective comparison between these two methods. I think that eventually, by combining the experience gathered by both parties, we shall get the best results. We can learn a lot from procedures followed by American heart surgeons. On their part, doctors in the United States are very much interested in our specialized ambulance service for coronary cases. As we know, it is the first hours of a heart attack that usually prove fatal. This consideration accounts for one more field of Soviet-American cooperation—problems of sudden death caused by heart diseases."

In the field of oncology, Soviet and American efforts are concentrated on the study of the virus nature of leukemia. Soviet and American scientists will exchange virus cultures; cultures from the Soviet Union will be studied in the USA, and American cultures will be studied in the USSR—a quite unusual exchange. With the new data on those viruses recently obtained, methods of treatment can be studied. In addition, after the intergovernmental agreement was signed, the scientists exchanged new

...elds of *study—health.*

Photographs by Boris Babanov

Secretary Weinberger (right) and Minister Boris Petrovsky at the Research Institute of Clinical and Experimental Surgery.

Secretary Weinberger addressing staff members at the Research Institute of Clinical and Experimental Surgery. Below: A lively and less formal exchange with Soviet medical experts.

Minister Petrovsky explains the design of a pressure chamber used for examination and diagnosis.

A talk with Vyacheslav Yelutin, USSR Minister of Higher and Specialized Secondary Education.

antitumor preparations. Five Soviet anticancer drugs are presently being tested in the USA.

Twenty-two big Soviet research institutes are now working on the diagnosis and treatment of cancer. The prevention and early diagnosis of precancerous states, particularly in such organs as the stomach, mammary glands and the genitals, are getting special attention. Regular examinations and outpatient treatment are provided by more than 280 cancer prevention centers and a variety of specialized polyclinics. Modern surgery and other methods make it possible to control certain precancerous growths so that they do not develop into malignancies. A total of 95 million people in the country are checked at these centers.

Secretary Weinberger had an opportunity to get acquainted with Soviet hospitals and other medical facilities in Tashkent, the capital of the Uzbek Republic, and in Bukhara and Samarkand, two other cities in that republic, besides those in Moscow.

Speaking of his trip to Uzbekistan, he said:

"No one could fail to be impressed at the rapidity with which Tashkent was rebuilt after the destruction caused by the earthquake several years ago. We visited hospitals and other facilities in the area and saw that they were not only in full operation but well equipped. A very large amount of construction generally is going on in the area. And we naturally and necessarily were impressed with all this."

Secretary Weinberger is a lawyer by training but, said Dmitri Venediktov, in his talks with specialists in one or another "narrow" medical field he asked them such specialized questions that they never suspected he was not a doctor.

"I think," Venediktov went on to say, "this demonstrates Mr. Weinberger's real interest in our experience in health services and medicine and in cooperation in this field. His speech at the meeting of the Presidium of the USSR Academy of Medical Sciences, where he expressed his desire for long-term cooperation between our two countries, is added evidence of this. We, on our part, are ready to cooperate and can only welcome such proposals."

At the concluding press conference in Moscow, Secretary Weinberger said:

"I want to convey the gratitude and appreciation that my colleagues and I feel for the warmth of the hospitality with which we have been received, and the genuine friendship that we feel between the peoples of the Soviet Union and the people of the United States.

"We have said many times and we mean most sincerely that peace is far more than the absence of war. It is active, healthy, continuing and growing cooperation in many vital fields. And this communiqué today demonstrates that very practical achievements have already been realized and that the foundation has been laid for many more."

The ceremonial signing of the joint communiqué on the visit of the U.S. delegation to the Soviet Union.

U.S. MEDICAL EQUIPMENT IN SOKOLNIKI

Last fall DRG International, Inc., with assistance from the USSR Chamber of Trade and Industry, arranged the Medical Equipment from the USA exhibition at Moscow's Sokolniki Park. The most modern equipment for diagnosis, anesthesia, resuscitation, various kinds of therapy, organ transplantation and the processing and transmission of medical information was displayed and demonstrated by 40 manufacturers.

The Sokolniki exhibition attracted considerable interest among scientists, physicians, medical engineering people and public health officials. The large response is understandable considering the scale of the Soviet Union's medical equipment industry; its factories turn out 4500 items in general use in medical and research institutions.

Medical equipment made in the Soviet Union is recognized internationally. The heart and lung machine for artificial blood circulation, the apparatus for welding bones, the optical devices for inspection of internal organs are familiar to practitioners in many foreign countries.

Most of the people who visited the Sokolniki exhibition had the background to evaluate the high technical standards of the American equipment. For example, Yuri Logachev, head of the department of medical equipment, USSR Ministry of the Medical Industry, said:

"Soviet specialists have something to learn from their American counterparts. There are also areas where cooperation would be mutually helpful, exchange of technical information, for instance. I liked much of the equipment displayed, particularly a scintillation camera for high-fidelity gamma imaging made by Picker Corporation, autoanalyzers for clinical biochemical analysis made by Technicon Corporation and ophthalmological instruments made by American Optical Corporation.

"But I thought the prices of some of the instruments and apparatus were too high. This applies not only to complicated apparatus, but to such relatively simple units as surgical scissors. Scissors made in the Soviet Union are one-seventh the price of the U.S. equivalent. On the average, the price of American equipment is four to five times higher than Soviet items with similar or comparable characteristics. This evidently reflects the different approach to public health services in our countries. What I mean is that even the most complicated up-to-date medical equipment is used free of charge for everybody who needs it in the USSR and cannot, therefore, be high priced. However, that does not deny the generally favorable impression made by the American equipment."

A BOOK ON THE HISTORY OF SOVIET-AMERICAN RELATIONS

THE INSTITUTE of U.S. Studies, USSR Academy of Sciences, headed by Professor Georgi Arbatov, has just published a book in English marking the fortieth anniversary of the establishment of Soviet-American diplomatic relations. It is titled *Soviet-American Relations: Past and Present.*

The authors point out in the preface that this is a work of political as well as academic interest, because it deals with the most important trend in twentieth century diplomacy —the development of relations between countries with different social systems. The current détente, Professor Arbatov feels, is proof that ideological differences and contradictions are not a barrier to mutually beneficial cooperation.

Edited by Professor Nikolai Yakovlev, a well-known specialist in American studies, the book traces the history of Russian-U.S. relations since the American Revolution. Russia resolutely supported the colonists' struggle for independence; Catherine the Great refused to comply with a request from King George that she send 20,000 Cossacks to crush the rebellion. Russia took the initiative in proclaiming "armed neutrality at sea," thus wrecking the trade and economic blockade of the North American colonies, and later helped the U.S. obtain compensation from England for damages done to American citizens.

The first section of the book tells how Russian-American relations flourished from the founding of the U.S. until World War I.

The second section deals with the period between the two world wars. It took the United States 16 years to recognize the Soviet state. The decision, made by President Franklin Delano Roosevelt, called for a good deal of political courage; later events confirmed its necessity and wisdom. During the 1930s relations between the USSR and the USA developed sufficiently to pave the way for the anti-Hitler coalition, which played a major role in the defeat of fascism. At the same time, the authors of the book argue most convincingly that World War II could have been prevented if the Western powers, including the USA, had adopted the Soviet proposal for a collective security system.

The third period—that of the military and political alliance between the USSR and the USA during World War II—is still recent history. In spite of deep ideological and social differences, the two countries achieved a close cooperation based on their common interest in defeating fascism.

Ties between the Soviet and American peoples grew stronger as joint decisions were made on the conduct of the war and then on the terms of the peace.

However, soon after the victory, as the authors point out, the cold war began. It is hardly necessary to describe in this short review how it began: It is much more important to draw valuable lessons from it.

Only in the mid-sixties did signs of normalization in the relations between the USSR and the USA start to appear: An accord was reached banning nuclear tests in the atmosphere, in outer space and under water; an agreement on scientific, technological and cultural exchanges was expanded, a direct air link established between Moscow and New York, a treaty on nonproliferation of nuclear weapons and other documents signed.

In the postwar period the Soviet Union has offered numerous proposals for the relaxation of tensions and the development of international cooperation because, as Leonid Brezhnev, General Secretary of the CPSU Central Committee, observed, peaceful coexistence is more than an absence of war between socialist and capitalist states; it is an opportunity to broaden and deepen the friendly ties between them.

The seventies, the authors point out, mark a turning point in the history of Soviet-American relations. In this period the Nixon administration replaced its earlier emphasis on absolute power with the concept that strategic arms are sufficient, and also recognized the principle of equality of nuclear forces. These changes in approach opened the way for a constructive dialogue between Moscow and Washington.

In May 1972 President Richard Nixon visited the USSR, and in June 1973 General Secretary Leonid Brezhnev came to the U.S. Their talks resulted in the signing of more than 20 agreements, notably the historic accord on the prevention of nuclear war, concluded during the second summit meeting. In the authors' opinion, a large range of mutual interest has made the present normalization of Soviet-American relations possible. These include the prevention of nuclear war, the limitation of arms spending, the expansion of trade and economic relations and of scientific and technical cooperation.

The book's basic premise is expressed in the final section: For the Soviet Union, peaceful coexistence of states with different social systems is not a tactical maneuver undertaken for momentary advantage—it is a major political principle to which socialist diplomacy has consistently adhered.

As a basic doctrine of Soviet foreign policy, it can be depended upon by all states interested in international security.

By Yaroslav Golovanov
Science Commentator
of the newspaper
Komsomolskaya Pravda

Photographs by Oleg Ivanov

There used to be little or no hope for infants born with defects requiring immediate surgery. At the Moscow Regional Research Clinical Institute headed by surgeon Vyacheslav Frantsev, 80 per cent of the once doomed infants now survive after surgery. Medical care is free in the Soviet Union, including such unique operations as those performed by Dr. Frantsev.

Vyacheslav Frantsev: SURGEON FOR THE NEWBORN

THE BABY BOY born to the Tarasovs in the small town of Ozery in Moscow Region looked strong and vigorous. His size and weight were normal, he did not cry too much and, in general, gave the physicians no cause for concern until he was brought to his mother to be breast-fed. The infant began to choke on his mother's milk. After the second attempt at breast-feeding it was evident that there was something wrong, and the child was taken immediately to the Moscow Regional Research Clinical Institute.

The diagnosis of specialists was that the infant's esophagus was blocked at the other end. A fistula connected it with the trachea, and when the baby was fed, the food passed into the lungs instead of the stomach. Moreover, the lower part of the esophagus, leading to the stomach, was also connected with the trachea, and that made artificial feeding impossible. However, the immediate threat to the baby's life was not hunger but pneumonia, since his lungs were already full of milk. Complicated emergency surgery was indicated. Dr. Vyacheslav Frantsev operated on the 36-hour-old infant.

A word about the surgeon. Vyacheslav was the ninth child of a railroad worker. At the age of three he developed tuberculosis of the joints and had to spend years in various hospitals. Doctors became his best friends.

Vyacheslav did not start school until he was 11, when the cast on his foot was finally replaced by an orthopedic shoe. This was during the hard years of the Second World War.

In 1947 he entered a medical institute. But he wasn't satisfied with being a general practitioner. After graduation he began to intern under Academician Alexander Bakulev.* Some time later several talented young specialists, including Frantsev, were invited by Professor Yevgeni Meshalkin, another famous surgeon, to work at his clinic. Vyacheslav became his assistant and soon after defended his candidate's thesis. "For two years we worked in a state of almost complete bliss," he says of those days.

Frantsev began to specialize in thoracic surgery, concentrating on congenital heart defects in newborn infants and babies. At the time world statistics recorded very few such operations, not all of them successful.

"On how many babies have you operated?" I asked Frantsev. "Hard to say. Maybe a thousand . . . I lost count."

But let us return to the Tarasov boy. Dr. Frantsev thinks that there was nothing special about the operation. More complicated cases have been recorded. This one became so widely known only because of the age of the patient.

The case history listed only the child's last name, and when I asked about that, I was told that the parents hadn't even had time to name the baby when the operation was performed. They later named him Vyacheslav, for the doctor who saved his life. He goes to school now, while the surgeon he was named after is head of the Moscow Regional Research Clinical Institute.

Frantsev seldom talks about his feeling for children, but I remember his saying once:

"Do you think infants don't understand what's happening around them? Even two- and three-month-old babies. I can tell when they understand me, know that I want to help them. I can see it in their eyes. It is simply that they can't express their feelings in ways we can understand."

Pediatric surgery means not only patients who are too small to tell the doctor how they feel. It also means new diseases that do not occur in adults, and untried methods of treatment. It means new methods of anesthesia, new and finer surgical instruments and new regimens of postoperative care. In a word, all the complexities of adult surgery are twice as great in infant surgery. It has given its creators many a difficult moment.

Talking of child surgery and of the work of colleagues in Moscow, Leningrad and other cities, Dr. Frantsev shared with me his ideas for a future specialized institute.

A lot of experience has been accumulated. It must be put together and generalized. Moscow is not the only place where heart operations on infants are performed. They are done in other parts of the country as well. However, Frantsev's demonstration operations are always medical events. He has operated in many Soviet cities and taught his skills to many now highly qualified cardiologists and surgeons. The staff members of his clinic have read papers at many conferences, symposiums and congresses: in Rostock in 1967, in Melbourne in 1970 and in Moscow in 1971, among others.

He had been invited to lecture by British surgeons, and this spring he visited the United States.

Professor Frantsev is a man of wide and considerable erudition. He speaks several foreign languages. His friends include writers, journalists and actors. I like his very human interests. Thus, for instance, he has a big dog. The reason? "I don't get much exercise and the dog will take me for walks." He has one of the largest collections of souvenir pins in Moscow, particularly medical and sports pins. Sports is another of his hobbies.

He has always been interested in boxing. He used to go to matches and has many boxing friends. He joined the Medical Committee of the USSR Boxing Federation and soon afterward was elected chairman of the medical commission of the European Boxing Association. Presently he is a member of the medical commission of the World Boxing Association.

One of the youngest people in the country to have gotten a Doctor of Science degree in medicine, Professor Frantsev still has a long and brilliant way to go.

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*Alexander Bakulev (1890-1967), founder of Soviet heart surgery, performed first heart operation in 1948.

Around the Country

SPACEMEN MEET

Last summer a group of Soviet cosmonauts and space scientists involved in the preparations for the projected joint Soyuz-Apollo flight visited the U.S. manned-space-flight center at Houston. Vladimir Shatalov, twice named Hero of the Soviet Union, spoke to newsmen about the two-week visit to the USA.

"We studied very carefully the American spacecraft, all its systems, including the docking, or, as it is called, adaptor, module. Our talks with American astronauts and specialists and the lectures we attended in Houston were very helpful. We had a chance to see the simulators on which our American colleagues are training for their flights.

"During our joint work at Houston, we went into the program of the flight, the docking, the sequence of visits from one spacecraft to another and many other matters. Although docking is the main purpose of the flight, we also worked on the scientific program since the flight of the two spacecraft in a docked state will continue for two days.

"To sum up, I must say that tremendous and intensive work lies ahead, and spacemen are ready for it."

MAIDEN VOYAGE

A new mother fishing ship, the *Vostok*, built in Leningrad shipyards, left the port of Ilichevsk on the Black Sea not long ago for her maiden voyage in the Atlantic. As high as an eight-story building and 820 feet long, the *Vostok* carries 14 fishing boats. They are put down in waters that ensure a continuous supply of fish to the mother ship.

The *Vostok* can process close to 350 tons of fish a day. The fully automated shops of the floating factory have the capacity to turn out 150,000 cans of fish and about 22 tons of fishmeal daily.

The vessel has comfortable quarters for the crew, lounges, a movie hall, a shipboard polyclinic and a hospital.

IN MEMORY OF LEO TOLSTOY

In the city of Tula, near the Tolstoy estate museum Yasnaya Polyana, is a new monument, to Leo Tolstoy. It is the work of sculptor V. Buyakin and architect A. Kolchin.

FAMOUS TROTTERS

Next year the Khrenovoye stud farm, near Voronezh, Central Russia, will be 200 years old. Preparations are under way to celebrate the date. Restoration and repair work has been started. The Khrenovoye stables and all the structures around them are uniquely Russian in architectural style.

Some 10,000 tourists come every year to see the Orlovsky trotters and the famous stables in which they are housed. There are plans to build a major tourist complex here.

DRUGS AGAINST CANCER

Among the 40 antitumorigenic drugs used today in cancer clinics around the world, many are of Soviet origin: sarcolysin, dopan, dactinomycin, chrysomallin, aurantin and fluorafur.

Each of these drugs is effective only for a particular tumor. For this reason the drugs have not yet had a significant effect on over-all cancer statistics, but in the chemotherapy of some tumors, even rare ones, good results have been obtained: It has been possible to destroy tumors in women suffering from chorioepithelioma of the uterus (a variety of cancer) even when metastases have already penetrated the lungs; and where metastases have not been present, an overwhelming majority of the patients have been cured.

In the division of the Institute of Experimental and Clinical Oncology headed by Lyudmila Novikova, corresponding member of of the USSR Academy of Medical Sciences, more than 100 young

ANOTHER HOME FOR SEALS

Some of the fur seals at the breeding station on Tyuleni Island (in the Okhotsk Sea) will shortly be moving to Cape Terpeniya, the easternmost point of Sakhalin Island. Although the breeding station on Tyuleni Island was enlarged, it is still crowded. The new one at Cape Terpeniya, 50 miles away, is being laid out according to scientific specifications. Special open spaces are being set aside for breeding grounds. The top layer of pebbles will be moved from Tyuleni Island to the shore of Cape Terpeniya.

TIEN SHAN GRAIN

Tien Shan has not grown its own grain since anyone can remember. Local people had the fixed idea that the area would never be good for anything but raising sheep. Until 1971. That year, in the Jumgol Valley, at an altitude of more than 6500 feet above sea level, 2,052 pounds of grain was the average yield per acre. In 1972 the yield rose to 3,122 pounds. Today truckloads of grain flow from the heights of Tien Shan.

Modern equipment, irrigation and reclamation, the use of organic and mineral fertilizers have transformed the economy of this highland area. Farming techniques based on the use of large amounts of local fertilizer have become widespread in recent years. The numerous mountain rivers here provide plenty of water for irrigation.

HOW OLD IS ANTARCTICA?

Antarctica is now believed to be twice as old as was previously estimated. The new dating indicates that the seventh continent is not two billion years but four billion.

The specimens for the analysis —granite-like rock and crystalline shale—were collected in Enderby Land, not far from the Soviet Molodezhnaya Research Station. The

COPPER DEPOSIT

ylakh is a new name on the latest geological map of the yr Peninsula. Big reserves of e copper were found here ar from Norilsk, an industrial r in the Arctic Circle. The l content of the deposit runs gh as 99.65 per cent; it is enough to the surface to be d by the opencast method.

U.S.-USSR TREE EXCHANGE

ery year the Sochi experimental forest station in the casus adds new specimens, ing trees native to other parts e world. This year the station ived from the USA the Ari- sycamore (Platanus Wrightii), new varieties of California sycamore, an evergreen woody-leaved oak that grows 100 feet high and a nut-bearing pine. They were planted next to Arizona pines.

In exchange, the Sochi station sent seeds of more than 70 species of valuable trees to arboretums in the United States.

STEREO ELECTRONICS

A highly original electron-ray instrument called a polytron, which ushers in a new field of technology—stereo electronics—has been built by Leningrad scientists. The device distinguishes speech and optical images, making it possible to control computers by voice. All processes in the polytron operate at a speed close to that of light; power consumption is a few watts only.

NEW TV STATION

A 1,246-foot TV tower has been built in Kiev, capital of the Ukraine. It is the second highest of its kind in Europe; the highest one is in Moscow.

For the first time in the Soviet Union, an all-welded tower, weighing 3300 tons, was mounted by the lift-slab method. The summit of the tower was lifted into vertical position by means of hydraulic jacks. The next lower section was raised and welded to the underside of the summit, then each succeeding part was similarly attached.

FOR VALOR

Vera Kashcheyeva, a wartime medical nurse and now director of a kindergarten at Bira (the Jewish Autonomous Republic), has been honored with the highest award of the International Red Cross—its Florence Nightingale Memorial Medal. During the war she carried many soldiers from the battlefield.

WORKING-CLASS POETS AND WRITERS

Worker-poets Vasili Borzdov and Yuri Borisov are often called upon to recite their poetry at meetings of the literary club of the Rostselmash plant, where they work.

The club at this big farm-machinery plant in Rostov-on-Don (south of the Russian Federation) is more than 40 years old.

There are others like it at many factories. The work of their poets and writers is published in factory newspapers, in the general press and in books. Many well-known Soviet poets and novelists had their first audiences in factory clubs like these.

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nen have been cured of this of cancer without surgery— with drugs. Those patients wanted children had them. r offspring are healthy—there more than 30 by this time— they are growing normally.

FOR MORE WILDLIFE

he government of the Armenian SSR has approved a plan for conservation and increase of republic's wildlife. Twelve preserves have been established. The habitats of the wild sheep, goat, leopard, Caucasian black grouse, turkey and other rare animals and birds have been declared wildlife preserves. Thanks to widespread conservation efforts, their numbers have increased several times over in the last 20 years.

RARE ANIMALS

An expedition of the Pacific Institute of Geography, the Far Eastern Science Center, spent two years getting a count of the tigers and leopards in the Primorye Territory. The Amur tiger figure is fairly accurate: 110 to 120 animals. In the forties there were barely 30 or 40 tigers here, and the number was dwindling. The animal was declared a rare species, and the population of the Amur tiger has since shown perceptible growth.

The situation is not as good for the Far Eastern leopard. The expedition found that there are no more than 45 to 50 head of this unique animal left in all of the Soviet Far East.

FROM THEATERS TO POST OFFICES

The Giprotheater State Institute of the USSR Ministry of Culture designs theaters, circuses, concert halls, museums and sometimes adjacent structures that meet more practical needs.

New theaters are in process of construction all over the country. One is the Ostrovsky Drama Theater in Kineshma rising on the high bank of the Volga.

On the Druzhba Narodov collective farm a complex of cultural and service facilities is going up. This includes offices for the collective farm board and the village Soviet, a club with an auditorium that will seat 1,000, a movie theater for 600, a library, a children's music school with a concert and lecture room for an audience of 1200, a restaurant, café, stores and a post office.

SPICE COOKIES

An unusual exhibition—the art of spice-cookie making—was organized recently by the Museum of Ethnography of the Peoples of the USSR in Leningrad.

Russian spice cookies are made of hard pastry flavored with honey, molasses and spices. They are baked in a variety of shapes and iced. Spice cookies keep for a long time and are often bought as souvenirs.

There are many schools of spice-cookie making. A connoisseur will immediately identify the signature of the Tver masters: Their favorite motif is fancy fish and lions. Spice cookies decorated with pictures of a girl in a Russian *sarafan* or with birds and deer come from Arkhangelsk. The cookies made in Tula, Novgorod and Siberia also have their own distinctive characters.

Most of the exhibits in the show came from architect Nikolai Vinogradov of Moscow. He collected 2500 spice cookies in 60 years and last year presented them to the Leningrad Museum.

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ng, based upon a correlation he uranium, thorium and lead pes in the specimens, was the k of the Institute of the Geomistry and Physics of Minerals, demy of Sciences of the ainian SSR.

Granite-like rock four billion rs old is rarely found on the th's surface. Of related interest the fact that the crystalline le, which proved to be 3.9 bil- years old, was recently found the Soviet Far East by staff mbers of the same Ukrainian itute and in Greenland by erican researchers.

LASER CONTROL OF EARTHQUAKES

A method of laser control of vertical movements of the th's crust has been developed by scientists of the Kazakh Academy of Sciences. A network of control posts has been set up in the foothills of Northern Tien Shan to prevent displacement of blocks of the Earth's crust by tectonic forces.

The data will be used to evolve methods of forecasting the time and location of earthquakes.

INDOOR INFLATED STADIUM

An inflated indoor stadium for track and field athletes has been opened in Kiev, capital of the Ukraine. It is a giant size light tent. Compressors pump in air through hoses fitted into the fabric. Air conditioners maintain a temperature of 65 degrees in any weather. The stadium has courts for volleyball, basketball, handball, tennis, a place for a boxing ring and an area for pole vaulting.

It can be used simultaneously by 350 athletes and has stands for 800 viewers.

BIGGEST GAS DEPOSIT

A development project has been completed for the world's biggest gas deposit, Urengoi in Western Siberia. It is estimated to hold 176.5 trillion cubic feet of natural gas.

The Urengoi field is slated to produce 353 billion cubic feet of gas a year.

CHILDREN AT THE WHEEL

A children's auto city has been built by the city council of Kirovabad in the Azerbaijan SSR. It has traffic lights, turnpikes, railroad crossings, filling stations and, of course, cars.

Children take turns in toy cars playing driver and pedestrian. In no time they learn the ins and outs of traffic regulations.

MUSEUM OF WOODEN RELICS

An outdoor museum of unique Russian architectural structures covers 193 acres in Malye Karely, 12 miles from Arkhangelsk. Some 50 wooden pieces built 200 to 300 years ago were brought to the museum from various parts of the Arkhangelsk Region.

LIFE WITH THE DANCE

Last December the Moscow Academic Ballet School celebrated its two hundredth anniversary. It trains dancers for the world-famous Bolshoi as well as for other Soviet ballet companies.

BY MARINA KHACHATUROVA

PHOTOGRAPHS BY ALEXANDER MAKAROV

THE YOUNGEST of them are as irrepressible as children anywhere, the older ones carry themselves with dignity. During recess the boys wrestle, the girls walk primly up and down the corridors. It is a school like any other. But in the mornings, when children in other schools are in history, geography or mathematics classes, these stand at the bar in the required ballet positions endlessly repeating monotonous movements. All 530 students of the Moscow Academic Ballet School spend the first two morning hours practicing the techniques of the classical dance. That is the basic discipline, and the most productive part of the day is devoted to it.

Time Compressed

Time is a prized element at the ballet school. It is so concentrated that its rapid flow is almost tangible. Even the younger students study from 9 A.M. to 6 P.M., with one long break for dinner. Not surprising, if we remember that each pupil virtually attends three schools simultaneously: ballet, music and general education. Aside from the classical dance, which is obligatory for every grade twice a week, the second and third grades also study the historical dance, the fourth and fifth grades the national dance, and the sixth grade the classical duet. Besides, every grade, from first to last, has what is called production practice, when the classical heritage is studied and concert numbers are staged. The younger students have only one or two hours a week of this practice, the older ones five or six hours. Piano is taught for seven years. As for other subjects, in the first five grades the course of study is the same as in regular schools. The remaining three years are devoted to special subjects: the history of the ballet, theater and fine arts, and foreign literature.

Ballet theaters all over the country are waiting to snatch up the school's annual 60-odd graduates. Top: Natalya Sadovskaya has an almost unfailing eye for talent. She has been examining and selecting future ballerinas for 50 years. Bottom: Even the youngest study and train from nine in the morning to six in the evening, with a long afternoon break for lunch.

All 150 teachers in the school try to integrate their teaching. Thus, a ballet teacher might ask the physical culture teacher to give more time to elevation and extension exercises in the gymnastics lesson.

There is always a possibility that young children might find the combination of lessons, rehearsals and performances too strenuous, either physically or emotionally. The teachers are aware of this and are constantly on the lookout for stress signals. In addition, the school has an excellent medical staff that gives the students a thorough checkup once a year.

"Dance What You Like!"

Nine-year-olds can apply for admission to the ballet school after completing the first three grades of a general education school. Enrollment begins in May and consists of three rounds of examinations. Sometimes a child will be told to "dance what you like," and then the members of the very sophisticated examining board may find themselves thrilled by the graceful abandon with which a little girl or boy flits about. Selection is strict. This year, for instance, only 90 out of 1300 applicants were admitted. Moreover, during the term, there is another professional elimination of some 30 per cent. This rigid selection is as it should be, not only from the school's point of view but from the student's as well. The training of a ballet dancer takes so much energy and dedication that failure to make the grade could easily turn into tragedy. It's much better to find out early if you are not going to make it all the way.

Before each new school year the teachers travel to the various republics, cities and villages to look for talented children. The local cultural institutions assist by scouting for talent and making recommendations. Sometimes a child is brought to Moscow

Top to bottom: All 530 students at the school spend the first two morning hours at the bar.
Pyotr Pestov is one of the school's best known teachers. Many of his former students now dance with the Bolshoi, among them Alexander Bogatyrev and Vyacheslav Gordeyev, prize winners at the International Ballet Competitions held in Moscow.
Natalya Skorokhodova illustrating hand movements.
Students go on tour to acquire stage presence. These have already danced in Spain and France. One school group

Students begin to perform on the stage of the Bolshoi when they are quite young. Olga Gurevskaya as Amur in Don Quixote, *the ballet by Ludwig Minkus.*

LIFE WITH THE DANCE

ndrei Yavlanov is
dy in the fourth year but
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ttom: First year student
esya Shulzhitskaya
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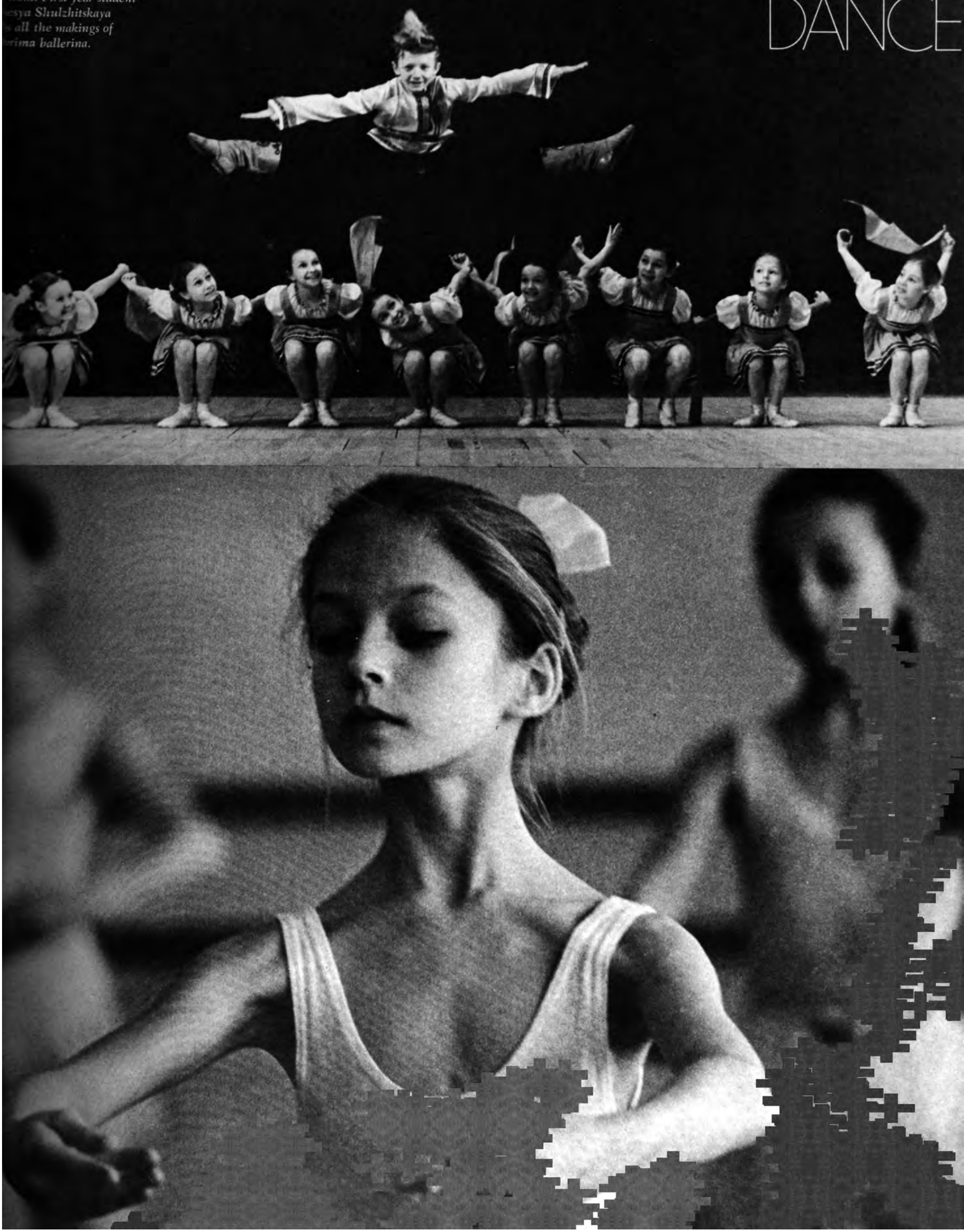
rima ballerina.



from a distant mountain village where people know about classical dancing only from television broadcasts.

There is a notion current that performing talent is somehow inherited. But the facts contradict this idea. The ballet school has very few children from theatrical families. The daughter and son of Maris Liepa, a leading dancer of the Bolshoi Theater, are the exception and not the rule. Slightly less than half the students—210—are children of workers and farmers. The explanation? Any child may apply, tuition is free, and ballet dancing is very popular in the Soviet Union.

The Debut

The Moscow Academic Ballet School is affiliated with the Bolshoi Theater, but it trains dancers for other Soviet theaters as well. Its graduates are welcomed everywhere, and the great hopes they raise are usually justified. In a year or two, they dance solo parts. A particularly noteworthy function of the school is that it trains dancers for republics that never had a classical dance tradition. Many of them are now opening classical ballet schools of their own. The school also trains students from Hungary, Italy, Czechoslovakia, Mongolia and South America.

All out-of-town students live in the school's dormitory, which presently accommodates 260. Some of the rooms are for two children of the same age, but most are for three. They are furnished simply, with modern sofa beds, night tables, one large table, chairs and a wardrobe.

However, the children spend most of their time outside their rooms. In the evenings they often have rehearsals for the monthly school concert or the annual and semiannual recital. The school has an excellent theater with 450 seats and a slightly slanted stage. The students go on tour to other towns. The idea is to popularize ballet and to accustom the children to performing for adult audiences. The latter is a very important consideration. A youngster may dance beautifully in class and still be paralyzed with stage fright. Throughout the year, therefore, they dance regularly on the stages of the Bolshoi Theater and the Stanislavsky and Nemirovich-Danchenko Musical Theater.

The school graduates some 60 to 70 students annually. Their eight years of study are generously rewarded, for they are snatched up by ballet companies. The graduation concerts and examinations, at which the Bolshoi's chief ballet master Yuri Grigorovich presides, are attended by choreographers of many ballet theaters who come to choose dancers for their companies. The more gifted—some 20 or so—are invited to join the companies of the Bolshoi Theater and the Stanislavsky and Nemirovich-Danchenko Theater. Preparations for the graduation examinations, which are held in April, start the preceding September. The teachers submit plans for their students' diploma projects with an eye to their individual gifts. Some excel in the classical dance, some in the character dance, and some in other genres. In addition to the Russian classical department, there is a folk dance department that begins with the fifth grade.

It would be hard to overestimate the school's value. It serves to maintain the level of the ballet groups and corps de ballet, especially of the Bolshoi Theater. Here the emphasis is not so much on training stars as on bringing out the potentialities of each dancer. So much so, that students who get sick and fall behind in class are given private lessons, at no charge, to help them catch up.

The career of ballet dancers is short. It usually begins at 17, and by 37 they are already eligible for a pension. Some become teachers. That's what former Bolshoi prima ballerina Sofya Golovkina, the present director of the

Vladimir Vasilyev in Tchaikovsky's The Sleeping Beauty. *Maya Plisetskaya in Saint-Saens'* The Dying Swan. *Nikolai Fadeyechev in Tchaikovsky's* Swan

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...alya Bessmertnova, ...terina Maximova, Vladimir ...lyev, Maris Liepa, ...hail Lavrovsky and other ...duates of the ...ool set the high standards ...oviet ballet on the ...e of the Bolshoi. There ...reciprocal ...lionship between that ...ment theater and the ...ool. Such prima ballerinas as ...ina Semyonova and Galina ...nova and dancers ...ei Yermolayev and ...f Messerer become teachers ...n they leave the stage.

The way to the top: They are now Bolshoi stars.

school, did. Most of the 60 dancing teachers attended the Moscow Academic Ballet School. Since the diploma is the same as the one issued by specialized secondary schools, some graduates go on to do further study in the ballet master, teacher training or critics course of the State Institute of Theatrical Arts.

The Price of Virtuosity

I sat in on a lesson in the classical dance and had the chance to see what hard work it is. It's the kind of work that audiences do not and should not see. The efforts of the really talented dancers are never apparent, their sweat and the tears remain in the wings. "I see you working. What I want to see is dancing!" said Tamara Vasilyeva, who has been teaching at the school for 15 years, to one of the 11 children in her class, a third year student. Tamara Vasilyeva's class happens to be an experimental one. Children are admitted to it at 12, which means that they have to finish the course in six instead of eight years. Vasilyeva believes it is possible. She teaches the girls, someone else the boys. Not a single minute of her daily lesson is wasted. When she enters the classroom, the floor has already been sprinkled to keep it from being slippery, and all 11 girls are standing at the bar. They begin by doing pirouettes and arabesques. Then they put on their toe slippers and repeat the exercises. Toward the end of the lesson they even do an adagio. To my uninitiated eye, everything looked fine, but Tamara Vasilyeva kept correcting them: "Turn out your heel!" "Lower your shoulders!" "Relax your arms!" "The center of gravity is at the hips, not the shoulders!" "Stretch your foot!" "Your toes must be taut!"

It is strenuous work indeed. But the reward is the genuine joy of creativity, when all these elements comprising the alphabet of the classical dance resolve into a lovely series of movements—elegant, pure, beautiful.

Natalya Bessmertnova in Adam's Giselle. *Maris Liepa in Khachaturian's* Spartacus. *Yekaterina Maximova in Asafeyev's* Fountain of Bakhchisarai.

The Buryat Republic and Its People

The Buryat Autonomous Soviet Socialist Republic, 50 years old last year, lies in Central Asia, on the eastern shores of Lake Baikal. More than 800,000 people live on its 135,000 square miles. Ulan-Ude, the capital, has a population of 254,000. Information on Buryatia, which is larger than Italy, is sparse even in such major international sources as the* Encyclopedia Britannica *and does not reflect the republic's contemporary social and economic profile. What is Buryatia like today? This may be gleaned from the notes of our correspondent Lyudmila Borozdina.

By Lyudmila Borozdina
Drawings by Boris Zhutovskiy

OF THE INDIGENOUS Siberian peoples the Buryats are the most numerous. Although they voluntarily joined the Russian state in the seventeenth century, they were neither independent nor self-governing, and as a result of the czarist policy of compulsory Russification, their culture was gradually dying out.

Today Buryatia is part of the Russian Federation but with national autonomy. As an autonomous entity it has its own seal and flag. Buryatia has its own Constitution, similar to those of the USSR and the Russian Federation; its national needs, however, are specifically enumerated. The Constitution vests all power in the working people of town and country as represented by the Soviets of Working People's Deputies, who are elected on the basis of universal, equal and direct suffrage by secret ballot.

The body with highest authority in the Buryat Republic is the Supreme Soviet. It has jurisdiction over such matters as the adoption of constitutional provisions and their observance, legislation, economic planning, education, public health and the use of natural resources; it appoints the Council of Ministers.

Buryatia is represented in the highest organs of state power of the USSR and the Russian Federation, a guarantee of day-to-day interaction with the other republics.

The pace of Buryatia's advance is felt with special force in the Council of Ministers, where the administration of the multiphased economy is centered.

The Chairman of the Council, Nikolai Pivovarov, has held the position for six years. He was born to a Buryat peasant family in 1912. The local occupations at the time were horse breeding, sheep raising, growing wheat and prospecting for gold. There was no industry to speak of. Most of the people were illiterate.

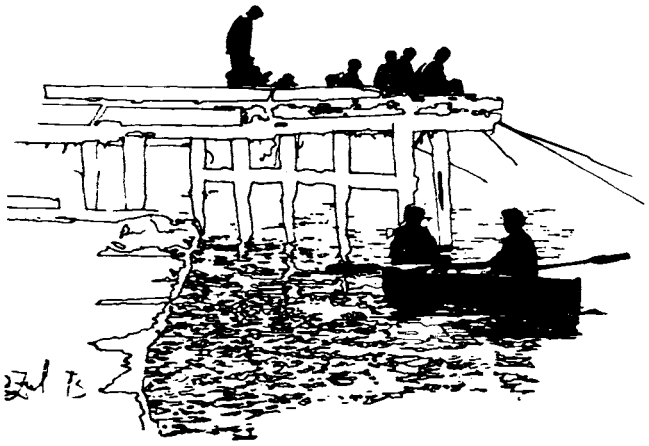
By the time Nikolai was old enough to go to school, the Civil War was over in Siberia, Soviet power was established in that part of the country and the people were eager to strengthen the social and national equality that followed. Soon afterward Buryatia became an autonomous socialist republic of the Russian Federation.

Nikolai Pivovarov went to Leningrad for his higher education. He came back an engineer and took a job at a new plant, the Locomotive and Car Repair Works in Ulan-Ude. It was there his practical education in organization and management began. Subsequently he held various positions in Buryatian state agencies. Over the years he has developed his own style of work, a blend of Eastern warmth and European efficiency.

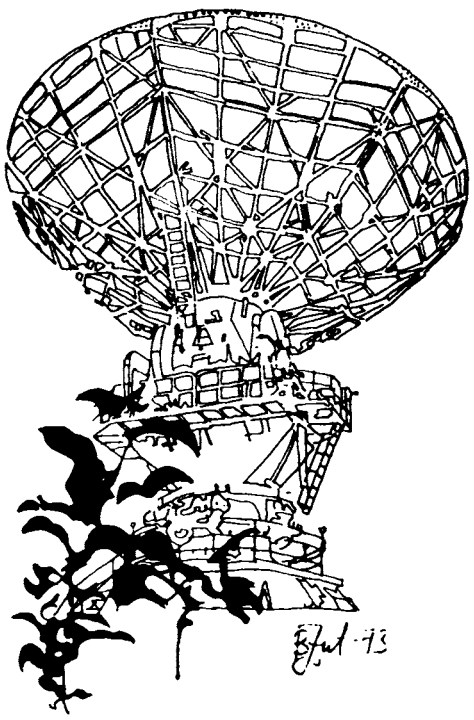
The working day of Chairman Pivovarov does not allow for a wasted minute. It starts off with phone calls to the district heads. The range of the republic's economy is most unusual: Sheep are bred on the steppelands; timber is cut in the taiga districts; mountain areas are mined for coal, gold, tungsten, molybdenum and asbestos; there are vast grain-growing fields; finally, industry is producing locomotives, aircraft, autocranes, electric motors, machine tools, fabrics and other consumer goods.

The republic's productive forces are growing fast: In the eighth five-year plan period (1966-70) industrial output rose by 64 per cent; the current five-year plan schedules a growth of 55 per cent as compared with the preceding period. This figure can be projected not only on the basis of the republic's own resources, but because of the help of the entire country, the Russian Federation particularly.

A map of Buryatia covers a whole wall in Pivovarov's office. The blue crescent of Lake Baikal stretches over a very large portion. Near it are pinpointed current five-year-plan construction projects: A rich deposit of chrysotile asbestos with an unusually long fiber is being developed farther to the east; in the south the foundations are being laid for a Young Pioneer health resort which will accommodate several thousand children from all over the nation.



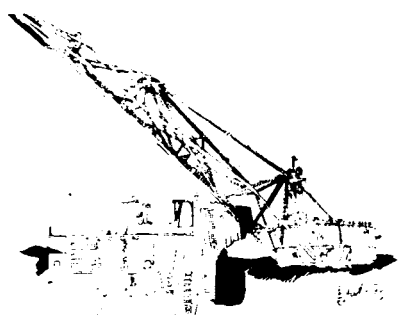
Lake Baikal beach.



TV programs are relayed by satellite.

TV commentator Zigbo Gombozhabayev.

Coal excavator near Lake Gusinoye.



A hundred years ago American George Kennan, an employee of Western Union Telegraph Company in Russia, traveled up and down the country. He visited the Don, the Volga and many other places. In 1885 he made a long trip to Siberia, reaching the Karsk mines. On his return he published a book on Siberia and penal servitude, **Siberia and the Exile System** (1891). The czarist government was shocked; it had given him permission to visit Siberia in the belief that he would report favorably on the measures taken to put down rebels and anarchists. Kennan, however, flatly condemned the entire penal servitude system.

In Buryatia we decided to follow, as closely as we could, Kennan's historic journey. In Chapter 12 of his book, which deals with his travels through the Trans-Baikal, from Selenga to Kyakhta, he wrote that the road ran straight south and crossed an uninhabited area. Once in a great while, he noted, they met tea caravans or were overtaken by Buryat horsemen wearing strange-looking hats and long brown robes. This road was evidently little used, and very seldom did they come across small villages—those they did seemed very poor. The only thing to draw his party's attention in the 50-mile stretch was the piles of rocks atop the hills, altars made by Buryats for sacrifices to appease their gods.

And now we were on the Kyakhta highway, one of the best roads in Buryatia. The vast steppe valley, girdled by a chain of hills, twists southward. In the distance can be seen the railroad leading to the Mongolian People's Republic. The road divides: to the left is Novoselenghinsk, to the right, Gusinoozyorsk. Mention of the latter could not have been expected from Kennan or even travelers as late as 1930. The first houses there went up in 1934.

Gusinoozyorsk is a typical new city, with a population of 17,000, paved streets, modern houses, a hotel, a palace of culture, cafés and schools. It is framed by a landscape of striking beauty: On one side is huge volcanic Lake Gusinoye, on the other, pine-covered hills. The lake, stretching for 22 miles along the Khamar-Daban mountains, is 118 feet deep. Its sparkling water reflects the blue of the sky and the green of the mountains.

As far back as the last century there were traces of lignite in the area; the deposits proved to be very rich. Under way in Gusinoozyorsk is construction on an important project for which the Young Communist League has assumed sponsorship. A thermal electric plant is going up; the first section will be ready in 1974. The station, expected to consume more than 5600 tons of coal a day, will generate 1.2 million kilowatt-hours a year. New pits are being developed so that the mine can supply that much coal.

There is an influx of people to the city, where they master new trades, learn to run modern machinery, build new houses, kindergartens and food-catering facilities. Everywhere there is movement. Generators and turbines are arriving from Leningrad, boilers from Barnaul; a walking excavator with a 353-cubic-foot bucket, truly a steppe vessel, has just come from Uralmash (Ural engineering works). Tents nestle on the shore of the lake near the silvery gray buildings of the electric power plant. They belong to Moscow and Ulan-Ude students who have come to lend a hand. In no time they put up their own housing and rolled up their sleeves. During summer holidays they built a 400-car garage, a canteen, a kindergarten and the construction office.

Our nineteenth century traveler wrote that even then Kyakhta looked like a prosperous village, with several handsome houses and two or three churches in the Byzantine style. But his stay in Kyakhta was ill-starred and spoiled the remaining part of Kennan's trip. He stopped over there in furnished rooms rented by an exile, the Pole Klembotski, and had to sleep on the floor. Kennan fell ill, ran a high fever for two weeks and did not fully recover for three months.

There was certainly no sign then that a future cosmonaut would live and study in the city. When Kennan tried to photograph Buryats, Mongols and other inhabitants of the Gobi Desert "who had not been described by anyone so far," they ran away in terror at the sight of a camera. But it is a fact that test engineer Nikolai Rukavishnikov, who made an orbital flight on Soyuz 10 in April 1971, lived and went to school there, was a member of a physics club and used to go to the Young Pioneer House. He never fails to mention his mother, who was an engineer on the construction of the rail line that runs from Ulan-Ude to the Mongolian People's Republic.

Sheepherding is still a major industry.

The Kyakhta hospital is almost completed.

Buryat ethnographer Sergei Baldayev.

Kyakhta, once a little village out there in the sticks, is now abreast with the times: There are 13 industrial plants in the district, a medical specialized secondary school, 25 libraries and three children's music schools.

The two churches "in the Byzantine style" are still there and are even being restored. One of them will house an art gallery (the exhibits will come from the reserve stocks of Moscow museums).

All told, 69 million rubles have been allocated from the budget of the Russian Federation and the Buryat Republic for the city's reconstruction. The master plan was drafted by the Novosibirsk Design Institute, and work has already begun. An interesting note: old Kyakhta and its fine wooden houses, with their ornamental carving that combines Russian and Eastern motifs, are being preserved as a museum exhibit.

The Greek myths have come down to us thanks to such poets and scholars as Hesiod and Herodotus. But even in our time, when groups of scientists and whole institutes are occupied with the study of folk legends, there is a man who can stand in the company of those ancient collectors of Greek myths.

Sergei Baldayev has been collecting for some 60 years almost everything that has come out of his people's poetic inspiration—168 rhymed heroic epics the length of the **Iliad,** more than a thousand fairy tales, 1500 songs, 6,000 proverbs and sayings, 5,000 riddles, tongue twisters, prayers and incantations, folk omens, popular beliefs, superstitions and rituals.

"The Buryats like allegories and metaphor," said Baldayev. "This inclination is usually nurtured in the family. From childhood a thought expressed figuratively is met with approval by the elders. It is repeated and people are amused by it." All Buryats love to listen to **ulighers,** rhymed stories about past generations, manifestation of the great need of a people that had no written language to preserve their history. The atmosphere in which Baldayev lived was imbued with folk poetry. His parents liked to arrange family parties where **ulighers** were recited and songs sung. There were many famous singers and bards among his relatives; his grandmother was the daughter of the shaman Abagai and knew an endless number of shaman incantations.

When he was five or six years old, Sergei learned by heart 20 **ulighers,** which meant that he knew in poetic form the history of his family for 20 generations back. Now he is responsible for rescuing from oblivion many stories, not to speak of shaman rituals. "I am the last true shaman," he says with a laugh. "Probably the only man who remembers their immense repertoire." The shaman mythology is as rich as the Greek, he says.

Baldayev's apartment is crowded with whole bookcases of manuscripts—the wealth of folk poetry he has collected. In his study is a desk, the typewriter never covered, a sofa, bookcases and portraits of his favorite writers —Dostoyevsky, Chekhov and Gorky—as well as photographs from which one can follow the ethnographer's own career. In one photo he is a college student in Irkutsk (czarist teachers taught only in Russian; there was no Buryat alphabet). Another picture was taken when he was a country schoolteacher. After the October Socialist Revolution his photos show a figure active in public education, a graduate student at the Moscow Institute of the Ethnography and National Cultures of the East, a participant in the First Congress of the USSR Association of Proletarian Writers (Baldayev had written several plays by that time) and, finally, researcher at the Academy of Sciences of the Buryat Republic.

A large part of Baldayev's collection has not yet been published. It will probably take several years for a research institute to go through all of it, make notes and comments, compare the versions of one and the same legend, select the best and publish them.

The Buryats in half a century have moved from primitive tribalism to socialism, from folk epic to literature, drama, opera and ballet, to sculpture and painting, to symphony music and modern science, all of professional quality. Thanks to Baldayev and his colleagues, the cultural past of the Buryats will be preserved to inspire their future achievement.

SOCIALISM AND CAPITALISM: IS CONVERGENCE POSSIBLE?

By Ivan Kozikov

Ivan Kozikov, Candidate of Science (Philosophy), replies to readers who have asked what Soviet economists and political scientists think of the possibility of convergence, a theory which has a considerable following in the West. The author, a Moscow University lecturer, specializes in problems of the scientific and technological revolution.

THE PRINCIPLE of peaceful coexistence has won general acceptance as a basis for relations of states with different social systems. As the climate for economic, scientific-technological and cultural ties improves, discussion has intensified in the West regarding the future of the two opposing systems: socialism and capitalism. Recent events, Marxist-Leninists believe, have confirmed their view that the present stage of social development is characterized by the transition from capitalism to socialism and communism.

Some Western scholars and political leaders have come to different conclusions. One of these is that socialism and capitalism are converging, that they will develop into some sort of post-industrial society with no essential differences between the two systems.

Similar Goals?

The basic premise of the convergence theory is that the development of all aspects of society is determined directly by changes in the material and technological foundation, that the sole criterion of historical progress is the level of industrialization.

The advocates of this theory dismiss the part played by social relations in the development of production; they ignore the nature of the social system as a determinant of social progress. They maintain that the common elements of the scientific and technological revolution in the socialist and capitalist countries produce identical social consequences and bring the two systems closer. To prove these propositions, they confine themselves to the superficial similarities, without analyzing the core of the process.

There is no denying that the development of science and technology has common elements in the socialist and capitalist countries. But that is far from a complete description of the social process. One must also consider the branches of social production to which machinery and science are channeled, what social needs they meet, in a word, toward what goals scientific and technological progress is directed. An analysis of this aspect of the problem reveals substantial and basic differences between capitalism and socialism.

In countries where private property is the prime mover and individual profit rather than the interest of society as a whole defines the goals of production, you often see industrial expansion that does not and is not intended to meet the actual requirements of society (for example, the overinflated automobile industry). Under the private enterprise system, the satisfaction of demand is merely a means of achieving maximum profits. In socialist society, however, output is aimed directly at raising the living and cultural standards. Here are some figures for comparison. Between 1960 and 1971, the real earnings of industrial, professional and office workers in the USSR increased by 66 per cent (the price of food and other consumer goods remained stable during this time). In the same period the cost of living rose by 30 per cent in the Federal Republic of Germany, 40 per cent in France and 50 per cent in Great Britain.

The advocates of the convergence theory see a similarity between socialism and capitalism in the fact that in all highly industrialized societies the per capita share of the gross social product is increasing. But again, this is only a superficial similarity. Under socialism the social product is distributed according to the work done, not according to the amount of property owned. This is the core of the difference.

Production for Whom?

The adherents of the convergence idea point to the outer similarity between the systems of planning and organization of production in the two societies. The capacities and requirements of economic planning are determined, they say, not by whether the means of production are owned privately or publicly, but by the scope of production, technological level, size of capital investments and complexity of organization. In fact, however, there are basic differences between socialism and capitalism here as well. In the socialist states, as soon as socialist relations begin to dominate production, opportunities open for the planned harmonious development of the economy of the entire country. In societies based on private property, even those that have engaged in large-scale production since the thirties or earlier, there has not been nor can there be any economic planning on a nationwide scale. Planning is restricted by the limits of individual monopolies and is circumscribed by the spontaneous demand of the market. Socialist production, on the other hand, is defined by a single state reflecting the needs of society.

Some champions of convergence see confirmation for their theory in the increasing self-sufficiency of the socialist enterprises and the growing role of monopolies in the capitalist countries. This is also an outward similarity. The self-sufficiency of the socialist enterprises is qualified by the state plan and is channeled toward a more efficient and speedier fulfillment of the plan. The monopolies, regardless of the state, determine the nature and extent of their operations. Moreover, they often impose their interests on the state.

Thus, the development of the material and technological foundation under socialism and capitalism is completely different; there is no evidence of a tendency to converge.

Convergence advocates argue that the scientific and technological revolution is creating a special stratum of executive specialists who will eventually run the country and change the core of both social systems. As a refutation of this view, consider who holds the power in our country.

The USSR Supreme Soviet, the nation's parliament, is composed of 1,517 deputies. Seven hundred sixty three of them, 50.3 per cent of the total, are workers and farmers; 146 (9.6 per cent) are workers in science, education, literature and the arts, and public health. The same picture is evident in the composition of the local bodies of power. As socialism develops and is transformed into communism, all working people will be directly involved in the management of their factory or farm and in the management of the country. This is the goal of socialist democracy. The gradual disappearance of the differences between mental and manual labor has the tendency to unite specialists with other strata of the population rather than insulate them.

The proponents of the convergence theory do not, of course, maintain that in industrial society private property will be eliminated. Consequently power will remain in the hands of those who possess capital.

The assertions of some adherents of convergence that the scientific and technological revolution will lead to a rapprochement in ideology are groundless. Socialist ideology is related directly to the activities of the socialist peoples as they transform their society. Because it is built on a scientific foundation, there is no objective reason for it to disappear.

SOVIET TV

By Sergei Lapin

Sergei Lapin (b. 1912), Chairman of the State Committee for Television and Radio under the USSR Council of Ministers, has had many years of service as a newspaperman and diplomat. He was the Director General of TASS. Since 1970 he has headed Soviet television and radio broadcasting. He is on the Central Committee of the Communist Party of the Soviet Union, deputy to the USSR Supreme Soviet and a member of the Soviet Government.

TELEVISION has been the subject of any number of learned books. Scholars have long been debating its proper function and trying to determine how it affects people's social and cultural lives, their everyday activity.

I'm afraid I have neither the time nor the inclination to participate in this exchange. Besides, what I would like to discuss here is not television in general, but **Soviet** television, some of its specific features. What distinguishes Soviet TV programs? How do we establish contact with TV viewers? How do we try to comply with their requests? How are relations shaped between Soviet television and the agencies in charge of sports, theater, and the like? This is the range of questions I would like to cover.

Outwardly, the programs of USSR Central Television are not much different from those in Western countries. They include news, feature films, documentaries, animated cartoons, TV adaptations of plays, science reviews, variety shows, surveys of serious music, sports broadcasts. One of the channels is used expressly for popular science programs.

Soviet television has its own commentators for politics, music, sports and every other field. Our program participants are often eminent foreign policy analysts, economists, literary and film critics, lawyers, specialists in all spheres of human endeavor. The TV screen often becomes the rostrum for government ministers, deputies to the Supreme Soviet, party and trade union functionaries. Sometimes the TV appearance is of a discussion type, sometimes an interview or answers to questions.

Our TV programs feature workers and collective farmers as well as specialists, public figures, statesmen and journalists. They not only discuss matters of immediate concern to them but voice their views on domestic and foreign policy. That sort of occurrence is daily rather than occasional. If audience response is any indication, this has general approval.

To make contact with televiewers, we employ such conventional forms as canvassing, sociological studies and joint meetings of TV personnel with the general public. We have a center for scientific programming that does public opinion research and prepares summaries for the various departments.

Besides that, the departments maintain their own contacts with the TV audience. And the way it is done is very simple. USSR Central Television averages from 5,000 to 6,000 letters daily from viewers—detailed judgments of TV programs, concerts, reviews, films, content analysis of certain programs, evaluation of the producer's work, artistic skill, suggestions and recommendations.

Some of the letters are on a par with professional analyses. Our mail is, therefore, tremendously useful in planning programs. The departments select the most interesting and topical letters and bring them to the attention of the appropriate commentators. They use the viewers' opinions and judgments, answer their questions and engage in debates with them. Last year Central Television received a million letters from viewers. More than half were used in our TV programs. There is hardly an aspect of our country's life that escapes notice.

The goal of our socialist society is to raise harmoniously developed and well-

educated individuals. In this respect television, with its daily audience of millions, has an almost unlimited influence.

There are no commercials on Soviet TV programs. Films and telecasts are never interrupted by advertising. Television has no obligation to any government agency nor any commercial commitments.

Only radio and TV professionals serve on the Administrative Board of the State Committee for Television and Radio. The committee has the status of a ministry and is a unit of the government. No agency can influence the content of TV programs for its own advantage.

So far as cultural and sports organizations are concerned, Soviet television has incomparably greater authority than Western television companies. If we think a sports competition will interest TV viewers, we include it in the programs and comment on it. There is no question of financial obligation to the organization sponsoring the competition. The technical facilities are all available. We have stationary equipment in all large gyms and stadiums in addition to mobile TV stations. All we have to pay for are the communication channels.

Soviet television has no problem televising concerts or plays and pays nothing for the privilege. There are TV rooms, cameras and lighting equipment in the largest concert halls and theaters of Moscow, Leningrad and Kiev for the purpose. The Bolshoi Theater has equipment for televising ballet and opera.

Plays need TV adaptation more than concerts and operas do. Therefore, although we sometimes make direct telecasts of theater performances, more often we stage them at our studios, making the minor changes that will add the specific TV dimension to a play. The actors are paid for the extra time they put in.

All feature films, documentaries, popular science films, animated cartoons, newsreels are televised at no cost to the film studios involved. All types of films except features are made available to television immediately on release. Feature films reach television later, following a run in movie houses, which can take up to a year.

It should be added that the country's largest film studios have TV divisions which, at the request of television, make serial films.

The cost of producing such films is met by television or, to be more specific, by the state, since all television expenditures are covered by the state budget.

But television itself releases quite a few films through Ekran (Screen), its film studio, which the movie houses run.

A few words about our international links. Soviet television is a member of Intervision, the TV association of the socialist countries, and often also avails itself of the opportunities offered by Eurovision. In return it supplies Eurovision with reports and TV news from the Soviet Union. All the major political events that took place in Moscow in recent years, as well as visits by Soviet party and government delegations to other countries, were telecast through Intervision and Eurovision channels.

We have a natural interest in how television is developing in the country, how fast our audiences are growing. We are pleased to know that in Moscow and other major cities 96 per cent of the homes have TV sets. Last year six million TV sets were sold in the country, just about the industry's annual production.

The number of TV sets in the Soviet Union totals 45 million.

Apart from Central Television there are 131 TV centers in the country—in the constituent republics and regions.

In the union and autonomous republics and in the national areas programs are telecast in the languages of peoples inhabiting these republics or areas.

Soviet TV speaks 67 languages. The viewers may choose between central and local programs. But central and local programs never include a film or a telecast that children or teenagers may not see.

The Ostankino Television tower in Moscow houses the country's largest TV center. Four programs in black and white and a color program are beamed from here. They are received in the capitals of all 15 union republics and in more than 160 cities. There are 1700 stations in the country. Local telecasts are transmitted in 67 of the languages spoken in the USSR and in 57 foreign languages. There in a fine restaurant 1100 feet above ground. The lower part of the tower contains studios, a conference hall, editorial offices, dressing rooms and technical facilities.

FOR YOUTH ABOUT THEMSELVES

By Stanislav Sergeyev

HALF THE POPULATION of the globe is under 30. So is 50 per cent of the USSR's 250 millions. Every phase of governmental effort is involved in the concerns of youth; television plays an important and innovative role here.

Dealing with Problems

Central Television's Valeri Ivanov is the Youth Department editor in chief. Like any executive with some 70 persons under him, he has an office, but his is a veritable museum of exhibits, ranging from a comic book (the creation of would-be humorists) to a model of a turning lathe made by youthful craftsmen, all products of TV programs. Today the office is a projection room, where a current program is being previewed.

On the screen is Anatoli Merzlov, an 18-year-old tractor driver from the Ryazan village of Prudskiye Vyselki. One hot summer day in 1972, fighting a fire that threatened 375 acres of collective farm wheat, Anatoli was badly burnt and died after two weeks in a hospital. Only 10 days before the fatal accident he had married, and now a child was on the way, a child who would never see its father but would hear stories about him. In the film Anatoli's mother and father, his fellow villagers and teachers are telling other young people about him. Despite the tragic story the program is a paean to life: It affirms the strength of the human spirit.

The feature was prepared by the Publicist Studio, one of the three studios in Central Television's Youth Department. Its func-

Well, Girls!

"Well, Girls!" (above and right) gets people from a variety of occupations in front of the TV cameras. The programs provide background for contests and quizzes in the arts. People from all parts of the country participate in Central Television programs. At the left is a show by gymnasts from Riga, capital of the Latvian Republic.

tion is to open up for young viewers the complex inner world of their contemporaries and to give them the opportunity for candid exchange of opinions. But such a public heart-to-heart talk is possible only if the participants are serious and the subject is a vital one. The program "Ordinary Fellows," for example, is an essay series, with drunkenness one theme. The treatment of each series subject may vary from week to week—the program can take the form of a play, a debate, a confession. Whatever the form, nothing is glossed over, the author-journalists throw themselves into polemic struggle, fully aware that to convince is to win the battle.

Close to "Publicist" in purpose and subject matter is the socio-political program. The formats and participants vary—there are talks with people in the news, legal counselling sessions, competitions among young inventors, international youth programs and real-life drama. A few words about this last.

The Heroes Among Us

A new series of telecasts is called "From the Heart." The idea of the episodes is to help people look at themselves in a kind of detached way, beyond and apart from the seeming monotony and pettiness of everyday life, to see the strength and beauty of actions which would ordinarily go unnoticed. For such a telecast the editors choose some factory or small settlement. Journalists do a real piece of painstaking research, collecting facts for stories about several representatives of a particular body of people. It is all done as unobtrusively as possible. And then the secrets are revealed on the stage before an audience, and people who have known one another for years see themselves as if for the first time.

Here is one such story. A night-shift controller with 40 years' service at Moscow's Caliber Plant, Dmitri Kononov by name, found himself one day in a serious predicament. Kononov, an enthusiastic bibliophile and owner of a unique library, had picked up the plant payroll at the bank, and the money (a pretty large sum) was stolen from him on his way back. Those were hard times, shortly after the war, in 1945. Kononov told nobody about the theft. The workers got their wages, but a day late. To make up the sum, Kononov had sold his library. Almost 30 years later people learned about it, thanks to television.

"Dmitri Ivanovich, which books in that library of yours was it hardest for you to give up?" Kononov was asked during the telecast.

"There were many valuable books. To answer you honestly, I still sometimes see that old edition of Saltykov-Shchedrin in my dreams."

And right then, as if by magic, he was handed all 12 volumes of that rare edition of Saltykov-

PHOTOGRAPHS BY NIKOLAI BOLOTIN

TV FOR YOUTH ABOUT THEMSELVES

Shchedrin's writings, which Central Television's Youth Department had bought especially for him. At the request of the TV people, who had learned of Kononov's dreams, Moscow secondhand bookdealers had managed to track the books down.

Serious Games

The most popular TV programs, however, are those produced by the contest section of the Youth Department. Though meant for the young, they draw audiences of all ages. The viewer may here be a participant in the show. For 12 years TV featured the Quiz Club. Now Central Television has turned over that lively mass-audience show to newspapers and schools, local TV studios and Young Pioneer organizations, higher schools and plants—having found for itself new attractions; no program, even the best, can go on forever.

The Quiz Club arranged student-team contests that took in just about anything and everything dramatic and spectacular—variety shows, sports, battles of intellect and wit. The interests of television and the young viewer coincided. Are you looking for company, young people? The club is at your service. Do you like sports? We'll open a stadium on our stage. Do the streets attract you? Let's meet on TV's "Youth Avenue."

The Quiz Club receded into Soviet TV history. New programs took its place: "Well, Girls!," "Well, Boys!," "Hello, We're Talent Scouts!" (later renamed "Young Voices") and "Mo-lodtsy!" ("Good For You!").

"Well, Girls!" puts young people of various trades and professions in front of the camera. Each program is in the nature of a special to provide background for dance and song contests, literature and art quizzes, the display of professional and domestic skills.

"Well, Boys!" is addressed directly to urban and rural youth, offering them a stage to exhibit their dexterity and physical strength. These programs are wide open; any viewer can get in touch with Central Television and compete in TV sports, for example. Yevgeni Ovsyannikov, an electrician at the Udarnik (Shock Worker) Collective Farm near Moscow, was top man in the 1972 season. Having won several TV contests, he became a television personality.

An interesting offshoot of the Youth Department's programs has been their duplication off the air waves. Many towns and villages, plants and institutions are staging their own such events on the spot

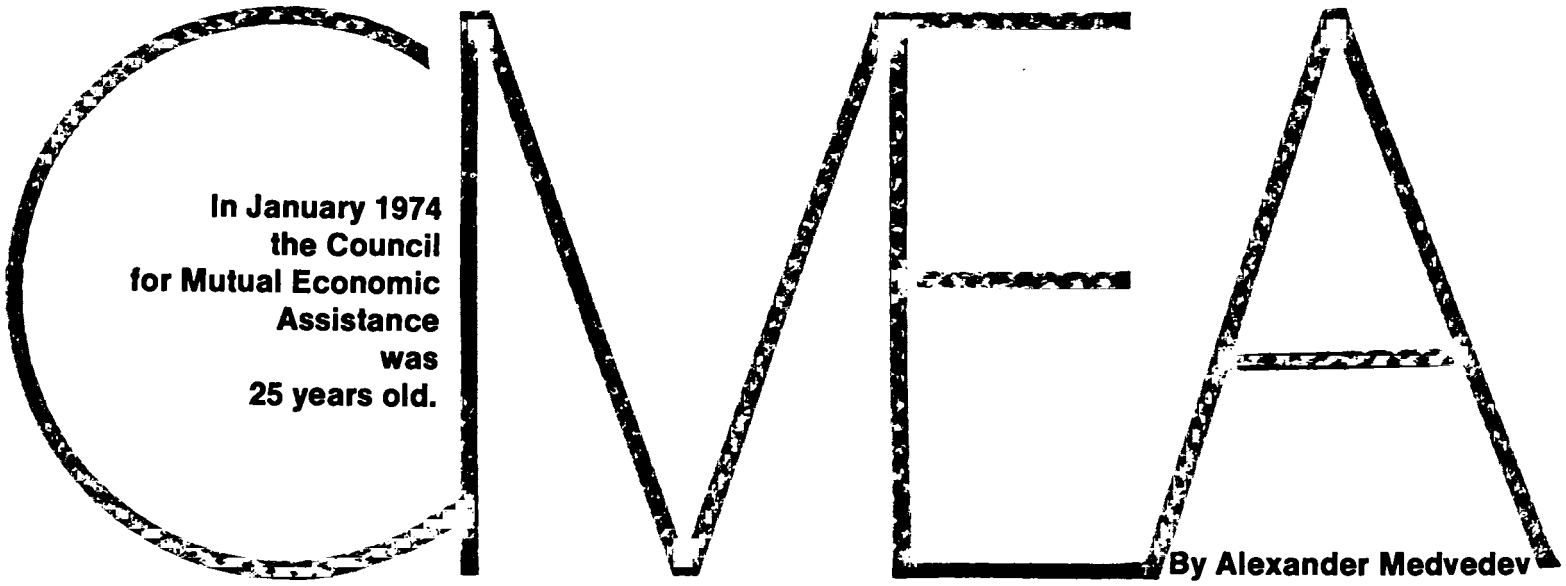
Besides professional performers, the judges' panel for this amateur show consists of people from many trades and professions, including an occasional cosmonaut.

On the Lookout for Talent

"Hello, We're on the Lookout for Talent" is now called "Young Voices," but it has as big a listening audience as ever.

This combo, part of the Smerichka troupe, hails from Lvov, a Carpathian city. They are performing on the amateur talent show. And singer Anna Darayeva (right), a teacher, comes from Frunze, capital of the Kirghiz Republic.

Getting ready for the program. Bottom left: Director Kira Parashyutinskaya gives last minute instructions. Bottom center: A couple of harried assistant directors. Bottom right: Makeup.



By Alexander Medvedev

SOCIALIST COMMONWEALTH: DIALECTICS OF THE NATIONAL AND INTERNATIONAL

The Council for Mutual Economic Assistance (CMEA) marked its twenty-fifth anniversary this year. In the quarter-century this council of socialist countries has created an inter-state industrial complex. Practice has confirmed the value of equitable economic cooperation.

With the CMEA, the bilateral foreign-trade and scientific and technological ties of the socialist countries have developed into multilateral cooperation. There is planned exchange of commodities based on the coordination of national economic plans; an international socialist division of labor has taken shape. The Comprehensive Program for a 15- to 20-year period adopted in 1971 outlined a new stage of integration.

This article by Alexander Medvedev, who has a candidate's degree in history, is devoted to the balanced combination of national and international interests that socialist integration achieves.

A NEW TYPE of inter-state relationship emerged with the formation of the world socialist system after the victory of the anti-Hitler coalition. It combines the national requirements of the individual states and the international interests of the community as a whole. Its basic premise is that what benefits the whole system benefits each socialist nation, and that the economic, political and social advance of any individual state strengthens the whole community. This is socialist internationalism in essence.

Some Western economists question the mutually beneficial value of socialist integration on the grounds that it "limits sovereignty." This notion of "limited sovereignty" holds that the participation of any nation in the socialist system limits its independence and works against its own national interests.

Practical experience, however, proves the contrary. Unilateral efforts to solve major social and economic problems invariably run into big obstacles, including shortages of economic resources, electric power and scientific and technical personnel. By pooling their efforts and potentials, the socialist countries are best able to resolve their domestic problems, protect their national sovereignty and have a strong voice in world politics.

The socialist countries have largely similar concerns. In their domestic politics their primary concern is the expansion of socialist democracy; in economics, a steady rise in the public welfare; in the ideological field, the education of the working people in communist understanding.

The dialectic unity of the national and international in the socialist community manifests itself in all spheres of economic, political and cultural life. Let us review the economic sphere. In the quarter-century of the world socialist system the member states have made enormous progress. Bulgaria's industrial output has grown by 39 times, Poland's by more than 18, Hungary's by 8.5, Czechoslovakia's by nearly 8, and so on. In the late forties, when the world socialist system was being formed, its European members were industrial-agrarian, agrarian-industrial or simply agrarian, with the two latter groups predominant. Now, in all European member states of the Council for Mutual Economic Assistance (CMEA), the major share of the national revenue comes from industry.

Taking the 1950 level as 100 per cent, by 1970 national income in Bulgaria grew to 593 per cent, in Rumania to 599 per cent and in the USSR to 326 per cent. In the 1960-70 decade (taking the 1960 level as 100 per cent) the actual income per working person increased by 1970, on the average: in Bulgaria by 173 per cent, in Hungary by 129, in Poland by 119, in Rumania by 146, in the USSR by 134, in Czechoslovakia by 126 (1969).

The industrial production pattern has changed qualitatively: There has been an especially rapid growth in the most advanced industries—heavy engineering, electronics and chemistry.

That course of development is beneficial for each socialist country; it is equally beneficial for the community as a whole. Economic integration promotes the development of a unified socialist economy.

As the scientific and technical revolution goes on, the economic cooperation of the socialist countries increases, moving from the lower forms to the higher. At the initial stage simple commodity exchange predominated; today the emphasis is along the lines of specialization and cooperation and the organization of inter-state industrial facilities. There is more attention focused on the coordination of economic plans. The scale of the problems tackled jointly is wider. Thus, plans have been drawn for the joint construction of large industrial enterprises and research and technical centers. One of these will make machinery and equipment for nuclear power stations and electronic computers.

This is only one instance of socialist economic integration at work. The Comprehensive Program of Socialist Economic Integration was discussed and adopted at the twenty-fifth CMEA session held in 1971.

Socialist economic integration does not rule out cooperation of the socialist countries with countries advocating other social systems. Mutually beneficial contacts are welcomed.

The unity of interests of the socialist countries is strikingly evident in their foreign policy. In international affairs they present a united front. Their united foreign policy is based on their common concern for strengthening world socialism, the class interests of the working people and the furtherance of universal peace.

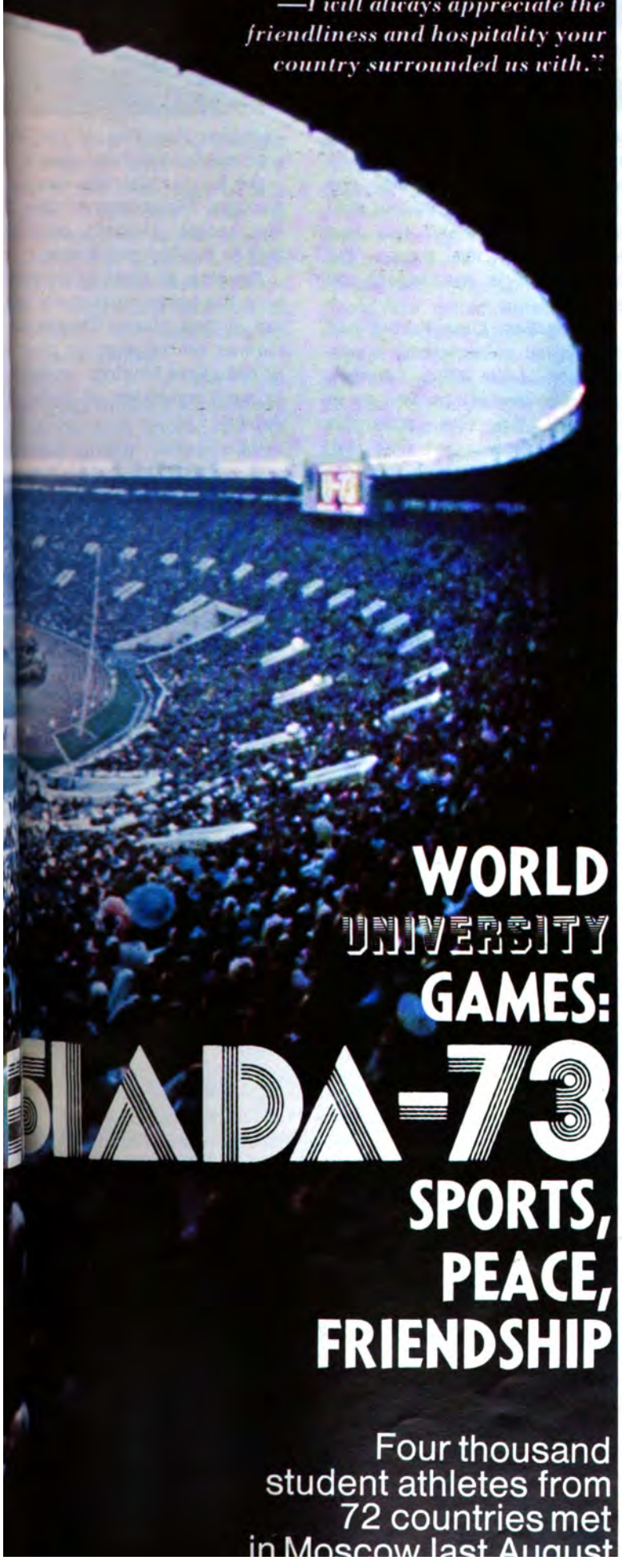
Today we witness an ecouraging shift from the policy of confrontation toward détente and mutually advantageous cooperation of states with different social systems. The foreign policy program of the Soviet Union adopted by the Twenty-fourth CPSU Congress has been actively backed by all socialist countries.

The ruling Marxist-Leninist parties play a dominant role in shaping coordinated policies both in the internal development of the socialist countries and in their international undertakings. It has become a tradition, for example, to hold friendly meetings of party leaders, exchange delegations and pay mutual visits. The meeting of the leaders of the Communist and Workers Parties in the Crimea held in July 1973 was most fruitful. The meeting confirmed once again the unity of views on all major aspects of international politics, particularly on security in Europe and Asia, the elimination of hotbeds of war, disarmament and cooperation with capitalist countries. As always, the meeting did not deviate from these principles: the equality of all parties and countries involved, non-interference in each other's internal affairs, combining the interests of each individual party and country with those of the world socialist system generally.

The interests of the countries of the world socialist system are united and indivisible. This unity is founded, in the economic field, on the public ownership of the means of production, in the political field, on the power of the working class, and in the ideological field, on their common philosophic outlook, Marxism-Leninism.

УНИВЕРСИАДА
МОСКВА·1973
UNIVE

THE WORLD UNIVERSITY Games was a real festival of friendship. Exactly what is needed for good relations between peoples of different countries, said Dr. Primo Nebiolo, president of the International Federation of University Sports (FISU), when journalists asked him for his impressions of the Moscow event, held in August, 1973. And this is how USA collegian Richard Lavinger felt: "The wonderful memories of my trip to Moscow I will treasure all my life; and not only the recollections —I will always appreciate the friendliness and hospitality your country surrounded us with."



WORLD UNIVERSITY GAMES: SPARTAKIADA-73

SPORTS, PEACE, FRIENDSHIP

Four thousand student athletes from 72 countries met in Moscow last August

Olympic champion decathlonist Nikolai Avilov (USSR), who lost to Ryszard Skowronek of Poland. Top left: A water polo match between the USSR and the Federal Republic of Germany. Center left: Women's basketball: the American and Soviet teams. The USA and USSR teams on the court, one of the most exciting contests at the games. Top center: Backstrok. Many of the USA's leading swimmers competed. Top right: The 3,000-meter steeplechase final. Center right: Five thousand-meter final.

By Alexei Srebnitsky,
Novosti Press Agency Sports Commentator

Photographs by
Vadim Kivrin and Sergei Lidin

UNIVERSIADA-73

From All the Continents

The games which gave rise to such compliments were held from August 16 to 25 in the finest sports facilities of the Soviet capital, attracting more than 4,000 entries from 72 countries on all the five continents. Such a broad representation at the World University Games (the Moscow meet was the seventh) was unprecedented. Perhaps because some of the students chose to turn down other contests in order to make the Moscow trip. Many of the USA's leading swimmers gave preference to the University Games. As a consequence, Muscovites had the chance to see, among others, the brilliant Olympic breaststroke champion Cathy Carr, who is very popular with Soviet fans.

As events proceeded, it was evident that not only the competition, not only the desire to contest for top honors at the games had brought young men and women from all parts of the world to Moscow. During the games, Novosti Press Agency (APN) sports department distributed a questionnaire to the participants. One of the questions asked: "What do you think is necessary to advance international solidarity and the friendship of students?" The collegians' replies expressed in different words one and the same sentiment: The future of the earth depends on the mutual understanding and united action of its young people, and the games help to strengthen peace and develop mutual understanding and contacts. May there be more of such get-togethers, they said.

In the Sports Arenas

The students competed in 10 different events. It goes without saying that not all countries sent supersportsmen, though there was a considerable representation of continental, world and Olympic champions. However, the fact that athletes from 34 countries placed among the top three in the different events shows the increasing spread of student sports throughout the world and the rising level of ability. The caliber of athletic prowess shown by the students of Africa, Asia and Latin America was a conspicuous example of this phenomenon.

The USSR team did well, winning 68 gold medals.

Basketball. This event attracted 511 participants playing on 29 men's and 16 women's teams from 32 countries. The superiority of the Soviet women's squad was clear. But the performance of the American girls, who placed second, was quite a surprise. Coach Jill Apten made no secret of the fact that the USA team had just been formed, had only begun to prepare for the 1976 Olympics and had not counted on doing nearly so well.

The USA men's team demonstrated first-class basketball and deservedly took top place.

Freestyle and Greco-Roman wrestling. For the first time this event was included in the University Games. The Soviet Union had used the right as the host country to pick the tenth event of the program and naturally chose a sport it is strong in. The result: Olympic champions Shamil Khi - samutdinov, Levan Tediashvili, Ivan Yaryghin and their partners took nine gold medals in the Greco-Roman and six in the freestyle events. Also among the winners were Rumanian Olympic champion Gheorghe Berceanu and Japanese and Mongolian matmen. The concensus of opinion was that the first world student meet of mat stars was a great success.

Volleyball. Both the USSR women's and men's teams were way ahead of their competitors. Cuba and Brazil played unusually well, something the experts did not expect.

Water polo. Here too the Latin American countries, newcomers to this game only yesterday, created quite a stir. The interesting thing here is that Cuba (second place) and Mexico were whipped into shape for the contest by Hungarian coaches. At one time the Hungarians were also the teachers of the Soviet water polo men, but today—and this was borne out at the games—the USSR team is the recognized leader.

Gymnastics. Olga Korbut had never given so wonderful a performance. Little Olga emerged the victor over-all as well as in three of the four apparatus events. This was the first University Games at which the Japanese men's team suffered a defeat: the veteran Nikolai Andrianov and the young trio of Vladimirs—Shchukin, Safronov and Marchenko—made up a triumphant quartet.

Track and field. Athletes set 23 World University Games records. The champions were Mona-Lisa Pursiainen (Finland), who won both of the sprints; the Polish decathlonist Ryszard Skowronek, who beat Olympic champion Nikolai Avilov (USSR); Soviet triple jumper Mikhail Bariban, who came out ahead of world record holder and Olympic champion Victor Saneyev and Olympic silver medalist Joerg Drehmel (German Democratic Republic). Soviet athletes picked up 17 gold medals in the 34 events of the track and field program.

Swimming. The young men and women of Peter Deland's squad grabbed the lion's share of the gold medals—16. And Soviet swimmer Vladimir Bure distinguished himself, beating Kenneth Knox in the 100-meter freestyle. Swimmers smashed 25 World University Games records.

Diving. Soviet participants won three gold medals. Vyacheslav Strakhov pulled ahead of Olympic champion Vladimir Vasin and State McFarland in the springboard event. Of the foreign participants, only Milena Duchkova of Czechoslovakia managed a gold medal, falling behind Muscovite Tamara Safonova in the springboard event but jumping faultlessly from the tower.

Tennis. Olga Morozova and Teimuraz Kakuliya of the USS won everything there was to w —the singles, doubles and mixe doubles. Never before have S viet racket wielders done th well at the Student Games.

Fencing. In most of the even here the home musketeers cam out in first place. Experts com mented on the marked progres of collegiate fencing, particulari in such countries as Cuba an Japan.

Special Awards

The Japanese gymnast Su Fujimoto injured his leg muscle while limbering up, but he ca ried on, with teeth clenche against the pain. Although h lost out on the medals, he di get the special prize, For Val in the Struggle.

Fujimoto said: "It was hard f me to go on, but I learned lon ago that in sports, as in all life, nothing comes easy. On has to be in control of onese Now that everything is over an the time has come for analysis can truly say that the Universi Games in Moscow was a goo school for me. I believe that it of inestimable benefit to all pa ticipants."

The organizers of the game Soviet newspapers and mag zines, Moscow factories an higher educational institutio all offered many different spec prizes. There were any numb of deserving claimants for t prize Knight of the World Univ sity Games. Among them w Rumanian fencer Ecaterina St who held off from making t winning touch against Valenti Burochkina, the future champi when Valentina slipped. A tennis ace Kakuliya saved partner Morozova a number times from physical contact w the smashes of his rival in t mixed doubles. Still, the prize c not go to them but to a whc team—Brazil's basketball playe

During the match between t Brazil and Puerto Rican squad there was a moment when on four of the Puerto Ricans we

Brilliant Olympic breaststroke champion Cathy Carr is congratulated by Soviet rival Porubaiko. Left: And here she is in action. Far left: R. Steven in the 400 meter relay. Opposite page, left to right: S. Lawrence in the 110-meter hurdles. The springboard event. Stephanie Stromer of the U.S. on the beam. Mikhail Saladze of the USSR and American Lobell Kennett.

ft on the court, without a single eserve. The Brazilian coach took me out and also placed only our men on the court. Then the uerto Ricans lost another player, hereupon the Brazilians volunarily benched one more of their hen. A magnificent example of he chivalry that characterized he Moscow games.

Probably one of the most ought after prizes a woman can vin is the one offered by the nagazine *Soviet Woman*—Most legant Sportswoman. Journalists amed fencer Carola Maggiarotti f Italy. She started fencing as a hild: Her father holds one of the op places in the history of fencng for number of awards won at Olympic Games and world chamionships. Carola is now 21. Here is what she said: "Though didn't win a gold medal, the rize I did receive made me very appy. And in sports, I hope, verything still lies ahead of me."

New Stars Appear

The journalists called it the Games of Revelations. Sportsmen unknown until then even to experts became champions quite suddenly and altogether unexpectedly. There are any number of examples.

American fans might like to get acquainted with a new star of Soviet athletics—sprinter Yuri Silov, now called Borzov No. 2 after his victory at the games.

Silov is 23. With a height of 5 feet 9½ inches, he weighs 174 pounds. The small-town boy, who lives in Stucka, Latvia, near his birthplace, got interested in athletics eight years ago. His best time in the 100-meter dash is 10.1 seconds. Although an avid reader of science fiction and fantasy, Yuri is no daydreamer. Soberly appraising his possibilities, he has come to the modest conclusion that to some extent his successes are accidental. But specialists, among them such celebrities as Igor Ter-Ovanesyan, predict a brilliant future for sprinter Silov.

For the Soviet fan, basketball player David Thompson of the USA squad was a real discovery. He may not be very tall as basketball players go, 6 feet 3 inches, but he can do just about everything on the court. That goes for his high jumps, approaching circus stunts, his speed and reaction time, his shooting precision —and all of it team work, nothing done for personal stardom. Muscovites went to see Thompson in action at the Sports Palace the way theater lovers tag after their favorite actors.

It was at the World University Games that these athletes came to the fore, also Bariban, Skowronek and Pursiainen, the gymnast Shchukin and diver Mikhailin.

That was the Games of Revelations.

Around the Samovar

The International Club at Moscow University's Student House, where the athlete-participants lived, was open house for 13 days. There they sat up well into the night around the samovar. The students at the university had organized a Tea House for their foreign guests. The competitors themselves arranged their own concerts and musical contests, picked the best dancing couple, got together with the leaders in the arts of the Moscow scene, waged chess battles in simultaneous exhibitions given by former world champion Tigran Petrosyan and other Soviet grandmasters.

At the club collegians of different countries struck up friendships, talked about life.

But these meetings were only a part of the cultural program the organizers arranged. Moscow's guests had plenty of opportunity to see the sights of the Soviet capital, the art galleries, a number of theater and musical performances.

Once again the World University Games in Moscow showed how closely related peace and sports are. The lives of these future scientists, engineers, teachers, writers and artists merged for 13 days in one place, in Moscow. And, as General Secretary Claude Pineau of the World Federation of University Games said, the Moscow meets will help to inspire cooperation in a peaceful and a comradely universe.

COMMEMORATING THE GAMES

BY IGOR SVETLOV

The Soviet Union has issued more than 0 stamps on sports, commemorating, ong other major events, world chamnships, Olympics and People's Games the USSR. The stamps depict virtually ry sport under the sun—tennis, basketll, volleyball, soccer, ice hockey, gymstics, track and field, swimming, rowing, uestrian sports, skydiving, skiing.

Our postage stamps are issued by the nistry of Communications. A recent se- commemorates the World University mes staged in Moscow in August 1973. e four multicolored stamps designed by n Kozlov show a gymnast, a mermaid, hammer thrower and fencers. A javelin rower is pictured on the block.

The drawings are framed in a ring bear- the emblem of a Kremlin tower with

PEOPLE'S JUDGE

By Yuri Feofanov

The author, a journalist on the newspaper *Izvestia*, served as people's assessor for two years with Judge Nikolai Yudin.

AFTER EVERY TRIAL Nikolai Yudin goes off by himself for a while. He does not necessarily shut himself in his study or retire to the country. A stroll along a busy street or a stop on a bench in a public garden may be all he needs to insulate his mind from the things and people around him. Then the case on which he just passed sentence and which he knows so well unfolds before him in minute detail.

This personal review has nothing to do with the reaction of the appellate court. Over the many years that he has been a judge, there have been only a few cases when his sentence or decision was overruled, even though he does not think that he departed from the law by one iota or else he would not have signed the decision in the first place. But I know from personal experience that Judge Yudin is never emotionally uninvolved at a trial so that he always feels the need for posttrial analysis.

The position of a Soviet people's judge is clear: He is independent and subject only to the law. The Constitution of the USSR spells this out in Article 112. The judge's decision is based on the evidence and is guided by socialist law. It is almost axiomatic that court decisions are made by law and conscience.

Nikolai Yudin long ago learned the simple truth that there is no such thing as an easy case. Even when the crime is proved, the guilt of the defendant and the desirability of punishment may not have been established beyond question of doubt. Crimes may be very similar, almost identical, and call for the application of one and the same article of the code. But are the people in the dock that much alike? Soviet law says that it is not only the facts of the crime but the personality of the defendant as well that must be taken into account in passing sentence. Therefore the ethical, the reform aspect of the sentence is a very important part of the court's action, its real goal. In other words, beyond punishment for breaking the law is the more important purpose: to reform the criminal and thereby exert a positive influence on all those who follow the trial proceedings.

This is why it is so vital to understand the person who is standing trial. By no means an easy undertaking. Every person is unique, and his character, his ethics and his way of living are not apparent at a glance. But they must be comprehended, which is why Nikolai Yudin is not dispassionate when he signs a verdict. He is under stress every time. I have seen him presiding at trials, administering justice in the name of the Russian Federation. And I have seen him, not from the viewpoint of a spectator in the courtroom, but of one sitting on the bench alongside him.

Under the USSR Constitution, in all courts and in all cases people's assessors are participants (Article 103). In effect, then, three people conduct the trial: the judge, who is a jurist by training, and two people's assessors, usually nonjurists. All three are vested with the same rights. The judge presides. At any stage of the hearing, however, people's assessors have the right to put questions to all the people involved in the trial. In the conference room, where the sentence or the decision is agreed on, the vote of the judge and that of each people's assessor carries equal weight both in finding a defendant guilty or not guilty and in arriving at a sentence. Forinstance, if the two people's assessors arrive at a judgment contrary to that of the judge, theirs becomes the verdict. The judge merely has the right to record his dissenting opinion for consideration by a higher judicial body (the same holds for a people's assessor).

People's judges are elected by the voters of the city districts by secret ballot for a term of five years. People's assessors, who serve two-year terms, are elected at meetings of industrial, office and professional workers and farmers at their place of work or residence and at meetings of servicemen in their military units.

I had the honor to be elected one of the people's assessors of the Frunze District People's Court of Moscow.

Nikolai Yudin talked to us about our difficult assignment. We must be completely independent of everyone, he said, including those who preside at trials. We were urged not to agree with the judge, a jurist, if we had any doubts about the defendant's guilt, not to be swayed by authority and to make our decisions guided by law and our own consciences.

Once we tried seven young people for embezzlement and profiteering. Judge Yudin presided.

Serious proof of guilt was established during the investigation. We had to decide if this evidence was sufficient to sentence the persons involved and, if so, what the sentence should be.

And so we found ourselves in the judges' conference room, a holy of holies. No one else can come in, nor can the people in it be communicated with, even by phone. They must not get in touch with the outside world. If this rule is broken, a higher court will void the sentence. And so even now, after sentence has been passed, I have no right to reveal everything we said. I can, however, lift the curtain a little.

When we gathered in the conference room, the judge said:

"First we must decide whether the guilt of the defendants has been proved. What do you think?"

"Perhaps you ought to tell us what you think first since you are far more experienced."

"No, you must have the first word," Yudin said. "That is what the law says. And that is the way it should be so that you are not influenced by a jurist's opinion."

People's assessor Anna Rutenberg, an economist by profession, agreed with me that guilt had been proved. Then began a long discussion about the punishment, whereupon immediately we came up against some tough problems. The gang had two ringleaders—Osin and Alekhin. Their guilt was equal where the money value of their misappropriations was concerned, and the same was true of the nature of the offenses.

Soviet law requires that the character of the defendant be taken into consideration. This involves many things—his background, his behavior at the trial, whether he regrets committing the crime. No two people are alike.

And so we set about analyzing the defendants. Osin was a lazy hanger-on who objected to work, he said, "on principle." His record showed many previous arrests for violations of the law. During the investigation he lied to the court, and it was only irrefutable evidence that forced him to plead guilty. During the trial, he tried to exonerate himself by shifting the blame onto people who had once been his friends.

Alekhin was an altogether different sort, a person with an open nature. His life had been hard, he lost his parents when he was young, he had worked at different jobs but left them for reasons beyond his control. Still, he had never spent a day without working. At the trial, Alekhin went so far as to confess to crimes which were not uncovered by the investigation. In a word, it was obvious that he was sorry for what he had done. And according to Soviet law, repentance is a mitigating factor.

Once we had discussed Alekhin's background, we asked ourselves whether he should be punished at all. Obviously he had changed greatly during the imprisonment awaiting trial and during the trial itself.

"I agree with you that he can be reformed," Judge Yudin said. "But we have the responsibility of administering the law. We haven't the right to punish or to pardon as we please. Let us remember that a function of the court is to instill in people a respect for Soviet law. We cannot permit a person who violated one of the most important Soviet principles, concern for socialist property, to go unpunished. Criminal actions like Alekhin's cannot be dismissed. And pity alone is not justice."

We gave sentences to all seven defendants. But Alekhin's term was less than the lower limit set by the appropriate article of the Criminal Code. The law gives judges the right to modify that limit.

After the trial I made it my business to talk to the judge. We people's assessors, who are not professionals, I said, were very concerned about what would happen to Alekhin (I single him out for purposes of this account, but we discussed in as great detail the sentences we gave every one of the defendants). "I am concerned, too, even though I have been a judge for nearly 25 years," he answered.

Nikolai Yudin was born in 1915, son of an accountant. After finishing eight grades, young Yudin went to work as a fitter and continued his studies in night school. When he graduated from high school, he was called up for army service and commanded a tank crew. After he was demobilized, he worked as a driver and passed the entrance exams to a road-transport institute.

Then the war broke out. From June 1941 to May 1945 Yudin was at the front.

He was offered a chance to enroll in a two-year law school when he returned to Moscow so that he could work in the militia after graduation. He began studying law, graduated from the two-year course and entered a law institute.

In 1948 he was elected people's judge for the first time.

"Who knows, perhaps I might have gone to work in some other area of the law. But my future was decided by the first case I tried,"

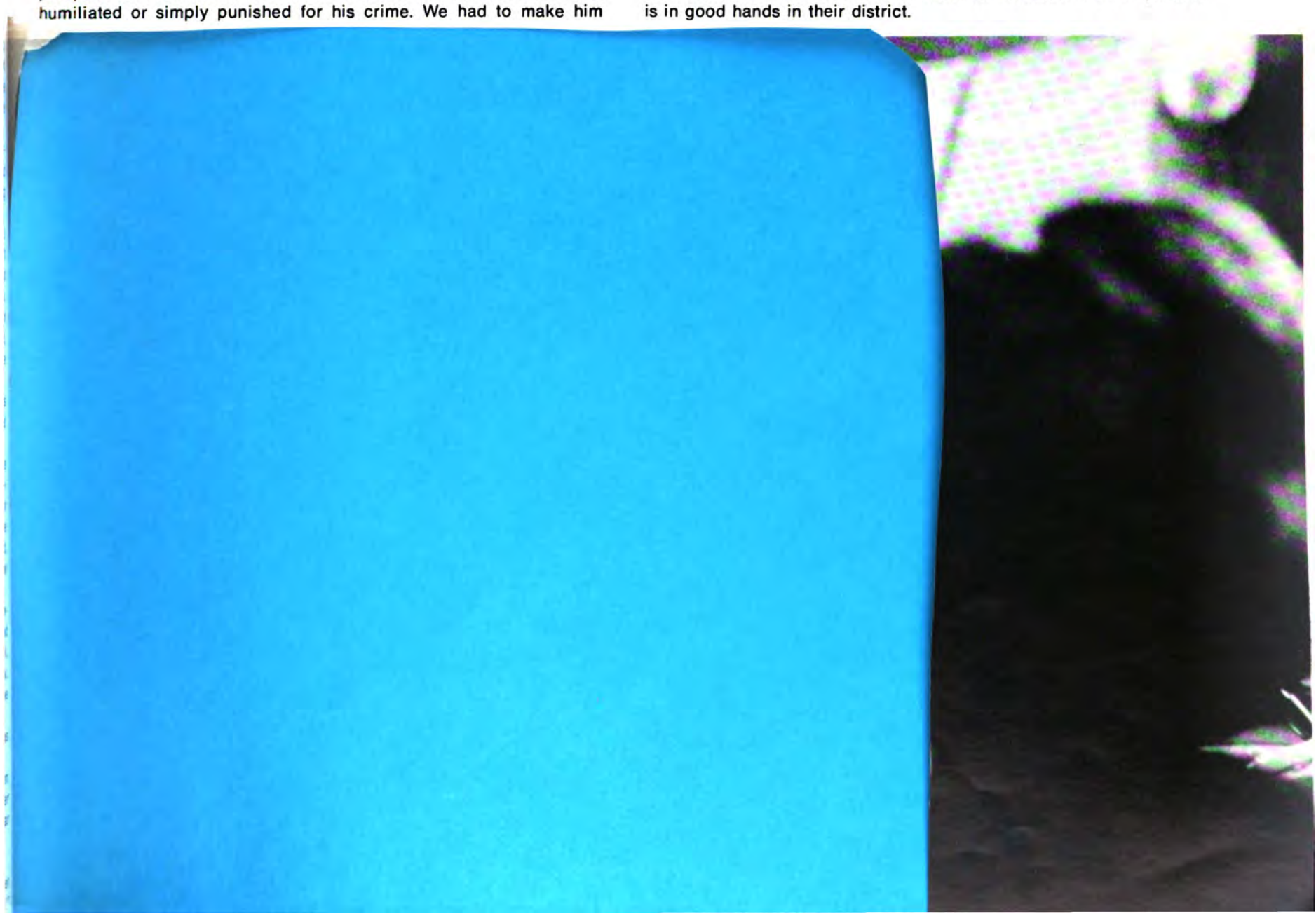
The court in session at the plant where the defendant works. Below: Judge Yudin listens to the evidence.

says Yudin. "My first verdict was for acquittal. The defendant was released right there in the courtroom, and I felt at once, perhaps as strongly as the person released, that administering justice is synonymous with fairness."

"But there must be cases when you punish people."

"There are, of course. A gang of thieves was on trial one time. The ringleader was hardly more than a boy. His father had been killed at the front, and he grew up in the hard postwar years. His crime was brash and cynical. The prosecutor asked for 12 years' imprisonment, we gave him seven. The sentencing was preceded by a heated debate in the conference room. I knew that if we sentenced him to a longer term, he would have no hope. There would have been no prospect for reform. He had to understand that he was not being humiliated or simply punished for his crime. We had to make him feel that all of society, represented by the court, was concerned with what happened to him, was trying to make his life as rewarding as that of others his age. So what was the outcome? He was released in five years for good work and good behavior, and he came to visit me and shake my hand and speak to me. Later I was invited to his wedding and to a birthday party for his child. He writes to me now and then and visits me sometimes."

Like all people's judges, Nikolai Yudin regularly reports to his electorate, listens to them, answers their questions, gives talks. Close contact with people is a necessary condition for a people's judge. Voters in his district have expressed their confidence in Judge Yudin many times. They know that one of the most important and responsible functions of the state, the administration of justice, is in good hands in their district.



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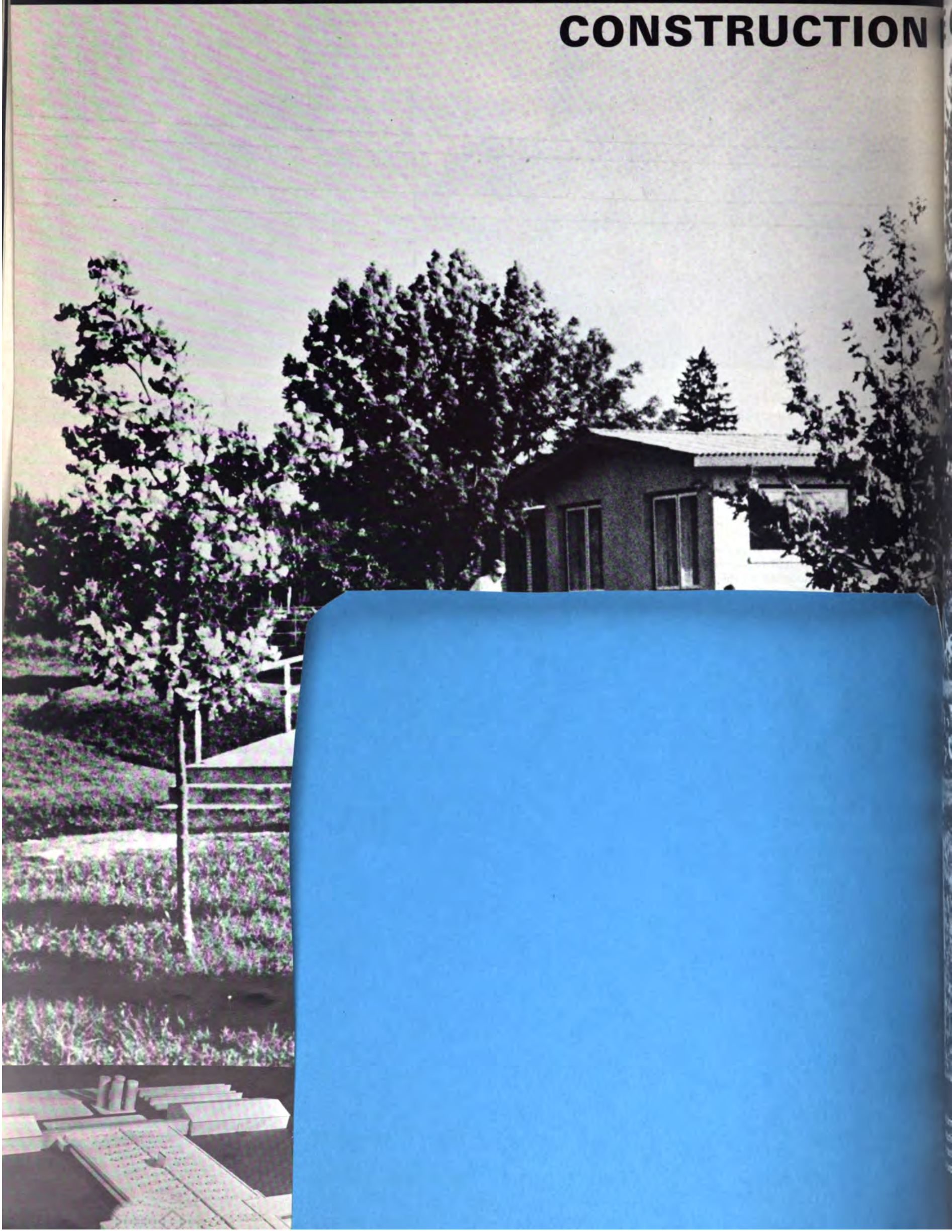

changing the face of the countryside.

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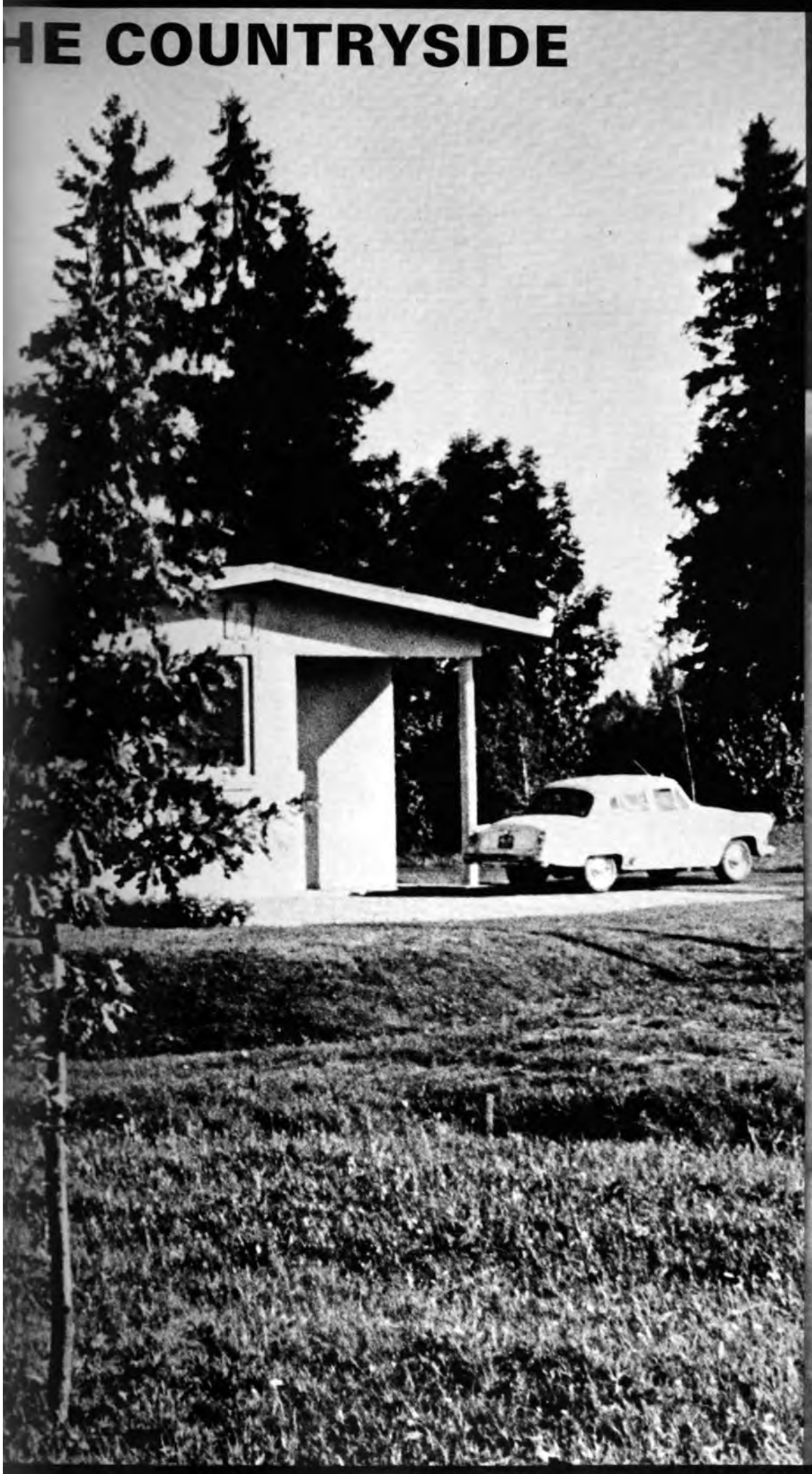

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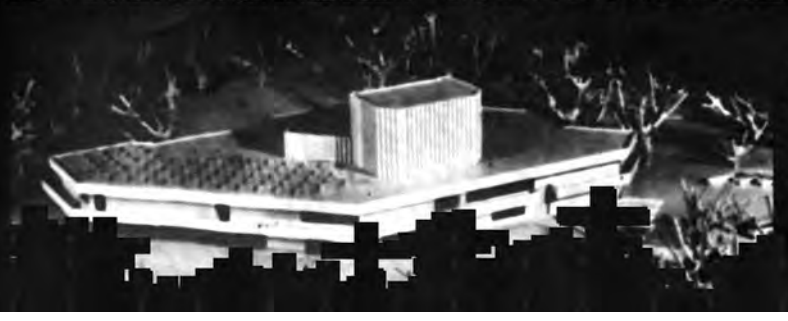


Model of a house of culture to be
built for the Vandra
Collective Farm.
The architect is Toomas Rein.

Modern apartments in big housing developments, good schools, medical services and cultural facilities—these are typical of Soviet farm areas today.

Oskar Mets works as a mechanic at the Vandra Collective Farm. His modern apartment is in the farm's housing development.

FOR FARMERS' COMFORT

By Georgi Dashkevich

A DRIVE to develop an industrial base for agriculture is under way in the Soviet Union. Many of the collective farms have decided to work together in putting up modern production facilities and are organizing intercollective farm building organizations (IBO).

The building organization is financed from the dues paid by the collective farms that are shareholders. These member farms decide how funds are to be dispersed. The IBO board gets orders from collective farm shareholders for new construction projects and sees them through to completion.

The IBO buys most of its construction material from the state. The rest comes from production units owned and run by the building organization itself, including asphalt-concrete, precast ferroconcrete parts, silicate, metalworking and woodworking plants. Each IBO unit is expected to specialize. For example, one makes building blocks only, another structural steel. Their profits come to 10 per cent of the total cost of construction.

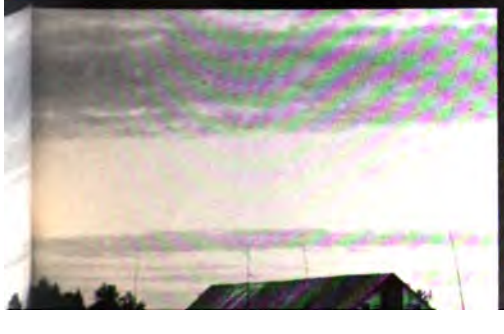
As a rule, some 60 to 70 per cent of the profits go to expand production facilities. What remains is divided among the farms that are shareholders.

Experience has proved the value of such building cooperatives. The construction of livestock sections and dwellings has increased, and costs have dropped substantially.

The wages of the factory and office workers employed by the building cooperatives are guaranteed. A skilled worker makes as much as 250 to 300 rubles a month.

The trend in rural areas is toward automated production units that will ease the work of farmers and not only make for economic growth but narrow the social and cultural gap between town and country.

A family-style hotel (below) and a resort hotel in Parnü (far right), both for collective farmers; a barn for 480 cows (right) recently built for the Nigula farm.



NEXT ISSUE

International Women's Day, March 8, is truly international in origin. Commemorating the day in 1857 when American women working in the garment and textile trades demonstrated for shorter hours, better working conditions and a living wage, the holiday was initiated on the proposal of German Socialist Clara Zetkin, a close friend of Lenin's, attending the International Socialist Congress in Denmark in 1910. Since then, March 8 has been celebrated mainly in the socialist countries, but nowhere as festively as in the Soviet Union. Dedicated to Soviet women, the March issue includes articles about a woman textile worker who is a member of the Presidium of the USSR Supreme Soviet, a woman orchestra conductor, a woman flier—about women in a variety of fields of endeavor.

Yakutia was a white wilderness overrun with wild reindeer. Only nomads lived there before the Revolution. Today the industrial development of the Yakut Autonomous Republic exceeds the average for the country. The Vilyuiyskaya Hydroelectric Power Station has been built, large ore-extracting centers have been developed there and gas pipelines are being laid to the most remote settlements. The world's only institute of permafrost studies is located in Yakutsk, capital of the republic. Last summer more than 700 specialists from 14 countries gathered there to attend a permafrost conference. "Vistas for High Latitudes," by the Yakut Deputy Minister of Education, "Americans in Yakutia" and "Sun Fete at Mount Khunkhada" picture life in this northern republic.

Health care in the Soviet Union is based on prevention and begins long before the child's birth. Prenatal care, like all medical services, is free. The article "Every Day 12,000 New Babies" describes how it works.

A sociological study made in Leningrad indicates a definite interrelation of the educational levels achieved by husbands and wives and the increasing frequency these days of marriage between people with the same occupation. An article on the interesting facts and figures of this study.

A photo story showing how fathers-to-be are trained to be mothers' helpers. The course given by doctors and teachers at most women's consultation centers in the country includes tips on caring for the newborn baby.

An article by the director of the Institute of Virus Preparations explains why the Soviet Union, regarded as one of the safest countries by the World Health Organization, still turns out billions of vaccine doses a year for immunization against smallpox and other infectious diseases.

An article about the Kursk Magnetic Anomaly, the area in the center of the European part of the Soviet Union containing huge iron ore deposits.

COMING SOON

Sports in Moscow

Hundreds of animal species disappeared from the face of the Earth in the nineteenth and twentieth centuries. The sea cow, the aurochs and the tarpan head the list. Of the utmost urgency is the problem of preserving the rare species still with us among the mammals—the whale and seal, the white bear, the Asiatic lion, the onager and many others.

By mid-1950 the number of white bears in the Arctic had dropped to a critical minimum. In 1968 a polar bear study group was organized under the sponsorship of the International Union for the Conservation of Nature. Five Arctic countries were represented: the USA, Canada, the USSR, Denmark and Norway. Bilateral agreements on scientific and technical cooperation between the Soviet Union and the United States and Canada also play a considerable role in polar bear conservation.

Hunting of these animals was prohibited in our country as far back as 1938. As a result their number gradually has increased to 15,000. Although this figure is much above the 1950 critical level, the conservation of the polar bear remains an urgent business. Polar bear studies are coordinated by the Central Laboratory for Nature Conservation under the USSR Ministry of Agriculture. This laboratory arranges annual scientific expeditions to different Arctic areas; Wrangel Island is the central base for this work. Stanislav Belikov, researcher at the laboratory, gives his account of one such expedition.

AT HOME WITH THE
POLAR BEARS

There is a place in the country's extreme northeast in the Soviet Arctic which is described as the white bear's home—Wrangel Island. It is some 30 miles long, and the East Siberian and Chukchi Seas join their waters at its shores. One part of the island belongs to the Western Hemisphere, the others to the Eastern. As the crow flies, it is over 3700 miles to Moscow and 1200 to Magadan, the nearest city.

The den count is one of the most promising and reliable methods of determining the size of the Arctic's white bear population. The 1973 expedition established that 200 to 250 she-bears had dug themselves dens on Wrangel Island. The number is slightly higher than in preceding years, when ice conditions and other factors were less favorable.

Naturalists know little more about the white bear than that it inhabits frost areas, that it can do without food for long periods, that it does not hibernate and that it roams the drift ice summer and winter. The bear prowls freely on Wrangel Island, a perfect setting for the study of its migration pattern.

Savva Uspensky, well-known Soviet explorer and Doctor of Science (Biology). It sometimes takes three men to hold down a single cub, but Uspensky seems to be on amicable terms with this one.

After the very delicate and hazardous job of uncovering the den, scientists have injected this she-bear with a drug that causes temporary paralysis. The research team now gets busy weighing

her, something of a trick with a 650-pound animal. This tripod arrangement sometimes helps. Metal and plastic tags are then attached to the bear's ears so that her migration habits can be traced.

WE LEFT FOR Wrangel Island, six of us, in March 1973. Our research program included a den count, tagging animals and numerous observations, the general purpose being to learn more about the ecology and way of life of the polar bear—the biggest beast of prey on earth.

As in previous years, studies were done mostly in the Drem-Khed Mountains, in the northwest section of the island. The choice of location was not accidental. Every year some 40 to 50 pregnant she-bears dig their dens in these low mountains. We had a unique stroke of good luck this year—the concentration of dens was unprecedented: 13 to about one-third of a square mile, and the distance between some of them was no more than 10 to 15 feet.

We know very little, even today, about the white bear's migration habits. Tagging animals is a big help. It is done by attaching metal and plastic tags to the she-bear's ears. From these tags one can determine where the particular bear came from as well as get an idea of the scale of its travels. But to tag and study the polar bear, we first have to find its den. The search has all kinds of surprises waiting for you; the treacherous fragile roof of a bear's dwelling may turn out to be right under your foot.

How do we begin? First of all we look for the den's exit hole and close it off with snow. But the tunnel that begins at this hole and leads to the den proper may turn off to the left, to the right or in an upward direction. With a long metal pike we poke about in the snow feeling for an empty space. Once we have established the location of the den's chamber and the thickness of its roof, half the job is done. Now we dig a narrow well in the snow. The spade handle at such times seems to become shorter and shorter. Finally, we've dug through the last couple of inches, and the tip of the beast's muzzle, with its bluish-black nose, is visible through the opening. Work now slows down. The hole must be carefully enlarged so that we can work on the animal, still it must remain small so the bear cannot jump out. We must be careful not to hurt the animal; it's also not recommended to let the bear get hold of the spade.

A drug that causes temporary paralysis is shot into the beast from a syringe. In 10 to 15 minutes we can proceed with our work. We measure and weigh the she-bear, entering all information in a field diary, and also record our observations on the behavior of the cubs and the condition of the she-bear during the experiment. It's hard to say what worries us more—working with the motionless she-bear, which may come to life any moment, or with the frolicking cubs. The little ones are astonishingly strong, and it sometimes takes three men, strong ones at that, to hold down a single cub.

The weighing or, rather, the preparations for it, takes time. Things are not so difficult if the den's roof is no more than 10 to 15 inches thick, but it can measure as much as 3 feet. The bewildered she-bear, her viciousness subdued, has to be dug loose, then she's suspended in a net attached to a special tripod. The weight of an individual specimen may be as high as 650 pounds.

Now what's the den like, this snug retreat in which the she-bear spends a full half-year? To say that it's a chamber of about 6 to 10 feet in diameter with a tunnel leading to the outside is to tell you almost nothing. A she-bear's imagination rivals a talented architect's. One she-bear digs out an apartment of several rooms with nursery and bed-dining room clearly delineated. Another is satisfied with a one-room apartment. Each den has its individual exit with a little hall separating it from the den proper. The hall frequently becomes filled with snow, and then, in the spring, the she-bear has to dig a hole through the ceiling to get out.

Sometimes we come across ice-armored dens. Living in such a home would be uncomfortable, especially for cubs, if there was not a foot and a half layer of snow warmly blanketing the den. The temperature in such a dwelling is below freezing, but it is still 7-15 degrees higher than the air outside. The den is dark with a gentle bluish light streaming in through the ceiling. On the walls are traces of sharp claws.

In the spring the she-bear doesn't abandon her snow cave when she emerges into the sun. She spends days and sometimes a whole week getting the cubs used to the new world around them—the low temperatures and blinding sunlight, the steep, slippery slopes and the neighbors. Between the end of March and the first half of April most of the she-bears abandon their dens and head for the ice floes with their cubs. A bear family presents a curious sight. The she-bear moves unhurriedly up front, stopping from time to time to give the baby bears a chance to rest and to feed them meanwhile. Finally, the little ones are rested and ready to go on, but, their energy running over, they start to tussle. Mother bear quickly establishes order. The first cub to come within her reach gets a couple of light slaps, and the lumbering family is on its way again.

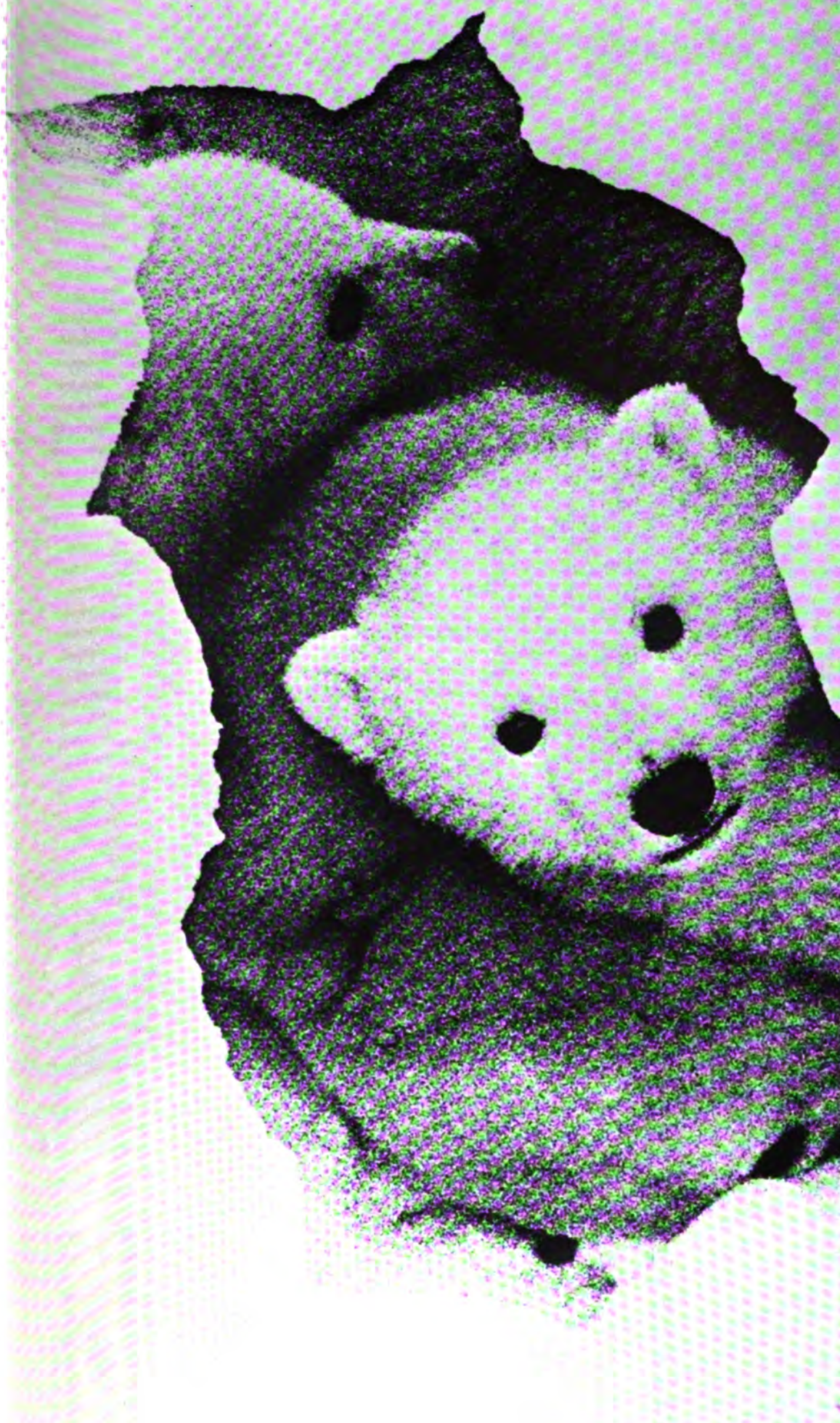
There are usually two cubs in mother bear's wake, rarely one or three, though scientists have found four babies in a den. A bear cub will then weigh about 17 to 33 pounds. That's quite a lot, considering that a newly born cub weighs only one and a quarter to one and three-quarters pounds. The secret of this rapid growth is the high fat content of the she-bear's milk—as much as 70 per cent.

Although the bear appears to be sluggish, the animal is a fine runner, especially for short distances. When it comes to obstacles, no living creature in the Arctic can beat it, let alone man. Hummocks many feet wide and long are nothing for bears although they prefer open ice floes. Lumbering but fast, the bear is constantly surveying the surrounding locality and, stretching its neck, carefully smelling everything. It perceives moving objects instantly. Many times we chased bears on a motor sleigh—which can build up a terrific speed—but we failed every time. The bear gallops off to the nearest hummocks and disappears from sight.

I mentioned the aims of our expedition. All our observations were done according to the International Polar Bear Study Program, and the data we collected is part of that program.

POLAR BEARS
AT HOME

They were born during the six-month polar night. It's spring now, time to come out of the den.



In the country

Photograph by Anatoli Yerin

SOVIET LIFE

PEACE PROGRAM IN ACTION

SOVIET WOMEN

AMERICANS IN YAKUTIA

March 1974 • 50 cents

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March 8 is International Women's Day, an official holiday in the Soviet Union since 1965. Soviet women—both in constitutional theory and in practice—have the same rights as men, including equal opportunity in education and employment. They are directors of factories and farms, university presidents, hospital chiefs, distinguished writers and artists, legislative leaders. Of the 1,517 deputies to the USSR Supreme Soviet, 463 are women. This issue carries a number of articles on the important role of women in Soviet life.

WOMEN IN SOVIET SOCIETY

Photograph by Yuri Korolyov

The Presidium of the USSR Supreme Soviet. Nikolai Podgorny, President of the Presidium is in the chair. Zoya Pukhova, second from left, is a textile worker. *(See story on page 26.)*

MARCH 1974, No. 3 (210)

SOVIET LIFE

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SOVIET LIFE

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LETTERS TO THE EDITOR

I am renewing my subscription to SOVIET LIFE for the sake of my son, Roger David Paul. He had read every issue since soon after it was published and carefully saved them all.

Roger Paul loved Russia, its land and its people. He had read so much about Russia that I am sure he would have been quite at home in any part of it. He was familiar with recordings of its lovely music; spoke some of its language. He followed eagerly the development of the great new cities in the East. He had studied in detail the Battle of Stalingrad and honored its brave defenders.

I had so hoped that sometime he could go and see this country he loved so well. But he can never do so. He died suddenly of a heart attack last October 24th. He was only 44.

I want someone in Russia to know about this man, Roger David Paul, who lived so far away but was so close to Russia in mind and spirit.

Mary Colter
Orangevale, California

You don't know how much your magazine—SOVIET LIFE—means to me. I look forward to it and enjoy it greatly when it comes.

What a pleasure to read of people doing good to their country! Going forward in this time of great stress everywhere—your planning, your finishing—all that helps so much. And no commercials!

Some of my friends say you only tell of the good that is in your great country and none of the bad.

Well all I can say is when you have so great a lot of the good to write about, Bravo—and we hear nothing but bad everywhere else in so many areas. Enough of that. My heart yearns for good news.

Katherine Neugebaner
Grand Prairie, Texas

I have subscribed to SOVIET LIFE for one year now and could not imagine another year without it.

The articles are fascinating, and with each issue my desire to someday visit the Soviet Union becomes greater.

I am happy that there is such international cooperation in at least some publication's related matters, and I feel that the peoples of the world may yet someday be united in a common goal and live in peace.

I study Russian and would like very much to see the original short stories in your magazine again.

Thank you again for existing.

Kathy Fox
Fairfield, Virginia

My congratulations to all the contributors of your well-edited publication and in particular to Doctor Grigori Glezerman for his excellent article about the 24th CPSU Congress and the Party's Social Policy in the December 1973 issue.

I would like to read articles on how your citizens are preparing themselves for the period when you will have reached a level of abundance where they can devote more energies for humanistic endeavors of all kinds. Such a vision must sustain their enthusiasm in the fulfillment of your Ninth Five-Year Plan.

I wish you well.

Paul Piuze
Hermosa Beach, California

THE COURSE THAT HAS PROVED ITS VALUE

THIRD ANNIVERSARY OF THE TWENTY-FOURTH CPSU CONGRESS

By Yuri Filonovich

THERE WAS A TIME—before October 1917—when the congresses of the underground Marxist party of Russia were held in secret, frequently abroad. But the party grew stronger, its influence spread, and it led the toiling masses in the struggle for liberation from the exploitation of capitalists and landlords. This struggle ended with the victory of the October Socialist Revolution, and the Leninist Communist Party which had organized the masses and expressed their vital interests became the ruling party in the world's first state of workers and peasants. Since then its congresses have been landmarks on the road the Soviet people are traveling toward socialism and communism. Now the whole world is aware of our progress.

The Congress of the Communist Party of the Soviet Union, as the party's highest organ, determines its political course and the direction of its activities. Hence, each congress signifies a definite historical stage in the country's development.

Three years ago the Twenty-fourth CPSU Congress worked out the major domestic and foreign policy goals of the party and the state for the years ahead.

The congress defined the main goal of the country's Ninth Five-Year Plan of Economic Development (1971-1975): "To ensure a considerable rise of the people's material and cultural level on the basis of a high rate of development of socialist production," through greater efficiency, the application of scientific and technical findings and an increase in labor productivity.

Along with the continued development of heavy industry, the CPSU outlined a program of measures to better meet consumer needs. During the current five-year plan period about 60 million people are to move into new and better housing. The budget for agricultural development in the 1971-1975 period is to equal the combined budget of the two previous five-year periods. Capital investment in light industry is to almost double as compared with the last five-year plan period, with still larger sums to be allocated for the development of the food industries. The volume of communal services is to increase by no less than two times. These samplings give some idea of the nature and goals of the Ninth Five-Year Plan. The implementation of a plan of this scope was made possible by the growth of the socialist economy.

The past three years give evidence that the program of the Twenty-fourth Congress is being carried out successfully. As compared with the corresponding period of the last five-year plan, the volume of industrial production has increased by one and a half times and the national income by about 1.4 times.

Qualitative changes have also occurred in Soviet industry. Since the beginning of the Ninth Five-Year Plan period, science and industry have been working together even more closely. At least 9,000 new items have gone into serial production, and over 3,000 advanced technological processes have been introduced. Every day another large industrial enterprise is completed.

The progress of agriculture has been equally rapid: Last year the country harvested a record grain crop of over 235 million tons.

In the three years since the Twenty-fourth CPSU Congress met, about seven million housing units have been built in towns and villages. The earnings of almost every third factory and office worker have been increased. Real per capita incomes have risen by 13.5 per cent.

Though a great deal has been accomplished, there is still much to be done to meet all the goals of the party congress. But the Soviet social system has demonstrated its potentialities in practice.

The Peace Program advanced by the Twenty-fourth CPSU Congress has influenced international relations and created the conditions for détente. Three years ago many people abroad saw the program as a desirable goal, little more; they considered it too daring, almost utopian. But time has shown that the proposals it contains are thoroughly realistic.

One of the program's main aims has been achieved: The dangerous hotbed of war in Southeast Asia has been eliminated.

Another goal put forward by the Peace Program—détente and peace on the European continent—is now being realized. The treaties concluded by the German Democratic Republic, Poland and the USSR with the Federal Republic of Germany have consolidated the existing borders between these countries. The All-European Conference on Security and Cooperation is also contributing to stability. The Soviet people hope that the conference will turn Europe into a zone of stable peace, good-neighborly relations and cooperation.

After a quarter-century of cold war there are very real and positive changes in the relations between the Soviet Union and the United States. The treaties and agreements signed by the two countries are specific steps on the way to ending the international arms race and eliminating the threat of thermonuclear war. They will ensure the mutually beneficial economic, scientific, technical and cultural cooperation that the world needs so much today.

Thus, we see that the principle of peaceful coexistence of states with different social systems is gradually gaining general acceptance. The international climate has, on the whole, improved, and the prospects for universal peace are brighter. Of course, not every problem has been solved. War and international crises have not yet been eliminated, acts of aggression and violence continue to occur, and there are still forces blocking social progress.

But history tells us that no force on Earth can halt the process of social reconstruction. The peoples of the world are striving to live in peace and friendship and to change our planet for the better. And change it they will. This was demonstrated at the World Congress of Peace Forces in Moscow, which can truthfully be called the first general assembly of the peoples of the world.

Many of the participants in the World Congress pointed out that the Peace Program advanced by the Soviet Union clearly expresses the aspirations of the Soviet people.

"Putting forward this program," Leonid Brezhnev, General Secretary of the CPSU Central Committee, told delegates, "we felt that it was our task to help eliminate seats of tension, to assist mankind in ridding itself of the specter of a thermonuclear holocaust, and to promote a relaxation of tension in every possible way. And we have been working and will continue to work ceaselessly for these noble goals, for the benefit of all working people."

Time is the crucial test of political decisions and actions. The three years since the Twenty-fourth Congress of Soviet Communists have confirmed the correctness of the course we have chosen.

The Indian people came out en masse to welcome Leonid Brezhnev. Left: A friendship rally near the Red Fort in Delhi, India, where the General Secretary of the Central Committee of the Communist Party of the Soviet Union spoke. Right: The Prime Minister of India and the General Secretary of the CPSU Central Committee at one of their round-table discussions. Below: Indira Gandhi and Leonid Brezhnev at the ceremony of signing the joint Soviet-Indian Declaration and Agreement on economic and trade cooperation.

LEONID BREZHNEV'S VISIT TO

THE SINCERITY of political declarations is tested by time and practice. The program for world peace advanced by the Twenty-fourth Congress of the Communist Party has stood up well to this test. The feasibility of the objectives set forth in this program and the persistent efforts to achieve them have brought a shift in the world situation in favor of détente and promoted mutually advantageous economic, cultural and diplomatic exchanges. This shift was made possible to a considerable extent by the meetings and talks of CPSU Central Committee General Secretary Leonid Brezhnev with the government leaders of many countries, including India.

The principles of peaceful coexistence which underlie Soviet foreign policy are becoming the norm in relations between states. They have been proclaimed in official bilateral documents signed by capitalist and socialist countries. Earlier, they formed the foundation on which the Soviet socialist state built its relations with the Eastern countries and, later, with the newly free states.

The friendly business relations between the Soviet Union and India are now described as a model of peaceful coexistence.

In cooperation with the Soviet Union, India has already built 51 industrial projects and is building 25 more. For the most part they are iron and steel mills, machine-building plants and electric power stations, enterprises which are critical for a country's industry and, hence, for its economic independence. It should be borne in mind that, as in the other developing countries, the Soviet Union does not have a share in the

INDIA

peace program in action

"Our position, which we propose to all countries, is essentially this: Let us respect the independence and sovereignty of every state, refrain from any military actions against each other and refrain from threats of force against each other. Let us not only coexist peacefully but develop all-round cooperation. We make this plea to all governments and to the public forces which, we are convinced, can greatly contribute to structuring international relations."

From the speech by Leonid Brezhnev, General Secretary of the CPSU Central Committee, at a friendship rally near the Red Fort in Delhi, India, on November 27, 1973

ownership, management or the profits of these enterprises. They are the sole property of India.

Cooperation of this kind continues to expand. Leonid Brezhnev's visit to India at the end of last year served to strengthen the ties between the two countries.

The documents signed during the visit showed that Soviet-Indian relations have risen to a new qualitative level. Among them was a 15-year trade agreement. Scheduled is an exchange of experience in the field of planning. Despite their different social systems, the Soviet Union and India are beginning to coordinate their economies for mutual benefit and with strict adherence to the principle of noninterference in each other's internal affairs.

The joint Soviet-Indian declaration noted that "Productive trade and economic cooperation, based on the principles of equality and reciprocal advantage, has become an objective reality and an important factor in the economic development of the two friendly states."

The peaceful aspirations of the two countries served as a basis for a common view on how peace could be strengthened in Asia. Both sides declared themselves for a more stable Asia based on the collective efforts of all states in the area. The joint document noted that a durable peace on the Asian continent would strengthen world peace and security.

In the present situation the relations between two countries concern all others; peace is indivisible. In this respect, as Leonid Brezhnev noted in India, "What has

been achieved as a result of the Soviet-U.S. summit talks in 1972 and 1973 in directing relations between the Soviet Union and the United States into healthy and normal channels undoubtedly meets the basic long-term interests of both the Soviet and the American peoples and the interests of universal peace." Relations between such large countries as the Soviet Union and India influence the international climate generally.

One Indian magazine wrote, during the visit, that although the Soviet Union and India differ greatly from each other in internal structure and policies, they are close neighbors who realize that a firm peace between them is a contribution to the vital effort to deliver the people of the world from the danger of a new war.

During the talks both sides demonstrated an understanding of their responsibility for the destinies of their countries and of the world. They supported measures for a further normalization of relations between countries and the strengthening of universal peace.

The Politburo of the CPSU Central Committee, the Presidium of the Supreme Soviet of the USSR and the Council of Ministers of the USSR were gratified with the results of Leonid Brezhnev's visit to India. "The Soviet Union and India," they said, "have reaffirmed their determination to continue their efforts toward a détente in the belief that an improvement in the world climate can and must yield practical results for all nations, large and small, advanced and developing."

SOVIET PEOPLE COMMENT ON LEONID BREZHNEV'S VISIT TO INDIA

K. Kotov, engineer, Dnepropetrovsk, Ukrainian Republic:
We regard the visit of Leonid Brezhnev, General Secretary of the Central Committee of the Communist Party of the Soviet Union, as a continuation of the Leninist foreign policy being carried out by the party in keeping with the decisions of the Twenty-fourth Congress. This policy is aimed at ensuring peace and international security. Leonid Brezhnev's visit to India is another link in the chain of efforts being exerted by the Soviet state to ensure universal peace.

P. Busalayev, lathe operator, Frunze, Kirghiz Republic:
We Soviet people cherish our long-standing friendship with India, a land of hard-working people. The Soviet Union and India stand united with other nations in safeguarding peace and upholding humanism and good will in relations among all countries on the globe. Our plant has direct business ties with India. Control and measuring instruments made at our factory are used on many construction jobs there. The good-neighborly, friendly relations and mutually beneficial cooperation between the two countries accord with the aspirations of our peoples and with the demands of our time.

Vadim Kozhevnikov, writer, Moscow, Russian Federation:
I had the pleasure of visiting India several times, and everywhere I sensed the warm feelings the cultural workers, scientists, political leaders and the working people have for the Soviet people.

The same goes for us in relation to the people of India, to their country, "our close neighbor and our good friend," as Leonid Brezhnev put it. His visit and his meetings with the leaders of a state friendly to us were a historic milestone in the development of relations between the Soviet and Indian peoples. This visit proved once again the correctness of the course of friendship, peace and democracy.

D. Nalbandyan, painter, Moscow, Russian Federation:
One of the reasons I remember Leonid Brezhnev's visit to India is that during the same period I was finishing my work on a painting I call *Indian Women*. It is encouraging for an artist when world developments are in harmony with his creative effort. It gives him a feeling of how important his work is. Leonid Brezhnev, General Secretary of the CPSU Central Committee, and Indira Gandhi, Prime Minister of India, had successful talks. For our peoples, this success spells not only expanded cultural and economic ties, but also deeper faith in good-neighborliness, in the future, in the triumph of humanism and truth.

P. Nikitina, dairy worker, Moscow Region, Russian Federation:
The Soviet Government is consistently carrying out the Peace Program drawn up at the Twenty-fourth CPSU Congress and keeps taking new steps to reduce international tension and strengthen peace and friendship among nations. The visit to India was a substantial contribution to this immense job. The documents signed during the visit are aimed at improving the welfare of our nations, at benefiting all peoples on Earth. As a mother, I favor this policy of our government's and hope that my children will not have to experience the horrors of war that our older generation had to endure.

Social Roles and Personality

W SOVIET

By Zoya Yankova, Doctor of Science

EVERY new era, every stage in the progress of society gives women particular social roles.

When the society changes, the role of women changes with it. same goes for the demands made on women by their contempor In a certain sense, every historical period creates its own ideal image by which to shape the female members of the society. Bu presocialist community ever advanced, nor could it have, the go of women's integral personality development—regardless of the social status. Nor did any presocialist community solve the prob in practice. It was posed for the first time by the present age, an being solved in the socialist countries—to the keen interest of th world at large. Women's social role, their personality, have beco subjects for general discussion.

Two Viewpoints

As a result, two main viewpoints have emerged in the West. On is the thesis of Simone de Beauvoir, the distinguished French writ that women have been forced by men into a position of dependen Their role has always been that of the driven. Men see themselves representing the rational element since they have the opportunity to do creative, productive work. They assume their right to rule th world, and they feel responsible for it. Their concepts of "masculi and "intellect" are formed by this sense of responsibility and by their community activity. The functions of women, on the other ha (with the exception of the creative intelligentsia), have been limite chiefly to the family. Women are expected to believe that they represent the emotional element, that they can feel completely self-confident only in their own homes.

In the world created by men, women, according to de Beauvoir, can never achieve a completely integrated personality. They are constantly being pressured to yield to men, and the women who a willing to accept a subordinate role are approvingly described as "womanly." The word, de Beauvoir says, implies a creature incap of independent solutions, absorbed in her family and her own emotional world. Outwardly, too, "the womanly woman" must demonstrate her readiness to play only emotional roles. Hence, he bright costume accessories, attention-seeking clothes, cosmetics and coquettishness, all of which are supposed to divert men from cares imposed on them by society.

No less widespread is the other viewpoint on women's functions Briefly, it boils down to the notion that women's role is determined by the natural biological differences between the "weak" and the "strong" sex. It follows that the "weaker sex" must perform second functions both inside and outside the home.

It is obvious that the concept of "womanliness" is aimed at denying women the right to social equality, at diverting them from the solution of social problems, from active participation in change In these ways, it acts to retard the full development of their personality.

ninin ity" and independence compatible?

OMEN IN SOCIETY

Women as Shapers of Social Relations

Socialism has a different concept of women's role and image. The woman of the future, whose image is emerging today, will be a harmoniously developed, creative, active personality. Participating in all fields of endeavor, she will become a shaper of social relations, using her abilities to the full in creative, transformative and managerial activities.

This ideal is already becoming a reality. Some 80 per cent of the able-bodied Soviet women hold jobs; they constitute 51 per cent of the country's factory and office workers. Women account for 68 per cent of the workers in communications, 47 per cent of those in science, 61 per cent of those in administration, 75 per cent of those in trade. Moreover, women make up some 60 per cent of the annual increment in the work force. The number of women is increasing fastest in those new fields of industry, public health, education and culture that require a comprehensive professional and cultural background. Out of 1,000 working women, 62 have a higher and 589 a secondary education; the corresponding figures for men are lower. As many as 72 per cent of our physicians and 71 per cent of our teachers are women. More than 500 women have been awarded the Lenin or the State Prize for their exceptional creative and economic contributions. All this testifies to their potentialities. Women in increasing numbers are coupling their jobs with community activity. They make up 34 per cent of the deputies to the Supreme Soviets of the union republics and 46 per cent of the deputies to the local Soviets. Many of them hold high government posts. In all factories and offices women are active in management. Hence, the Soviet woman's growing confidence in herself, her feeling of responsibility for the destiny of her own country and the world. Hence the blossoming of her personality.

"Masculine" Traits?

Does this mean that women under socialism are becoming less feminine? Some Western researchers would probably say Yes. Robert Rapoport, a leading British sociologist, notes, for instance, that the aspiration of women in Britain for a more equal place in the social system is regarded by the overwhelming majority of the men as a desire to ignore their duties as wives and mothers. Soviet sociologist Igor Kon sees it quite differently. He writes: "As they perform social functions that were previously the monopoly of men, women cannot help taking over certain traditionally masculine habits and ways of thinking, acquiring more self-confidence, smoking and so on."

As I see it, women's desire to break out of the bounds of domesticity is explained not by changes in their mentality, but by the objective demands of present-day society. Also, it is erroneous to place such different categories as ways of thinking and smoking on the same plane, as Kon does. Ways of thinking and self-confidence are determined primarily by the nature of a person's work, by his or her place in society, while smoking, which is no sign of masculinity even in men, is simply a bad habit.

The Important Thing in Life

In our day, you cannot define a woman's personality by listing only one of her social roles, important as it might be. Personality is always multifaceted, particularly in the case of women, whose many functions include the sociobiological role of mother. Obviously, limiting a woman's activity to home and family deforms her personality. But rejecting the value of family relationships can be equally constrictive. Women know that. In a recent questionnaire we asked a group of women, "What role do you think is most important—professional, sociopolitical or family-domestic?" Some 90 per cent replied: "All three."

Her professional and social-political functions give a woman confidence and a sense of social value, while her function as mother makes her sensitive, attentive, solicitous, emotional. We know that many maternal traits exert an influence—in an altered form, of course—on woman's attitude to man, and in large measure account for her attractiveness, charm and femininity.

Are these qualities changed by her new social roles? They are, and for the better. They become more pronounced, more refined. Woman's attitude to man begins to carry over to the entire spectrum of interpersonal relations.

We also asked some thousand men and women to evaluate their own characters: whether they were emotional, rational, quick-tempered, calm, optimistic, pessimistic, confident, unsure of themselves, active, passive, reserved, unrestrained, sociable, retiring, responsive, unresponsive, tractable, untractable, imaginative or not, capable of making responsible decisions, whether they preferred a job or domestic chores, mental or physical work, and so on.

We found that some 80 per cent of the women believe they are "active," "confident," "sociable," "prefer a job," "are capable of making responsible decisions," as well as "attentive," "able to sense the mood of others," "responsive" and "gentle." All noted that civic involvement, by widening their perspectives, had strengthened family relationships and given them added status at home. Conversely, their family relationships had had a good effect on their civic activity, making them more solicitous, attentive and responsive, more ready to consider the other person's point of view.

What Is Womanliness?

The new status of women in society thus changes not only their character, but also the very concept of womanliness.

Of the women quizzed, 20 per cent identified this concept with "gentleness," "emotional sensitivity," "solicitude" and "tact." Some 15 per cent added "elegance," "attractiveness" and "charm." But 65 per cent believed that these qualities alone did not make for womanliness. According to them, the concept also included such important personal qualities as independence, self-respect and self-confidence.

In other words, most of them associated the concept of womanliness with the more general concept of personality. This idea does not contrapose masculine and feminine traits, nor does it assume behavior differences.

This point of view seems convincing to us. The image of the Russian woman, so lyrically extolled by the poet Nikolai Nekrasov, was characterized by lofty patriotism, integrity, resolution, even though it was gentle and decidedly emotional. Patriotism, spiritual fortitude, loyalty, modesty are character traits of the woman of our day. The broader her cultural background, the more pronounced is not only her individuality, but also her femininity.

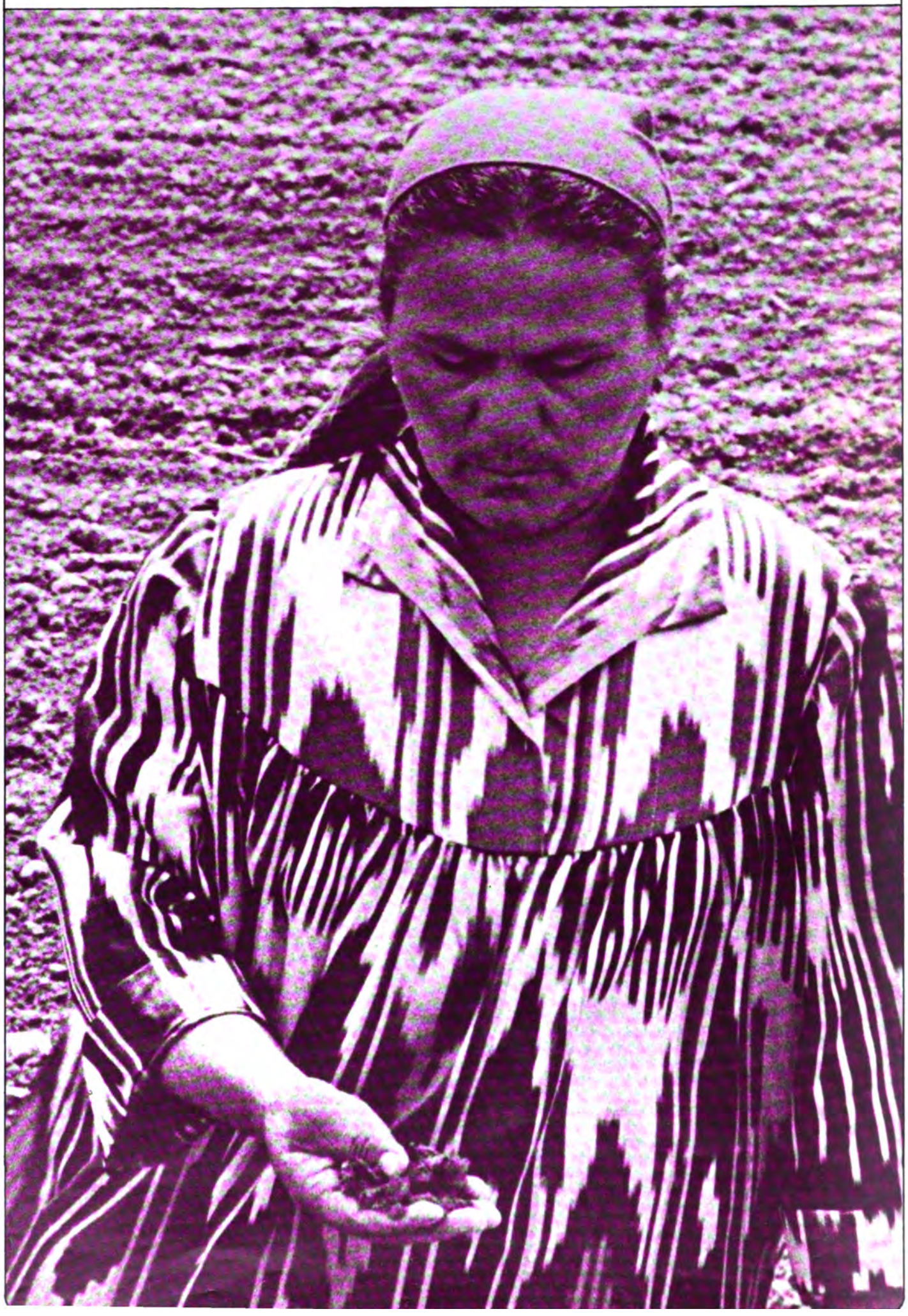
True, household duties and the survivals of "masculine parasitism" are still denying women the fullest possible opportunity for personality development. Housework, as Lenin pointed out, can be petty, mechanical and nerve-racking. To lighten the burden, Soviet society is working to make laundering, house cleaning, cooking and child care easier. The entire approach of our society to the home is directed toward this end. The increasing mechanization of housework, the opportunity for continuing education and a comprehensive system of social maintenance give women the chance to express their creativity and to play an active social role.

I should like to repeat that the independent development of a woman's personality need not entail her taking on such "masculine" traits as ruthlessness and overaggressiveness. These, of course, are unattractive in either sex. They are merely evidence of a poor cultural background and, further, of inhumanity. Genuine humanism in the modern woman is expressed in her ability to combine social and personal roles, in her striving for a creative harmony of family relations and constructive labor.

Our memories of the thirties and forties are closely associated with the names of such famous women flyers as Polina Osipenko, Valentina Grizodubova and Marina Raskova. During World War II there were even women's air regiments, famous for their skill and heroism. Nowadays a woman pilot is no rarity. But, on June 16, 1963, excitement spread throughout the world when Soviet radio broadcast the news that Valentina Tereshkova had entered near-Earth orbit. At that time, space travel was still a novelty and Tereshkova's name took its place among such pioneers as Yuri Gagarin, Gherman Titov, Andrian Nikolayev, Pavel Popovich and Valeri Bykovsky. Incidentally, Tereshkova married Nikolayev soon after her history-making flight. They now have a school-age daughter, and Nikolayeva-Tereshkova is preparing her candidate's thesis at the Zhukovsky Air Force Engineering Academy. Since 1968 this former factory worker from the old Volga town of Yaroslavl has been Chairwoman of the Soviet Women's Committee.

WHEN WOMEN TAKE OVER

Nazira Yuldasheva has been chairwoman of the Lenin Collective Farm (Syr Darya region, Uzbekistan) for 13 years. Half a century ago Uzbek women knew only housework and complete obedience to their husbands, but Yuldasheva has proved herself an excellent administrator in a highly demanding job. Her farm is one of the best in the republic, and she has been elected deputy to the USSR Supreme Soviet. She is also the mother of seven children.



In accordance with tradition, the March issue is devoted to International Women's Day, celebrated on March 8. The articles include a sociological study on women's roles and personality development, and accounts of women in unusual occupations. Judging from our mail, our readers are keenly interested in knowing more about Soviet women. Women in our country have long enjoyed equal rights with men in industry, government, science and culture—rights that are taken for granted by the entire population. Further, as socialist society develops, Soviet women continue to enter new spheres of endeavor. They are taking over traditionally "male" professions, proving there is no field in which they are not equally qualified.

otographs by Alexander Rubashkin

Lyudmila Gasyuk is a streetcar driver with a passion for airplanes. On page 62 she tells how she became a flyer.

Zoya Pukhova, a weaver at the Ivanovo Textile Mill, is also a deputy to the USSR Supreme Soviet, the mother of two boys, and the wife of a construction worker. Her story is on page 26.

Veronika Dudarova is chief conductor of the Moscow State Symphony Orchestra. Conducting is hard, she admits in an interview on page 18, but she'd choose it for her profession any time.

Pioneer spacewoman Valentina Nikolayeva-Tere kova has long been a heroine to Soviet schoolg Inspired by her example, streetcar conductor Lyudm Gasyuk entered an air club and learned parach jumping. She later switched to gliding and then flying. From the beginning, the male members of club acknowledge, she could best any of them. A other March article tells about Zoya Pukhova, a wea from Ivanovo who, like Nazira Yuldasheva, is a dep to the Supreme Soviet of the USSR.

While Veronika Dudarova's profession entails danger or risk, it was until recently a men-only aff Dudarova, one of the world's few women orches conductors, directs the Moscow State Symphony.

Natalya Makarova, chairwoman of the Moscow Regional Court, with two colleagues.

Tatyana Nikolayeva, secretary of a committee of the USSR Council of Ministers.

Tatyana Nikolayeva, like Zoya Pukhova, was born in Ivanovo. After graduating from the teachers institute in that city, she taught school for several years.

She was then elected First Secretary of the Ivanovo City Committee of the Communist Party. There are a number of former school and college teachers among party functionaries, since their knowledge of human nature and instructional methods particularly fits them for the job. Later, as a secretary of the All-Union Central Council of Trade Unions, Nikolayeva supervised the construction of cultural facilities such as clubs and palaces of culture and helped amateur arts groups get started. She now holds an important post in one of the government commissions.

Soviet women judges, lawyers and criminal investigators are disproving the old claim that women's thinking is ruled by emotion rather than reason. They have demonstrated that objective facts always take precedence in their work. This is true even though the sensitivity they bring to the job may make the administration of justice more painful in many cases. Natalya Makarova, chairwoman of the Moscow Regional Court of Justice, is the first to acknowledge this. But, she says, women's responsiveness actually helps their work by making them see the human being in every culprit.

With class barriers eradicated, there are no restrictions on free choice, but Soviet young people seem to favor their intellectual equals. The higher their education, the greater their demands.

By Larisa Kuznetsova

Photographs by Miroslav Murazov

CHOOSING A PARTNER IN MARRIAGE

A RECENT STUDY in Leningrad, the work of sociologist A. Baranov, indicates a definite interrelation of the education levels achieved by husbands and wives. Baranov draws attention to this fact when he points out that "at the present time approximately half of all married couples have the same level of education." (Of 1,211 couples, 565 had an equal education; in 417 cases, the husband had more schooling; in 229, they had less than their wives. The gap between levels (in years of education) is narrowing from generation to generation. This is to be expected since most of today's young people learn to know each other at their places of study or work or through mutual friends.

Moreover, not only equal academic attainment but even the same occupation is observed with increasing frequency in present-day marriages. In 1969 Estonian sociologists M. Titma and P. Kenkmann made a survey of 4,123 graduates enrolled in day classes at higher education institutions in Estonia. Their purpose was to find out the occupational groups of the students' parents and to determine therefrom what social experience the parents had passed on to their children. Results showed that among Estonian agricultural workers 54.2 per cent of the mothers and 63.2 per cent of the fathers had themselves married agricultural workers; second came workers at large enterprises, with 34.9 per cent of the men and 44.4 per cent of the women married to individuals in the same line of work; in third place came the intelligentsia.

The unions of couples working in the some occupational area comprised approximately one-fourth of all the families studied. The authors drew this conclusion: The small proportion of families in which the parents have the same occupation and the more significant proportion with parents belonging to different occupational categories characterizes the socialist society as one open to social mobility and the possibilty of establishing the most diverse ties,. including marriage.

When I use the word education, I am not necessarily speaking of formal schooling, which I do not underrate in any sense. One person may achieve much more by educating himself than another may through compulsory education. It is all a question of individual ambition and aspiration.

It would seem, however, that, on the whole, real life ignores the sociologists' graphs. A girl, after finishing a 10-year school, marries a journalist; her girl friend from a specialized secondary school marries a scientist; a worker chooses a student; a student weds a girl who is a house painter; a bus driver's wife is a translator; and a violinist is the husband of a hairdresser. These marriages between people of widely differing occupational interests happen all the time because, I repeat, class barriers have long been destroyed here.

However, it cannot be assumed that the educational level of married couples may remain what it is the day the wedding bells ring. It would be interesting to know the changes in educational achievement of young couples two or three years after their wedding day. All the evidence shows that the advances in education and culture continue during marriage: The worker graduates from a higher technical institution at his factory, the 10-year school graduate enrolls at an institute and the girl house painter enters a specialized secondary school. In all respects those who get married represent the most mobile part of the population. They are in constant movement, and improving themselves is integral to their lives. Very often young couples work and study at the same time and pull themselves up to each other's level. Combined work and study has become a mass phenomenon among young people, with the availability of evening and correspondence education and a broad network of courses, clubs, seminars and noncredit university study.

"It is significant that such a widespread incidence of education commitment among working youth is a specific feature of socialism. As shown by an international comparative study, the incidence and average period of schooling for the active sector of the population are, in the socialist world (particularly the USSR), several times that of the capitalist countries," write L. Gordon and E. Klopov, two Moscow sociologists. This combination of work and study is very difficult and, of course, demands self-denial—from those who are studying and from those who are helping them.

I was amused by the statistical study on divorce among various socio-occupational groups, made in late 1972 by American sociologists in California. Writers were in first place, sociologists in second, and architects rounded out the top three. Doctors, bookkeepers, biologists, geologists, newspaper reporters and botanists were significantly lower on the list.

Our divorce statistics show that the divorce rate is highest in the more urbanized republics and, particularly, in cases where the wife's education is higher than the husband's. What appears to be a related fact is that, according to the figures of various researchers, in 60 cases out of 100 (at times the number is as high as 80), it is now the woman who initiates divorce proceedings.

The recently adopted Fundamentals of Legislation of the USSR and the Union Republics on Public Education, which makes universal secondary education compulsory, promises to enrich not only the training of specialists for our developing science and industry but the family circle as well since in our society the center of family well-being has shifted from personal possessions, property and all other economic relations to moral and intellectual ones.

ACQUAINTANCE WITH THE ARTS

By Emma Pugacheva

Correspondent for the newspaper *Soviet Culture*
Photographs by Alexander Shipinyov

MARYAM BIKBULATOVA, middle-aged, her dark eyes bright with welcome, greeted me at the door of her small, cozy apartment in a Kazan suburb. Her restless hands have the plasticity that comes from precision work. Bikbulatova is the Tatar Republic's most distinguished master of hand embroidery and weaving, the traditional folk arts.

She is equally well known as a teacher and director of the model kindergarten at the Kazan compressor factory, a comparatively small enterprise. In her case the teacher and the artist form a harmonious combination. Bikbulatova believes that folk art plays an important role in child development. She expanded on this idea in an article entitled

"The Use of the Tatar National Ornament in Esthetic Education." The article was distributed to teachers at many children's institutions in the Tatar Republic and met with an enthusiastic response. It points out that no matter how rich national ornamentation may be (and Tatar ornamentation, with its many decorative motifs, varied rhythms and

styles of composition, is especially versatile), it is always possible to single out its most typical elements. Working with these elements, children create their own, at first primitive, compositions. In the process, they master the pattern and the technique of simple weaving. Bikbulatova's article does not merely generalize, it develops a whole system of introducing kindergarten children

to folk tradition as a source of art. In addition to the applied arts, this system uses music and the dance. The children present skits dramatizing the customs of the Tatars and other peoples of the Soviet republics. With guidance from teachers, they design and make the decorative details of their costumes and the sets.

As for Bikbulatova's own work, most of it was, as usual, on exhibition in professional art shows. But the samples I did see in her apartment were superb. A gold-embroidered **kalfak** (woman's headdress) resembles a piece of jewelry; its relief embroidery is so skillfully done that it seems sculptured. The intricate patterns of her woven pieces show her complete command of that ancient craft: Rugs, towels and coverlets glow with cinnabar red that covers almost the entire surface, leaving only small patches of the silvery linen background. The Tatar national taste is vividly reflected in these articles.

I could appreciate the versatility of that taste when I saw her unique collection of Tatar ornamentation, copied over the years from old things she had come across in the villages.

Her collection is frequently shown in the city house of culture and the village clubs. But it has an added function. In the discussion she stimulates at these exhibitions, she gets her audience to make esthetic judgments. For example, in one village the girls used to embroider rather tasteless cats. When Bikbulatova compared these cats with the national patterns, the girls realized how insipid their embroidery looked. Exhibitions and discussions had an effect. Re-creating the old customs, the girls of that village are now embroidering the national pattern on the handkerchiefs they present to their fiancés.

Above: Maryam Bikbulatova is the director of a model kindergarten in Kazan.

Opposite page: embroidery class.

THE PRESCHOOLS AND PERSONALITY DEVELOPMENT

Interview with Academician Alexander Zaporozhets

Millions of Soviet parents leave their children at nurseries and kindergartens on their way to work and pick them up in the evening. SOVIET LIFE correspondent Alexander Tropkin interviews Academician Alexander Zaporozhets, the founder and director of the Institute for Preschool Education, on what the preschools have set out to accomplish.

You began your research career in general psychology. What impelled you to specialize in the psychology of children of preschool age?

I had always been interested in young children. I still think that the process of child development, which can turn a helpless creature into an independent personality in some three or four years, is the greatest wonder in the world. Three- and four-year-olds have already begun to think about and react to the phenomena in the world around them. They have developed definite likes and dislikes, and their inner world has grown increasingly complex. My teacher Leonid Vygotsky, an outstanding psychologist, used to say that the thought processes of an adult are so intricate that they are almost impossible to analyze, but it is much easier to trace the psychological development of children. I've been a child psychologist for almost 50 years, and the field still fascinates me.

What are the main trends of Soviet research in preschool education?

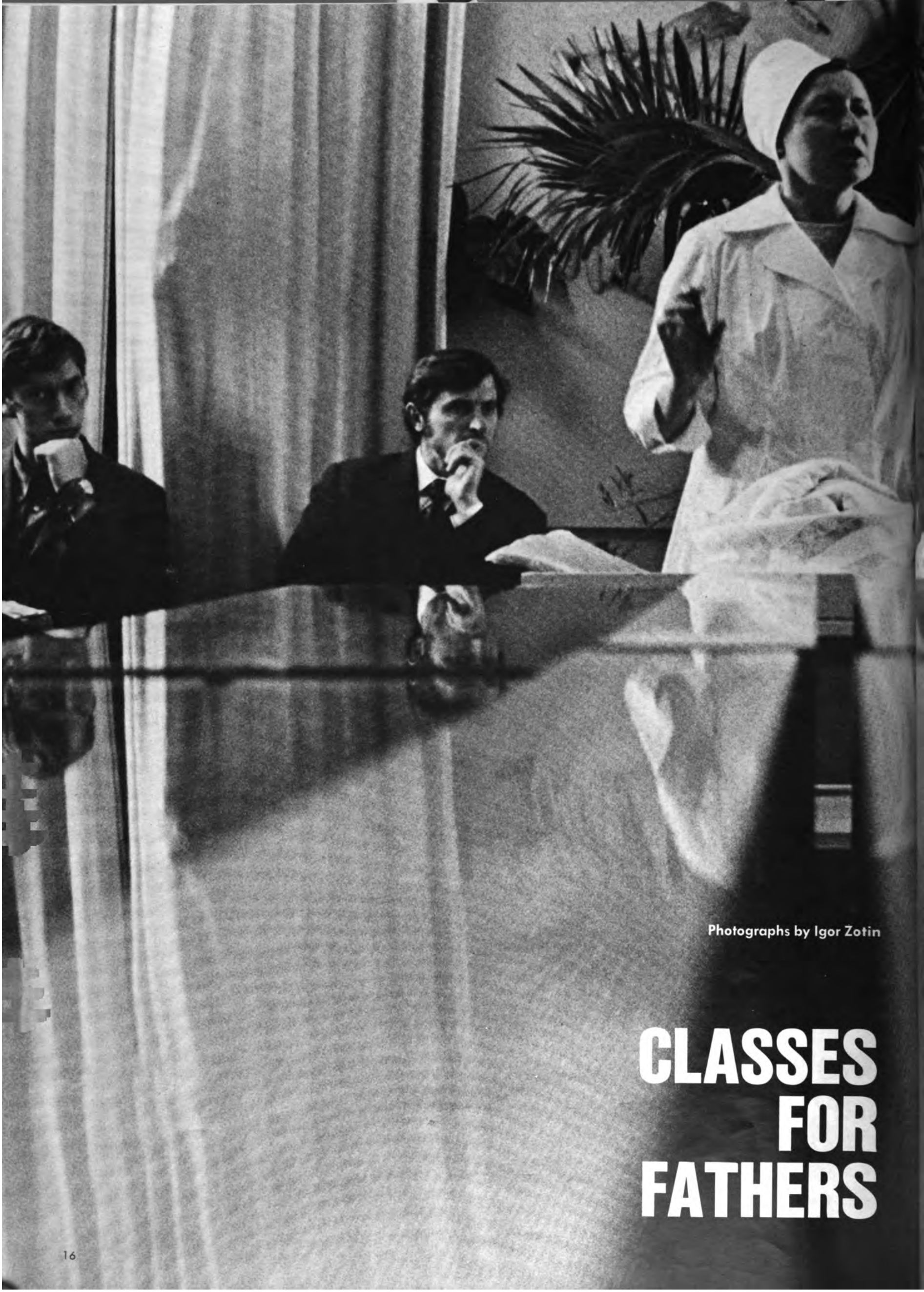
There are two such trends. The first is the study of the entire complex of factors in children's early development—their biological maturing, the environment, and their own activity. The second is the study of the influences brought to bear on the developing personality in order to achieve specific educational aims. These influences are important to many people besides psychologists, doctors and parents, because in the Soviet Union preschool education is the responsibility not only of the family, but of the whole society.

About 15 million children are cared for at nurseries and kindergartens, and these preschool facilities need well-trained teachers and doctors. Today preschool teachers on the medium and higher levels are trained at 202 institutes and 30 colleges. The research our psychologists and educators do is meant to be applied in the thousands of children's institutions. We have worked out for preschool teachers and doctors a uniform program with concrete recommendations on everything from physical exercises to instruction in reading and writing.

What distinguishes the Soviet system of preschool education? How does it differ, for example, from the open classroom system that is so popular in the West?

The open classroom method assumes that children's potentialities and abilities will develop spontaneously and they should not, therefore, be subjected to a structured program. According to this system, all that's really needed is the conditions for self-expression, self-development and self-education. We believe, however, that systematic instruction is necessary, that we must provide children with basic knowledge and skills, moral and esthetic standards, and teach them to get along with their peers. But it would be wrong to think

Continued on page 25



Photographs by Igor Zotin

CLASSES FOR FATHERS

SERIOUS WRITERS and poets are not the only ones who mark March 8, International Women's Day, with special newspaper and magazine contributions, humorists do also. Some of them play out this old tune: The lady of the house devotes herself entirely to her looks on Women's Day, while poor hubby slaves away in the kitchen. The whole house, of course, is in one awful mess.

The theme is not only overworked, it is on the way to becoming an anachronism. A great many husbands have learned all the mysteries of housekeeping. Not only on March 8, but any weekend, it is not unusual for the wife to entertain the guests with a lively description of the last hockey match, while the husband is in the kitchen preparing his specialty, a dish whose recipe he will proudly share.

The man's range of domestic interest keeps widening. Men have even begun to take care of newborn babies. The Soviet state has always had a countrywide network of consultation centers for young mothers. Now it advises young father as well.

Thus, at many maternity centers pediatricians teach classes for fathers. Like the classes for mothers, they are free of charge. These photographs were taken at Moscow Maternity Consultation Center No. 60. Zinaida Stroikova, who directs the center, said that when these classes were organized four years ago, the fathers stayed away in large numbers, mostly because they were afraid their friends would laugh at them. Now, however, the attendance is quite satisfactory.

After the lecture, to which we listened together with the future fathers, pediatrician Anna Taskayeva showed them how to bathe an infant, using a doll as model.

The director, who watched the proceedings with a kindly smile, said:

"Usually young mothers do not trust their husbands with this job. But things are changing. What we are concerned with here is not so much the practical knowledge as the psychological aspect. It is important for a man to share his wife's family responsibilities, to help her, not hold himself aloof because of a false sense of male superiority."

And what do the men have to say on the subject?

Mikhail Kuzin was quite willing to talk about it. He told me that his wife Galya and he are the same age, 23. He is an electrician at a clock factory, and she is a nurse. Not so long ago they were assigned an apartment and moved from the one they had been sharing with Galya's parents, so that now grandmother would not be looking after the baby.

"Galya's job is more wearing than mine," said Mikhail. "It's strenuous taking care of sick people. So when she goes back to work after her maternity leave, I'll have to do a lot of the housework. But that doesn't bother me, I've always tried to help her. Actually you can't have a decent family relationship unless you do."

Yegor Kobakhidze, the same age as Mikhail, is still a student. He told us that bachelor classmates thought it was very funny that he was taking the future fathers course. "But I don't see anything funny about it. It doesn't undercut what they call my 'masculinity' in the least. A husband should help his wife wherever possible, and that includes household chores. He must be able to make concessions in the little things; equality begins with just these little things."

At a maternity class for present husbands and soon-to-be fathers, studying the intricacies of diapering an infant.

Veronika DUDAROVA—Conductor

Photograph by Valeri Gende-Rote

ALL too often, conducting is considered to be man's domain. Veronika Dudarova is probably the only woman in the world to direct a major symphony orchestra. A journalist once called her "fiery," and the word fits her. She conducts with passion and style. Whatever her interpretation of the music—whether hopeful or somber—she invariably expresses the joy of living.

"Conducting is a difficult profession," she admits. "Still, if I were to be born a hundred times, this is what I'd choose. I consider myself very lucky—I like the work I do."

Dudarova studied piano at a music school for gifted children. She would have made an excellent concert pianist, but her first love was the symphony orchestra. She was the only woman to enter the Moscow Conservatory to study conducting. After graduation, she made concert appearances for several years and then became chief conductor and artistic director of the Moscow State Symphony Orchestra. She has toured the Soviet Union and many other countries. In the last 25 years she has conducted the music of Beethoven, Mozart, Debussy, Ravel, Rachmaninoff, Shostakovich, and many others.

Dudarova is faithful to the composers' concepts, to the color and emphasis of their music. She treats the score with great care, as if remembering Berlioz' remark that conductors worried him because so much depended on their interpretation: They could either move the audience or leave it cold. Dudarova is also highly receptive to new ideas; her creative energy never dwindles.

She treasures a sheet from a notebook with this handwritten comment:

"To the Moscow State Symphony Orchestra. Dear friends, I beg you to accept my sincere gratitude for the excellent performance of my compositions. I wholeheartedly wish you and your talented director Veronika Dudarova great success. Yours, D. Shostakovich."

Praise from Shostakovich is the highest recommendation a conductor can have.

Veronika Dudarova is married and the mother of a son. She enjoys vacationing in the warm climate of Osseiia, where she was born. She says the sight of the Caucasus Mountains gives her the feeling that she is home again.

Women make up more than half the country's population —132.5 million or 53.8 per cent.

A third of the deputies to the USSR Supreme Soviet (463) and 46 per cent of the deputies to the local Soviets (almost one million) are women.

More than 80 per cent of all the able-bodied women in the USSR work or study.

Women in the Soviet Union have the lowest retirement age in the world—55. Women who have borne five or more children and raised them to the age of eight are entitled to a pension at 50, after having worked for 15 years. Women or men in especially difficult or hazardous occupations are eligible for retirement at an earlier age (as low as 45 years) or with a shorter work record (15 to 20 years).

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equal work.

Women account for 51 per cent of workers and 53 per cent of the collective farmers.

Soviet women hold high elective offices, including membership in the Presidium of the USSR Supreme Soviet. Yadgar Nasriddinova, an Uzbek, is chairwoman of the Soviet of Nationalities of the USSR Supreme Soviet. Shamama Gasanova is a vice chairwoman of the other chamber, the Soviet of the Union. Four women are presidents of the presidiums of the Supreme Soviets of autonomous republics, ten are vice chairwomen of Councils of Ministers of union republics, and 28 more hold ministerial posts.

Nearly 500 women are Lenin and State Prize winners in science and technology, literature and art.

WOMEN IN THE USSR

Facts And Figures

At the beginning of 1972 some 10.5 million of the country's working women had a higher or specialized secondary education.

Women make up 39 per cent of the performing artists, stage directors, composers and orchestra conductors.

In 1972 some 72 per cent of the doctors in the Soviet Union (528,000) were women. There were 1.7 million women teachers, 71 per cent of the total.

The Soviet Women's Committee has friendly ties with women in 119 countries, in 250 national and international organizations.

More than half a million women work as directors of industrial plants and as state and collective farm chairpeople.

Some 400,000 Soviet women are engaged in scientific and scholarly research. Women scientists account for 39 per cent of the country's total. Those with graduate degrees include 68,000 candidates and 3500 doctors of science.

Women make up 49 per cent of the student body in Soviet higher educational institutions and 53 per cent of the student body in specialized secondary schools.

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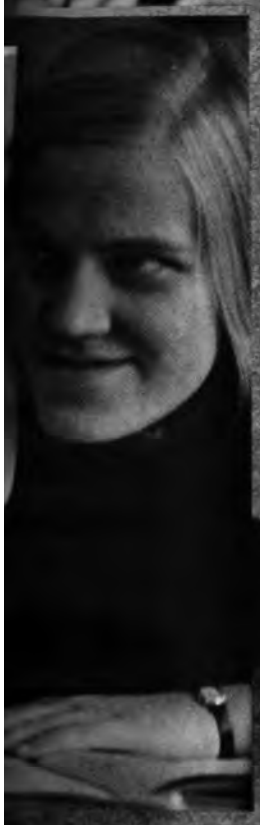
Photographs by Boris Kavashkin



Teenagers on Women and the Future

IT IS from what teenagers think about women and men and their place and role in the future that we can get an idea as to whether the younger generation accepts the ideals of the society it lives in.

The senior grades of several Moscow schools were asked to write compositions on the topics "My Place in Society" (for the girls) and "The Women I Respect" (for the boys).

Concerned that these young people with comparatively limited life experience would borrow generalities from their random reading, the authors of this study cautioned them that their judgment had to be independent.

These fears, however, were short-lived. The tenth graders showed themselves to be socially mature and capable of independent judgment. Studying these compositions, we see how the personality, its spiritual needs, interests and goals take shape.

Sergei Gruzdov, Moscow School No. 150, writes:

"The women I respect? That's a hard question to answer outright. It reflects the character of the person answering, so it takes some thought, philosophizing and even dreaming.

"We are people of the 'atomic' age. The progress of engineering is uncurbed. The tempo of civilization keeps accelerating. An offensive is under way to probe the world of mysteries and unsolved problems. But in this process we must not lose our hold on all that has been given us by the world of quietude, the world of nature. This world of harmonious beauty must be reflected in woman, as a creature wrapped in mystery and lyricism. She must be beautiful, not so much outwardly as inwardly. The inner feelings of a person are his or her own foundation, the foundation upon which relations with others and emotions are built.

"Every woman should have a sense of dignity. It is highly gratifying to speak to a cultured woman capable of viewing things objectively, of defending and substantiating her point of view. Such women command everyone's respect.

"I do not want to criticize the fashions. It is natural to want to be dressed well and look your best. Women want to be attractive. That is why they use cosmetics—and I am not against it. But sometimes it seems to me that in their pursuit of outward beauty, women use too much makeup, and now they are even wearing wigs. In their pursuit of what is in vogue, they forget the importance of being natural. If we were to ask what makes a woman beautiful—dyed hair, lipsticked mouth or naturalness—preference should be given to naturalness, for that *is* real beauty."

Maturity and good judgment were evident in the other compositions as well. Joy of life, the fullest opportunity to assert themselves—this, according to the teenagers, can be most fully achieved in interesting personal contact at work, at school, at home, in recreation.

"How do I see myself in the future?" writes a tenth grade girl. "Surrounded by friends. Nobody can live without friends. They make you happy, help to form your character and develop your interests." She concludes: "What a joy it is to work among friends! What wonderful satisfaction you get out of doing something nice for them!"

"How do I view my place in society?" another girl writes. She enumerates the qualities which make for good relations with other people: industry, courage, sociability, reserve, integrity and the readiness to lend a helping hand.

"To the question of what I should like my relations to be with people older than myself, people with other interests and occupations, I can say that I would want to show solicitude, to help people in difficulty," writes another girl. "In order for 'I' and 'you' to make 'we,' it is necessary to achieve mutual understanding born of common activities and aims. Only then is an inner contact, an emotional echo established," she adds.

And so we find that young people pay special attention not so much to the forms of contact (professional, family, and the like) as to its nature and content.

Equality, mutual understanding, respect, aid, sympathy—only these serve as the mechanism of translating "I" and "you" into "we."

"As to how I see myself in the future," we read in the composition of Tatyana Bukshatam, a tenth grader, "I cannot imagine it without satisfying work. I want to be an independent, useful member of society."

Lyudmila Anisimova also believes that she must be useful to society. "It is not wealth and personal gain that make me want to learn the sciences, but self-improvement, because that is the best way to become a vital part of my society."

Irina Neronova's plans show the same humanist feeling. "In 10

Teenagers: They come in all moods and dispositions.

years," she writes, "I shall have become an engineer, my real working life begun. If you like your profession and the people you are working with, they will reciprocate. You will be a full-fledged member of the collective, and that will make you happy."

Aware of the importance of career and community participation, both girls at the same time ask themselves: "What about love? A happy marriage? What's needed for that? A good home life? Mutual understanding and support? Common interests and aims?"

According to many tenth graders, the same qualities that make a person a contributing member of society are important in a family relationship. In other words, both the man and woman must have a broad world outlook, an interest in things beyond the "domestic hearth." "Then you are never lonely at home, never isolated from work and from the world. Only then can your family make you happy," we read in one of the compositions.

Do these judgments underplay the importance of the family, place it second to career and community interests? On the contrary, they prove that the woman's role in the family is large and is even fortified to the degree that she makes her social contribution. Woman, the tenth graders say, "should possess sufficient knowledge in different fields and strive to extend it. Otherwise she will be interesting as a personality neither to her society nor to her husband and her children." Even for those girls who believe that it is more important for a woman to be a wife and mother than to hold down a job or be active in the community (usually they say both roles are equally important)—even for them the need to become an individual on their own is vitally important. "The main thing for woman," writes Irina Rosenfeld, "is her family, but that does not mean that her interests must be limited to the home. If she is just a housekeeper, it is hard for her to retain a breadth of interests, to overcome her own inertia. That is why I think housekeeping alone is undesirable."

Nor is it desirable to all the other girls who say, and rightly, that the status of women in the family is closely related to their status in the world outside. In fact, family equality is possible only if the partners seriously assume responsibility for helping each other fulfill their career, social, political and family interests. This idea is reflected in the life plans of these youngsters.

THE PRESCHOOLS AND PERSONALITY DEVELOPMENT

Continued from page 15

that our purposeful system of education tends to obliterate the children's individual qualities, reduces them all to one level. On the contrary, our experience has shown that personality is best revealed through group activity. The children select the role in the group that best suits them. Their abilities are revealed and encouraged by the teacher. Other children follow their example, and that in turn activates their latent talents and potentialities.

But some children in the group may be shy and quiet. What about them?

I'm convinced that in such cases the child's passivity is seldom due to lack of ability or talent. A good deal depends on the family, the cultural level of the parents and their material well-being. Certainly the open classroom system would further inhibit such children, since it differentiates between those from wealthy families, who have had numerous opportunities for self-expression, and those whose homes do not provide such opportunities. Our preschools have a minimum program that each child is expected to follow. How can children paint a picture, give their imagination free rein, if they cannot hold a brush properly? Or, how can they play a musical instrument if they lack the elementary skills? We must teach them all these things, we cannot rely upon self-revelation. When they learn the basic techniques, they will have a large future for independent creative activity. In other words, the children are entitled to an equal start—their further development will depend on individual ability.

But suppose there are real infant prodigies at some kindergarten or other? What do you do for them?

Generally speaking, I think it's premature to talk about talent in a child of five or six. Unusual gifts are seldom revealed till later, in adolescence and youth. Still, we often do come across children with a special talent for music, the dance or painting, and we make allowance for them. The minimum program for such children is much broader and more complex. Music or dance teachers pay them more attention. We also have specialized kindergartens where music and choreography, as well as a foreign language, are taught more intensively. But from the point of view of moral education, it is important not to single out gifted children, not to build them up before the others. To prevent egotism, we should direct the abilities of the talented children toward helping their less gifted playmates. At our kindergartens such children are involved in preparations for holidays; for example, a song or a dance they compose is rehearsed by the whole group.

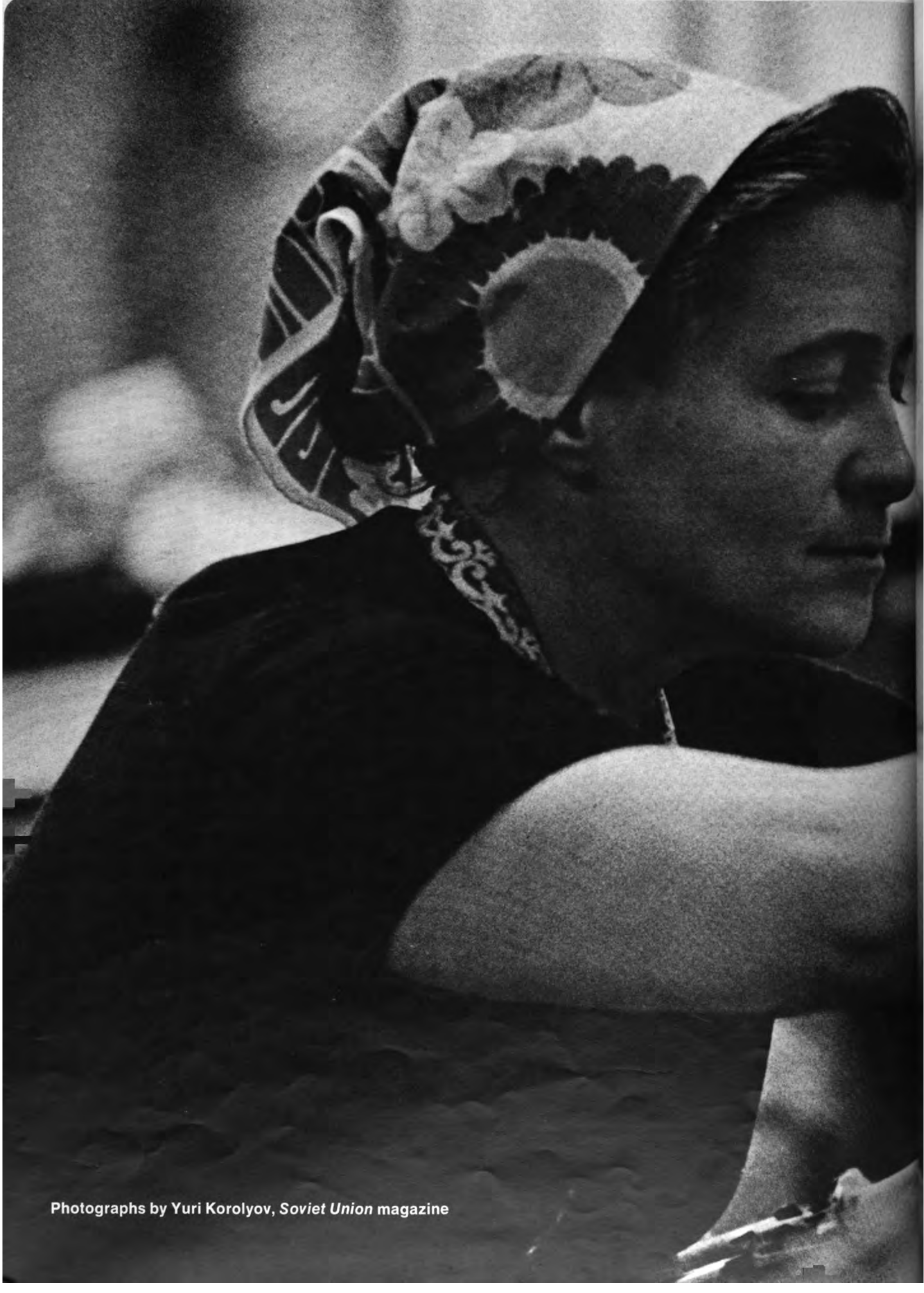
Why was it necessary to organize a preschool education center?

Research in pre-elementary education by psychologists, teachers and doctors was not coordinated. There was very little exchange of findings, so that people were unfamiliar with each other's work although the object of their study was the same—the child. I have always believed that we could do better by combining our efforts. When I was asked to organize the Institute for Preschool Education with Alexandra Usova, who is an outstanding teacher, I was glad to get down to work.

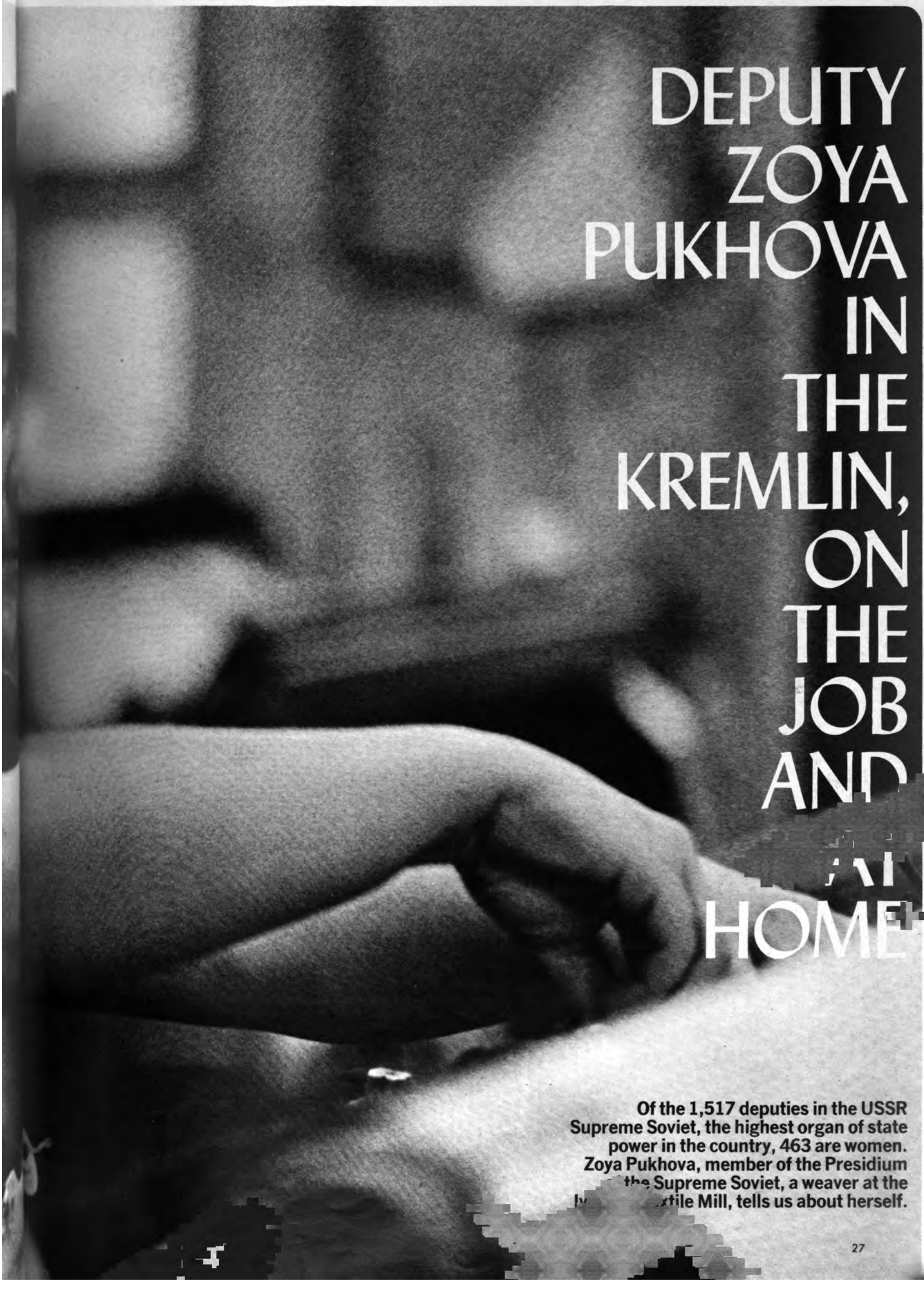
From the very beginning our institute was planned as a complex where psychologists, doctors, teachers, physiologists, and even art and music specialists would work in close cooperation. We were able to realize this plan. In this sense our institute is unique. We now have 12 independent laboratories investigating the education—psychological, intellectual, moral, esthetic and physical—of infants and preschool-age children. We are also studying such related problems as the development of the child's personality and preparation for school. All the laboratories are in close contact with the children's institutions of Moscow, regional and republican nurseries, kindergartens and schools, where they conduct experiments. The results of this research are widely publicized. Besides, we regularly issue monographs, books and pamphlets on preschool education. Our publications are very popular with teachers and parents.

What does the moral education laboratory do?

This laboratory studies how children's moral standards are shaped both by adults and by their peers, how they develop love for their parents, respect for their teachers and a sense of comradeship with their playmates. The laboratory investigates the conditions that foster the child's moral development and those that hinder it. I believe this is one of our most important fields of research since the moral values of the future adult are determined at the preschool age.



Photographs by Yuri Korolyov, *Soviet Union* magazine



DEPUTY ZOYA PUKHOVA IN THE KREMLIN, ON THE JOB AND AT HOME

Of the 1,517 deputies in the USSR Supreme Soviet, the highest organ of state power in the country, 463 are women. Zoya Pukhova, member of the Presidium of the Supreme Soviet, a weaver at the Ivanovo Textile Mill, tells us about herself.

Zoya Pukhova, a weaver at the Ivanovo Textile Mill, is one of a number of industrial workers and farmers who sit on the Presidium of the country's parliament, the USSR Supreme Soviet. Here she is barraged by news and TV people.

On the job her boss is assistant foreman Boris Burtsev. He heads a team of seven weavers, each of them with almost 20 years of experience. The mill workers nominated her deputy for their district.

I HAVE BEEN WORKING at the textile mill since 1951. I came here after graduating from secondary school. My work is interesting and creative. I tend 10 pneumatic looms, turning out 700 to 750 yards of fabric a shift. You have to plan your route around the looms in such a way as to reduce their idling time to a minimum, and you have to do what your experience tells you in every given situation.

I am a member of a team headed by assistant foreman Boris Burtsev. We all get along well. Each of the seven weavers in our team has almost 20 years' experience behind her.

The older operators at our factory are always willing to help the younger ones learn the tricks of the trade. Though I don't like acting the old-timer, my experience does obligate me to keep an eye on the young weavers and teach them a few things.

When the people I work with nominated

me as candidate and the working people of the city of Ivanovo voted for my election to the USSR Supreme Soviet, the highest organ of state power, I considered it a great honor.

Then at the session the deputies elected me a Presidium member. Fellow members of the Presidium include such outstanding statesmen and leaders of the Communist Party as Lina Tynel, a representative of the working people of Chukotka; Sergei Tsetsegov, a lathe operator at the Gorky Aircraft Plant; Galina Orlova, chairman of the Path to Communism Collective Farm in Irkutsk Region; Vasili Bolshukhin, senior foreman at the Sredneural Copper, Smelting Factory in Sverdlovsk Region, and the writer Rasul Gamzatov.

The Presidium meets approximately once every two and a half months, sometimes more frequently when necessary.

I keep in constant touch with the Kremlin by telephone. They send me all the documents on questions to be discussed at the Presidium meetings. To prepare for a discussion, I often consult specialists and deputies to the local Soviets.

As a member of the Presidium of the USSR Supreme Soviet I consider many important matters of home and foreign policy.

Deputies are required to have regular meetings with their constituents. All kinds of people come to see me: factory executives and heads of public utilities who want my help on matters concerning the development of Ivanovo, as well as individual citizens with personal problems.

I get many letters, not only from the city of Ivanovo and Ivanovo Region but from all over the country. Thanks to the efforts of Margarita Artemyeva, who helps me sort out and record the mail, every query receives a reply. Margarita, a very good secretary, is in her last year at a correspondence law college. We have been working together since I first became a deputy six years ago.

After examining the proposals and requests of constituents, I often apply to various departments for action. I can only remember one case when I failed to get a reply. It was from one of the ministries, and I had to apply a second time. In every other case the action I asked for was taken without delay.

Such close attention to a deputy's request is not due to any personal qualities of my own, but to the great authority enjoyed by the Soviets in general. That's because the Soviets are concerned with everything that involves the country's people, from such major questions as environmental protection and the ratification of treaties with foreign states, to such "trifles" as modern conveniences for settlements and villages.

Our city is growing more and more beautiful. Ivanovo has an honored tradition, not only in textiles but in revolution as well. It was here, in 1905, that the first Soviet of Working People's Deputies in history began its work. When I have the time, I like to walk along the city streets; for me this is the best way to relax. Not counting, of course, our family trips to the village near Ivanovo where I was born and where my mother still lives. My friend Dmitri Ageyev, a local artist, presented me with a painting of a woman sitting on a bench in front of a small, carefully kept house with lush green grass and yellow paths around it—my mother and my home. My husband, the children and I try to see her as often as we can.

I would like to be able to spend more time with my sons, but not everything works out the way we want it to. My husband and I have brought them up to be self-reliant; we taught them to do jobs around the house even when they were little, and now we appreciate their help. The eldest, Pavel, is in the eighth grade and loves sports. We named him after my father, who was killed at the front. Our younger boy, Kolya, is in the second grade. When I leave Ivanovo for a session of the Supreme Soviet (twice a year) or the Presidium (four or five times a year), we put Kolya in an all-day school group. He does his homework and has his lunch and dinner, and my mind is at rest. Both boys are doing well at school, though they occasionally get a low mark. When that happens, I give them a real talking-to.

Unfortunately, our family doesn't often get together at mealtime. The problem is that my days off are Monday and Tuesday one week, Wednesday and Thursday the next, and so on. But my husband, who works as a builder at our mill, always has Saturday and Sunday off. When our free days do coincide, however, we have a real family celebration. We go to the theater or to some interesting place and always have something very special to eat.

Being a deputy is not my main job, it's a public duty. I am not paid for it, but during the sessions of the Soviet and for my legislative assignments I get paid time off from my regular job at the mill.

In addition, as deputy to the USSR Supreme Soviet I enjoy the right of fare-free travel on Soviet territory on all conveyances. Expenses incurred in carrying out my duties as deputy are paid by the Soviet.

To be a deputy is a great honor and a great responsibility. I am proud of the opportunity to work for the good of society.

Courtesy of the magazine *Soviet Union*

MOSCOW HAIRDRESSERS COMPETE

Photographs by Igor Zotin

Moscow's outstanding designers of women's coiffures gathered recently to compete for the title of City's Best Hairdresser in a number of different categories. The time limit was 10 to 45 minutes, the subjects all photogenic and the most frequent comment "beautiful." This casual hairdo was one of the prize winners.

Models of both daytime styles (above right) and formal coiffures for evening got an enthusiastic audience reception. Some 150 women and men hairdressers participated. The winners will go on to the national contest, which is held every two years and makes possible a countrywide exchange of ideas.

Opposite page: The judges admittedly had a hard time picking and choosing, but remained as objective as possible. Each entry was graded on the basis of design, suitability, ease of upkeep, and so on. The patrons of Moscow beauty salons include factory workers, administrators, and tourists from all over the world.

ACCORDING to polls conducted in Leningrad, Perm, Minsk and other cities, for 80 to 92 per cent of Soviet women romantic love is fully as important as achievements in the economic and cultural fields. American sociologists Vera and David Mace, who visited the USSR, noted the interest in personal relationships among men and women alike and commented on it in their book *The Soviet Family*.

While sociologists have not gotten around to a poll on the subject, this emphasis is no doubt a reason for the thriving business done by beauty salons in towns and villages throughout the country.

The Soviet Union now has a full-fledged "beauty service," including salons, cosmetics research institutes and shops, and specialized clinics. Medical institutes and colleges offer degrees in cosmetology, and hair stylists are trained at specialized secondary or vocational schools.

Since hair styles change as rapidly as fashions in clothes, Soviet hairdressers take frequent refresher courses, which are given free of charge. Taught by the country's best stylists, they familiarize beauticians with the newest coiffures, both Soviet and foreign.

Annual competitions for the title of City's Best Hairdresser have become traditional.

Some 150 hairdressers from the capital's beauty salons took part in the most recent Moscow contest, held late last year. The entries included styles for day and evening from a number of different countries. Between 10 and 45 minutes were allowed for each design.

The winners received the title Best Hairdresser of Moscow, cash prizes and certificates. They will participate next in the biennial national competition. The aim of this event, which brings together urban and rural contest winners, is to find the most talented hairdressers and help them share some of their innovative ideas.

42

a trip around the soviet union

drawing by Leonid Sergeyev

Baltic Sea
Riga
Leningrad
Kiev
Odessa
Moscow
Arkhangelsk
Salekhard
Black Sea
Batumi
Baku
Caspian Sea
Krasnovodsk
Ashkhabad
Tashkent
Alma-Ata

Move forward 5 places by motorcycle

Move forward 3 places by express train

Out of gas—forfeit one move

Storm—forfeit one move

Move forward 5 places by camel

Move forward 3 places by bicycle

Arctic Ocean

Uelen

ting Station

Blizzard—
forfeit
one move

Move
forward
5 places
by plane

Tiksi

Forced
stop—
forfeit
one move

storm—
orfeit
e move

Petropavlovsk-
Kamchatskiy

Magadan

Heavy rain—
forfeit
one move

Fair wind—
move
forward
5 places

Yuzhno-Sakhalinsk

Lake Baikal

Khabarovsk

Irkutsk

Car
breakdown—
forfeit
one move

Vladivostok

This game was made up by the artist Leonid Sergeyev. It will take you on a fascinating trip around the Soviet Union and teach you things about our country you never knew before. The game is simple to play. Cut out the hexagon or make one yourself if you like. Stick a match through the middle and you have a top. Any number of people can play. Each player selects his own color chip; you can use an ordinary button. Spin your top each time it's your turn. The number it falls on is the number of moves you are allowed to make. The one who travels around the whole country and gets back to Moscow first is the winner. Bon voyage!

rill Chiryayev was born
925 into a Yakut family.
A graduate of the Yakut
ogical Institute, he rose
condary school teacher
Minister of Education
the Yakut Autonomous
Republic. Since 1965
been First Secretary of
Yakut Communist Party
ral Committee. He is a
to the USSR Supreme
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adventure stories.
extracts and processes
gas, generates power,
ure building materials.
It mines iron ore,
rrous and rare metals.
It is also lumber,
cattle-raising
crop-growing country.

Vistas for high latitudes

By Gavriil Chiryayev
Deputy Minister of Education of the Yakut Autonomous Republic

Photographs by Roman Denisov

Gavriil Chiryayev was born in 1925 into a Yakut family. A graduate of the Yakut Pedagogical Institute, he rose from secondary school teacher to Deputy Minister of Education of the Yakut Autonomous Republic. Since 1965 he has been First Secretary of the Yakut Communist Party Regional Committee. He is a deputy to the USSR Supreme Soviet, the country's parliament.

Yakutia's area is as large as India or Argentina. Much of it is close to and beyond the Arctic Circle. Its permafrost—permanently frozen subsoil layer—is a mile deep in some spots. Nowhere else in the world are there such deposits of subterranean ice. But Yakutia is no longer the white wildernes of the adventure stories. Today it extracts and processes gas, generates power, manufacture building materials. It mines iron ore, nonferrous and rare metals. It is also lumber, cattle-raising and crop-growing country.

THOSE who still imagine Yakutia as a white wilderness with herds of wild reindeer and dogs in harness running over frozen snow must update the picture.

Tractors and cross-country vehicles move across the tundra today, and hovering over reindeer-breeding teams are helicopters that deliver mail, films, lecturers, doctors and veterinarians. Electric dredges work the gold-bearing Aldan and Indigirka rivers and the foothills of the Dzhugdzhur Mountains; high-power dump trucks move kimberlite ore from the diamond quarries of Mirny, Aykhal and Udachnoye. On the spurs of ancient mountain ranges are settlements of modern houses built on sturdy piles rammed into the permafrost. As for industrial development, Yakutia has a higher growth rate than the average for the Soviet Union and the Russian Federation.

Time magazine said recently that Siberia is a force the world will have to reckon with. The comment is completely accurate except, perhaps, for the fact that the world economy already has to reckon with the industrial complexes that have been and are being formed in the eastern regions of the Soviet Union.

Yakutia has deposits of exceptionally valuable minerals that are not found at all or are found in small quantities in other regions of the country, as well as large reserves of coking coal and natural gas.

Work on a comprehensive long-term plan of development for the Yakut Republic has demonstrated the efficiency value of creating several big territorial production complexes. The accompanying construction of modern urban-type settlements will raise living and cultural standards in the North.

In rate of population growth, Yakutia leads other regions of Siberia and the Soviet Far East. Efforts are being made to attract manpower to the northern regions. Wages of all categories of workers are being raised, benefits have been revised upward, housing is being built rapidly, all forms of community services are being improved.

Today's multinational Yakutia has produced a rather special kind of person at its industrial plants and on its construction projects. The word "special" comes naturally to mind in descriptions of the residents of these high latitudes. It is an omnibus word for the hardihood, courage and stamina of these Northerners.

Thanks to their efforts, the Vilyuyskaya Hydroelectric Power Station has been built on the permafrost, big mining centers have been established, pipelines are being laid, valuable furs caught and livestock farms developed.

Complex societal problems are being solved in the Far North, important technical experiments are under way, and a comprehensive approach is being worked out for the development of new areas. It is no accident that Yakutia's experience has attracted the attention of foreign experts.

Many foreign companies have shown marked interest and readiness to cooperate in the development of the area's natural resources. Such mutually beneficial cooperation would serve our country as well, hastening the economic development of Siberia and the Soviet Far East to meet more of our domestic needs and enlarge our export potential.

Over the last quarter-century a major Lena-Vilyuy oil- and gas-bearing province has been mapped in Yakutia. Its total area is almost 309,000 square miles. The potential reserves of natural gas are estimated at about 459 trillion cubic feet. There are also other parts of Yakutia that are likely to contain oil and gas. Geological prospecting work has been expanded, with the current five-year plan calling for a five to six time increase in deep drilling.

The vigorous development of the gas-extracting industry in Yakutia marks a fundamentally new stage in the industrialization of that vast territory. The factories and workers' communities located along pipeline routes will tap the gas they carry; a system of delivery of liquefied gas in cylinders to the most outlying corners of the republic will be organized.

Yakutian natural gas contains a large proportion of condensate from which low-cost gasoline and diesel fuels can be processed. The construction of a plant for the processing of about two million tons of condensate a year will provide the republic with all the fuel it needs, making imports unnecessary.

A considerable volume of the gas could be exported. With this in mind, different versions of a trunk-line gas pipeline to connect Yakutia and the Pacific seaboard are being considered.

Of particular interest are the coking coals of South Yakutia, a region with a rare combination of the mineral and fuel resources required for metallurgical production. The Aldan iron ore area and the South Yakutian bituminous coal basin, each of which alone has the potential of a first-rate production center, are located here, close to each other—a fortunate and most unique combination.

The total estimated reserves of Aldan's iron ore (including the newly discovered deposits) are approximately 50 billion tons, while the explored reserves reach 1.4 billion tons. The balance of the coking coal reserves run as high as five billion tons. All the prerequisites are present here for one of the biggest coal and metallurgical bases in the country's eastern regions.

The Soviet Union is entering a new stage of development. The natural resources of the most outlying territories are being exploited. Conventional methods of economic management are changing. The emphasis is on new, improved equipment, on scientifically validated principles of economic policy that take into account the specifics of the rigorous northern areas in a comprehensive way. The development of new areas presupposes the priority construction of roads, power plants, building facilities and settlements, which will help to concentrate investments, use capital more efficiently and get new enterprises operating earlier.

My visit to Yakutsk has exceeded all the wonderful things my husband (who spent several weeks here in 1966) told me I would be. The people of Yakutsk are so warm & charming.

Sincerely
Teresa Johnston
Ottawa, Canada

I have had a wonderful time in Yakutsk

CTTAC1460
Janet K. Brown
Ottawa
CANADA

Ladies—

Thank you very much for your hospitality. It has been a memorable experience to see your country, meet your wonderful people and enjoy the unbelievable beauty of your countryside. Words cannot describe the feeling I have had at being given the opportunity to visit your Siberia. I shall always remember your graciousness! Again thank you

Dorothy M. Sayles
Hardy Hill
Lebanon, New Hampshire U.S.A.

AS AN ACCOMPANYING PERSON - I SINCERELY WISH TO THANK YOU & YOUR AIDS IN MAKING THE WIVES & MYSELF ENJOY EACH DAY. IT HAS BEEN MOST ENJOYABLE & PLEASANT

Ray W Ryan
MEDFORD OREGON, U.S.A.

Elizabeth Crory
40 E.P. Rd
Hanover, New Hampshire

This account of the Second International Permafrost Conference would be incomplete without a mention of the wives who bravely accompanied their scientist husbands to "cold Siberia." Their presence lent the conference a memorable warmth. They recorded their impressions of Yakutia and the Siberian friends they made in an album. These entries speak for themselves.

AMERICANS

By Vladimir Makhotin
Photographs by Roman Denisov

The 700-odd participants in this unusually representative conference came from countries where permafrost is a very real problem. More than 280 came from the USSR, 52 from the U.S. and 38 from Canada. The socialist countries—Czechoslovakia, Hungary, Poland and Mongolia—sent delegates. So did England, Belgium, Denmark, Norway, France, Sweden and Japan.

SPECTACULAR PICTURES of volcanic eruptions in our school geography books taught us more convincingly than any science teachers ever could that the Earth's interior was one great molten mass heated to a temperature of thousands of degrees. But not many of us knew that vast areas of the Earth were covered with deep-lying layers of frozen ground. Permafrost, permanently frozen subsoil, covers half of the Soviet Union's territory and about a quarter of the world's dry land, including large areas of the United States and Canada. Add the regions where the subsoil is frozen part of the year, and you have accounted for half of Mother Earth's dry land.

A Waterless Well

The permafrost layer in Yakutia, for example, is as much as 2100 feet thick, and in spots even close to a mile! To cut through layers this deep is not easy, and it is absolutely impossible without modern machinery and engineering.

Fyodor Shergin, a Russian merchant, found that out when he tried to dig a well in his yard a little over 150 years ago in Yakutsk. He got a long way down, but all he brought up was frozen earth. He realized he'd never reach water, but he went on digging for another full 10 years, partly out of stubbornness and partly because interested Russian scientists asked him to. It was they who explored the well to a depth of 380 feet and were the first in the world to prove that permafrost existed.

Shergin's well is still there, right in the center of Yakutsk, the capital of the Yakut Autonomous Republic. There is a long cabin

Permafrost Research Institute scientists showing their colleagues test equipment installed right in the Siberian taiga. The shirt sleeves? The permafrost capital welcomed its visitors with tropical weather. Temperatures in Yakutia shift as much as 100 degrees from summer to winter.

IN YAKUTIA

in one of the courtyards on *Prospekt Mira* (Peace Avenue). A memorial plaque on the cabin reads: "F. Shergin's well. USSR Academy of Sciences, Custodian." Inside the cabin is a wooden brace and massive lids covering the well proper. The illuminated walls are coated with eternal frost. On display is a plan of the well and a review of its history. This history is now familiar to every scientist doing permafrost studies, for faraway Yakutsk has become the mecca of permafrost specialists the world over.

Why Yakutsk?

There are at least two reasons why Yakutia is the focus of permafrost studies. The first is geography, a gift of nature: It is located in the very center of the frozen subsoil area, which, as we said earlier, takes in about half or, to be more exact, 48 per cent of the territory of the Soviet Union. This region is a natural laboratory in which all cryospheric processes and phenomena can be observed with particular clarity and fullness. The zone of subzero (centigrade) temperatures in the Earth's crust reaches its maximum depth here—4900 feet. Nowhere else in the world are there such deposits of subterranean ice.

The second is creativity, the gift of people: The efforts of Soviet permafrost specialists have made them the generally acknowledged pioneers in the study of the theory and the application of the useful properties of the "northern sphinx."

While the first scientific studies based on Shergin's well were done by Academician Alexander Middendorf of the Russian Academy of Sciences back in the mid-nineteenth century, systematic study did not begin until the Soviet period. The foundation of the new science was laid by Mikhail Sumgin with his major work *Permafrost in the Territory of the USSR* published in 1928. In the thirties, when the northern areas of the country began to be developed on a large scale, research moved from theory right into practice.

Yakutsk was the city where the world's first institute for frozen ground study, the Permafrost Research Institute of the Siberian Branch of the USSR Academy of Sciences, was founded 25 years ago. Four hundred scientists, most of them under 40, are working to make permafrost man's friend and ally instead of foe.

World Permafrost Forum

More than 700 specialists from 14 coun-

tries congregated in Yakutsk in the summer of 1973 for their "world assembly."

As I was looking over Shergin's shaft with a group of American and Canadian scientists, I heard one of them say, "Considering the fact that the man who dug this shaft, Russian merchant Fyodor Shergin, was an employee of the Russian-American Company at the time, we could say that our cooperation in permafrost study already has a half-century history."

That statement might not have been all that factual, but it does convey the atmosphere of the conference in the permafrost "capital."

Robert Dillon, a member of the U.S. delegation, said:

"I believe that in 1963, when the first permafrost conference was held in Illinois, Soviet scientists did not participate. Unfortunately, relations between our countries were not as good as they are today. We are glad, as we hope you are, that this has been changed. This time, here in Yakutsk, we

could bring as large a delegation as you are able to cope with.

"Mutual visits of Mr. Brezhnev and Mr. Nixon promoted the expansion of contacts between Soviet and U.S. scientists, and I hope that our cooperation and contacts will continue."

The favorite quip at the conference had to do with the thawing of the international climate and permafrost. Active contacts between Soviet and American permafrost specialists are indeed expanding as the international climate grows warmer and the cold war icebergs thaw.

Pavel Melnikov, a corresponding member of the USSR Academy of Sciences and Director of the Permafrost Research Institute, who returned from a trip to the United States not long before the conference, told me much the same thing:

"In May 1973, my deputy Felix Arre and I visited the United States to acquaint ourselves with the research and progress of our American counterparts in permafrost studies. We spent 32 days visiting the East and West coasts, the central part of the country and, of course, Alaska. We were given a fine welcome and had an opportunity to acquaint ourselves in detail with U.S. laboratory research on permafrost and its practical application. We were also briefed on the preparations for the construction of a hot oil pipeline that will cross the Alaskan permafrost zone from the Arctic Ocean coast to the Pacific Valdez Bay. It was gratifying to sense everywhere a noticeable improvement in relations between the Soviet Union and the United States. The conditions are favorable, we believe, for closer cooperation on permafrost studies."

Hospitable Yakutia

Until very recently, many Americans associated the word "Siberia" with bitter frost, bears, poor living conditions and austere and inhospitable people. Too many cock-and-bull stories and outright lies had been spread about this part of our country.

It's good to see the mental picture of this very rich and beautiful area changing. This also holds for Yakutia, which spreads over a territory larger than that of many European countries combined.

The Yakuts say, "It's better to berate a guest than let him go hungry." When Russell E. Train, Chairman of the President's Council on Environmental Quality, was here in September 1972, he commented on Yakut hospitality. The participants in the permafrost conference also found confirmation of Yakutia's hospitality.

A souvenir for those who can't bring home a bear skin. Right: The Yakuts are known for their wood carving. This jug is called a choron. *In Yakutia it is used for kumiss—fermented mare's milk—but, of course, you can drink anything you like out of it. Some* chorons *are five feet high.*

In the past several years Yakutsk has been the setting for various international gatherings. It has also been visited by any number of people from the United States and Canada. But I would guess that the city has never played host to an international conference as representative as the one that convened there last summer.

The message of greeting sent by the Supreme Soviet and the Council of Ministers of the republic said that the conference was "a great event in the social, scientific and cultural life of the republic and the city. We look upon the convening of international forums here, in Yakutia, as recognition of the great services of the republic's scientists."

Barefoot on Permafrost

So, as Roger Brown, a Canadian, put it, "the entire international community of permafrost specialists" assembled in Yakutsk.

And how did the permafrost capital meet its honored guests? Believe it or not, with tropical weather! I had been in Calcutta shortly before. The only difference was that there is no air conditioning in this city that is right near Oymyakon—the Pole of Cold. The "cold" specialists didn't get much relief by opening the triple-frame Yakut windows wide. But they weren't the only ones who suffered; the local people found the high temperature unbearable.

Formal clothes and ties were discarded the very first day, and the scientists conferred in shirt sleeves. There were long lines in the streets at kvass barrels, and white sheets were stretched over flower gardens to shut out the roasting "tropical" sunrays.

The emblem of the conference, an ice crystal with the globe inside it, was on display everywhere—in the streets, hotel lobbies and in restaurants—but unfortunately it didn't make things cooler. Only the cordiality and hospitality of the hosts helped the guests bear the vagaries of the Yakutsk climate.

Like Any Other City

Legend has it that it took the first governor of Yakutia and his staff three years to travel from Moscow. An airliner now covers the distance in 10 flying hours, the time it takes to get from New York to Moscow. The difference is that here you are flying over

the Soviet Union during the whole trip, and the country's vastness strikes you with particular force.

A visitor to Yakutsk 10 years ago would be amazed at the changes, at the giant leap from a feudal wooden city to a modern brick one, with a modest but well-appointed two-story airport building, concrete runways for heavy passenger liners, and a lively crowd of smartly dressed passengers.

As usual on such festive occasions, a streamer across the airport building read, "Welcome to the Second International Conference on Permafrost."

A comfortable Icarus bus drove us along a hard-surfaced road to the center of the city and pulled up at the Lena Hotel, a seven-story building with pleasant, quite modern rooms equipped with showers and running hot and cold water.

your hospitality has been so warm, we have been overwhelmed. Thank-you + do come to Canada

Arlie Hales.
Ottawa,
Canada

The city of Yakutsk was founded in 1632. It became a base for the exploration of all Northeast Asia. In 1668 Cossack Semyon Dezhnev set out from Yakutsk, skirted the northeast extremity of the continent and discovered the strait that separates Asia from America. It is called Dezhnev Strait. In 1922 Yakutsk became the capital of the Yakut Autonomous Soviet Socialist Republic and embarked on its modern history of development.

Extracting kimberlite ore from the Mir diamond quarry.

Only gradually do you realize that all this just seems simple and everyday. In reality everything about the city, from the concrete runway on which the plane landed to the water tap in the multistory hotel room, is unique.

Why? Because all this has been built on permafrost, on the cold back of the "northern sphinx," which people have humanized. All this is the product of 50 years of Soviet power.

Permafrost, the implacable enemy of multistory (and even one-story) brick buildings, is that no longer. Reinforced concrete piles driven deep into the frozen ground support such massive structures as the Yakutsk Hydroelectric Power Station, built back in 1937, the Lena Hotel, the spacious House of Political Education where the conference sessions were held, Yakutsk University and scores of other residential and office buildings, which for conveniences and finish are in no way inferior to similar structures in cities that have no permafrost problem. There is one difference, though it doesn't strike the eye at first: All stone and brick buildings are raised above the ground and rest on concrete piles. That is the secret: The heat of the building does not penetrate the ground, and the earth stays frozen and grips the piles driven into it 35 feet deep.

Buildings on piles are common, not only in Yakutsk but in Norilsk (160,000 inhabitants), Magadan (about 100,000) and in other cities in the permafrost zone.

"I recently had the pleasure of seeing fine building methods realized in Yakutsk. You have managed to replace small mooden houses on permafrost with huge concrete buildings on piles. By leaving the ground at the building's foundation in a frozen state, you have proven most conclusively that you are not dependent on permafrost in your construction work. This achievement of yours has become accessible to all and is widely utilized."
Professor Troy Péwé

Permafrostproof

For the record we should say that piles, wooden ones, were used earlier in building wooden and even brick houses. But they were meant to support small loads, were of small diameter and were not driven in very deep.

The precursors of Yakutsk's present-day builders were just as aware that building on permafrost was a gamble and hedged their bets. We were shown several brick churches. Built more than a hundred years ago, they still stand. The explanation lies in a simple but original construction trick: The brick churches were erected on log rafts made of ancient larches.

And another noteworthy sight—Yakutsk's first brick building—the former governor's mansion (1707). Despite the solidity of the old structure, permafrost got the upper hand. The building settled, and deep cracks spread all over the façade. But why speak of such ancient buildings? You frequently come upon leaning wooden and brick buildings constructed at a much later date (but not on piles). Some of their heat traveled downward, the ground thawed, gave way, and the buildings began to lean over and crack. Now they are waiting to be torn down. Modern buildings of concrete and steel, mounted on reinforced concrete grayish posts, will replace them. Not as prepossessing, perhaps, but permafrostproof.

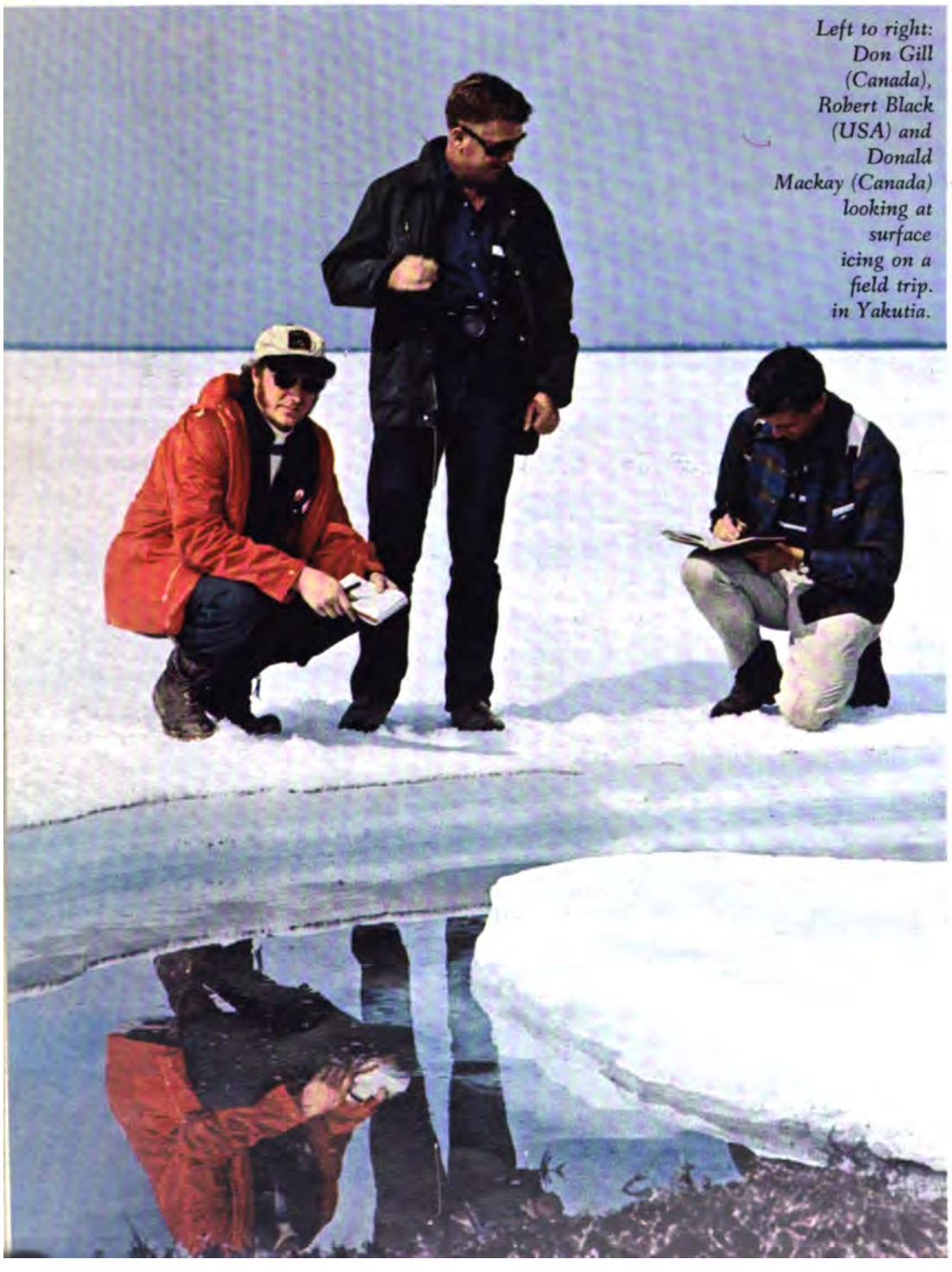
Mars . . . in Yakutia

American scientists think Yakutia can tell us a lot about the permafrost on Mars. And since the launching of the current Mars 4 and Mars 5 interplanetary stations was announced during the conference period, I decided to talk to Dr. Duwayne M. Anderson, of the U.S. Army Cold Regions Research and Engineering Laboratory.

Dr. Duwayne M. Anderson

The head of the Earth Sciences Branch of CRREL told me:

"We have examined in our laboratory all



Left to right: Don Gill (Canada), Robert Black (USA) and Donald Mackay (Canada) looking at surface icing on a field trip. in Yakutia.

Conference delegates visited the Vilyuyskaya Hydroelectric Station and big industrial structures in Mirny, the diamond center, all built on permafrost.

the photographs of Mars, searching for geomorphic features characteristic of permafrost terrain. We have also read in the Soviet literature good descriptions of the thermokarst terrain in Yakutia. And the Permafrost Institute in Yakutsk is well known to us in the United States as a leader in the research on these features.

"We found on the Mariner imagery features that look very much like the photographic maps of the thermokarst terrain of Central Yakutia. We have been unable to find similar terrain described anywhere else in the world except in Yakutia.

"However, I must add that from our recent ERTS 1 (Earth Resources Technology Satellite) we now have photographs of North American thermokarst terrain. But this terrain is not yet described.

"I have had the opportunity at this conference to have discussions on this topic with Soviet scientific experts in the field. The thermokarst terrain of Yakutia, we think, is the nearest analogy to the extensive zones of subsidence recognized in the Mariner imagery."

In reply to a question on the prospects of Soviet-American cooperation in the Mars research, Dr. Anderson said:

"Here at the conference we have exchanged opinions on the subject of permafrost terrain on Mars. We look forward to information from the Soviet sputniks Venus 7, Mars 4, Mars 5 and other planetary missions."

We have been delighted by our welcome to your land and very impressed by the culture of your people and the beauty of the country.
Thank you! Thank you!
Jean Hunter
North Vancouver, Ontario
Canada

The Women's Contingent

I've already mentioned Yakut hospitality. Not only the scientists spoke highly of it, but their wives did too. The women made a considerable contribution to the success of the conference.

Here is what Shirley Anderson from Hanover, New Hampshire, said:

"When the conference was first announced, we heard that women would not be invited. We were told later that we were. This offered a new dimension in the relationship between our peoples. And we are all very much aware of the uniqueness of the opportunity to attend the conference in Yakutsk and enjoy the journey north along the Lena. On our return, the warmth of the human relations will enable us to share with our friends at home the fullness of the experience."

"It was a series of delightful surprises from the moment we arrived in Yakutsk," the North American women declared unanimously at a special women's press conference arranged at our request on the pleasant upper deck lounge of the *Rossiya* motorship.

The conference participants (particularly those who were married) said repeatedly that the official host, the Permafrost Institute, had shown no less attention and interest in arranging the program for the wives (officially designated "accompanying party") than in planning the conference program proper. The Women's Committee was headed by Lyudmila Nekrasova and Albina Arre, staff members of the Permafrost Institute, who told us:

"It's a pity the conference ended so soon. We all became great friends. Our guests were very gracious, very much interested in everything we showed them.

"We shall cherish the precious gift of an album containing expressions of gratitude and affection that our American and Canadian women friends presented to us.

"Our get-together with the women from North America made us all realize that we shared a common love for peace, friendship and understanding, love for our children, and the hope that they will live in peace and happiness. We felt this with particular force during our visit to a Young Pioneer summer camp. During those moving moments we understood one

another perfectly without any interpreter."

Yakut Cuisine

There's a Russian saying that what makes a house fine is not its décor but its cakes. Our guests had a chance to sample the exotic and inimitable Yakut cuisine both at the Talik Café and in the town of Maya, where a big feast was prepared for them.

The chef of Maya's restaurant gave us a report in detail. Here are some of the dishes:

Boiled deer tongue, *khaan* (blood pudding of horsemeat with milk), crucian carp fish soup à la Yakut (the boiled carp being served separately), *kyorchekh* à la Yakut (whipped cream with jam), kumiss (mare's milk), and so on and on and on.

Still, when we asked the American women what dish they liked best in Yakutia, they replied in chorus, "Russian borsch!"

Guests who found the time to dine at the homes of their Russian friends tasted the famous Yakut *stroganina*—razor-blade thin shavings of chilled grayling or white salmon in sauce.

The women's general impression was briefly, but expressively, summarized, if I remember rightly, by Helen Lobacz from Hanover, who said, "This visit to Yakutia was so enjoyable that we shall now follow our husbands everywhere. Although they may not like that."

Gas Pipelines in Permafrost

Yakutia is one of the Soviet Union's richest gas-bearing areas. The possibility of Soviet-American cooperation in the development and utilization of these reserves, estimated at about 459 trillion cubic feet by geologists, is presently being discussed. Large gas deposits were recently surveyed not far from the city of Mirny, the mining center of the famous Yakut diamonds.

With permafrost scientists assisting, Yakut builders have gathered a body of experience in laying gas pipelines in permafrost conditions. It took almost five years to lay the first 250 miles, but the second section of 125 miles took only one year to finish. Yakut gas is now being piped to the cities, to industrial plants and to homes.

With a group of American and Canadian scientists we drove along the route of the line that carries gas to Yakutsk.

Chief of the pipeline construction project Vladimir Pershakov, and Victor Spiridonov, laboratory chief of the USSR Research Institute of Trunk Pipelines, were our guides.

The question of laying oil and gas pipelines in permafrost is of more than theoretical interest to U.S. scientists and businessmen. It is important today and will be even more important tomorrow, in view of such ambitious possibilities as the piping of Yakut gas to the Pacific, where it will be condensed and then shipped to ports on the West Coast of the United States.

For a summary definition of the Second International Permafrost Conference this will, perhaps, do: a dialogue, a creative, serious and friendly exchange among scientists and technicians sincerely interested in the broad development of Soviet-American scientific contacts. The Soviet and American scientists evaluated with respect and appreciation the contribution researchers of both countries were making and the practical assistance permafrost specialists were rendering in the development and exploitation of the northern areas of their countries.

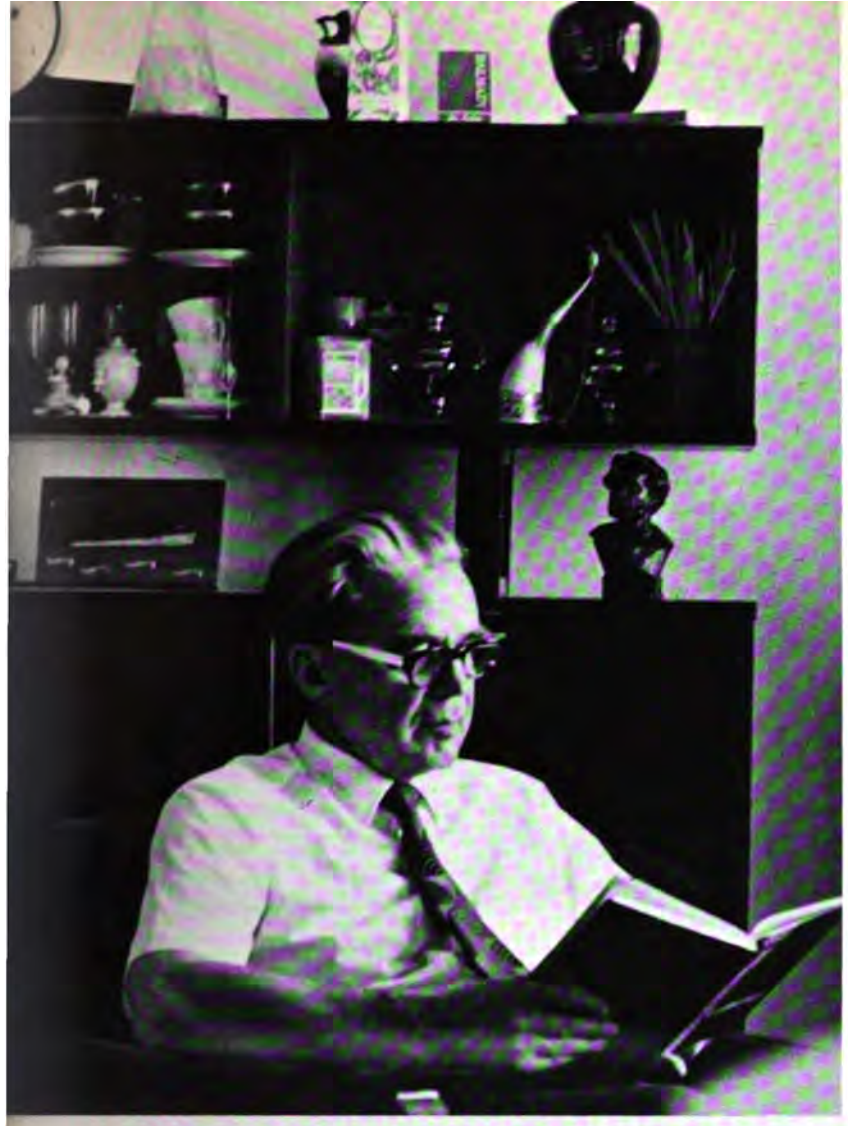
Soviet scientists, for instance, repeatedly referred to the interesting scientific and technical treatment of the problems that

Right: Visit to a construction site where permafrost theory is being tested in practice. Below: Simultaneous translation. Right center: Yakutia is a natural laboratory in which all cryospheric processes can be seen with unusual clarity. An ice outcropping that conference participants saw on a cruise of the Lena River.

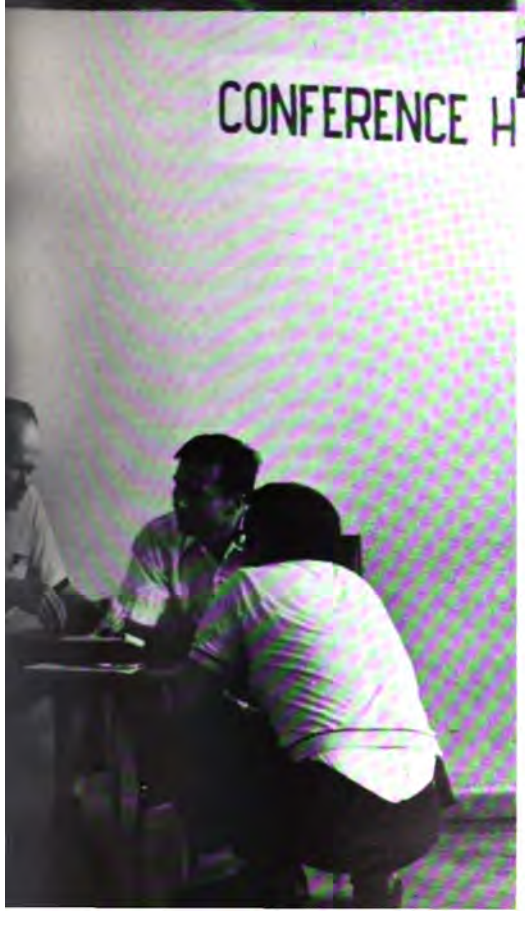
"In solving today's problems," said Pavel Melnikov, "we must not forget about the future. I believe that the time is not far off when scientists will begin investigating outer-space cryology, primarily that associated with the moon. This requires the cooperation of the scientists of many countries, especially the scientists of the United States, the Soviet Union and Canada."

Everyone who attended the conference in Yakutsk agreed that it was a great success. The discussions were business like and dealt with the latest findings of permafrost experts from each of the participating countries.

The next permafrost conference will be held in Calgary, Canada, and the one following that in Fairbanks, Alaska.



Bottom: A formal and . . .
. . . somewhat more informal conference session. Left: Pavel Melnikov, corresponding member of the USSR Academy of Sciences and director of the Permafrost Research Institute, which was host to the conference. He visited the U.S. in May 1973 to study the work of American scientists in the field. Below: A look at Orbita, television relay station in Ust-Nera.



arose in the construction of a 789-mile hot-oil pipeline across Alaska from Prudhoe Bay to Valdez, part of which will pass through permafrost. The 48-inch pipes will carry hot oil at a temperature of up to 140 degrees Fahrenheit. Of considerable interest, technically and scientifically, are the projects for oil refineries to go up in Prudhoe Bay, and the wells that are being sunk there.

Apart from their high appraisal of Soviet methods of construction in permafrost areas, American scientists noted the considerable contribution of their Soviet counterparts to permafrost theory.

"Scientists working in Siberia," said Professor Troy Péwé, "whether they are working in Yakutia or elsewhere in the USSR, have been able to give us basic information on various aspects of permafrost. I mean basic pure research information that may not be applied. New information that shows that permafrost existed more than one million years ago and, although I don't think that people of that time had any worry about it, nevertheless it gives us information as to what the climate was like at that time, and what the requirements were for the origin of permafrost."

The conference also discussed further cooperation of Soviet and American permafrost experts. The American scientists, for instance, want studies continued of the many problems that arise in construction work in permafrost areas. Both countries were urged to continue their research on the origin of permafrost. A new sphere of cooperation is opening up in the study of sea terrain permafrost.

Joint studies will also be done within the framework of the Soviet-American agreement on cooperation in environmental protection.

The numerous reports delivered by Soviet, American and Canadian scientists at the conference, the discussion, as well as the more than 300 reports published in preparation for the conference, issued in seven volumes by the Yakut Book Publishers, were presented to each participant.

Sleeping Bag Tours

The two weeks flew by. Besides the conference proper and sightseeing in Yakutsk, American scientists, divided into three groups, depending upon personal interest, made tours of Central, Northwestern and Northeastern Yakutia. They visited areas where no North American had probably ever set foot. On the motorship *Rossiya* they cruised along the Lena and Aldan to the famous Mammoth Hill; flew by plane and helicopter to Oymyakon, the cold pole of the Northern Hemisphere (a temperature of 95 degrees below zero Fahrenheit has been registered there); examined structures on permafrost in Mirny, the capital of the diamond region; and visited the Vilyuyskaya Hydroelectric Power Station. A good many miles were covered on foot. The invitations to the conference, sent out in advance, suggested rugged clothing and footwear. But you can't scare scientists, and permafrost specialists at that, with excursions on foot, nights outdoors in sleeping bags, and even the notorious Siberian midges. You should have seen the tanned, weather-beaten faces of the tourists when they got back, all aglow from communion with Yakutia's nature.

All's well that ends well. It was time for the final session. The atmosphere in the packed hall was gay and elated. One after another, scientists from the USA, Canada and France took the floor. They had only praise for the organization of the conference and thanked the Government of Yakutia and all the citizens of the republic for their warm reception and hospitality.

The leader of the Canadian delegation moved that the next permafrost conference be held in Calgary, Canada.

Professor Péwé invited the scientists to Fairbanks, Alaska, for the conference following the one in Canada.

The invitations from Canada and the United States were met with approval and applause. Considering the rapid development of permafrost science, it was decided to convene international conferences every four to five years instead of the former ten.

The decisions of the conference were adopted unanimously.

Farewell, Yakutia!

Looking forward to Calgary and Fairbanks!

Small Peoples in a Big Family

By V. Vorobyov

Deputy Director of the Irkutsk Institute of the Geography of Siberia and the Far East

THE 50-odd years of Soviet experience have shown that only socialism creates the conditions for solving the complex national question. The half-century of the Union of Soviet Socialist Republics, Leonid I. Brezhnev said in his report on the fiftieth anniversary of the USSR, "is the history of the growth to maturity of all the republics that have united under the banner of the Soviet state, of all the nations, big and small, which inhabit the country, and their attainment of true prosperity—economic, political and cultural."

This is manifest also in the development of the minority peoples, which in prerevolutionary Russia were doomed to extinction. Today, as equal participants in the country's life, they are part of a new historical community—the multinational Soviet people.

What changes introduced by the Communist Party and the Soviet state made it possible for the small peoples to acquire national statehood and develop their economy and culture?

Besides those from other parts of the Soviet Union who have migrated and settled in Eastern Siberia, 11 small indigenous peoples live there. Although their absolute numbers are not great (10.6 per cent of the population of Eastern Siberia), as a rule they live in compact territories where they form a significant fraction, and in some places a majority, of the population and preserve many unique features in their economic and cultural ways of life.

After the Revolution many of the small peoples of Eastern Siberia still retained elements of the feudal and even the primitive communal system. A comprehensive solution of the national questions offered by Lenin was adopted by the Communist Party and carried out in the course of socialist construction. Lenin's basic thesis was that backward peoples

> can go over to the Soviet system and, through certain stages of development, to communism, without having to pass through the capitalist stage.*

The published national policy of the party called for the immediate abolition of all national restrictions and privileges, the equality of all peoples and opportunities in every area of activity for the development of the national minorities and small peoples.

In the very first years of Soviet power considerable work was done to build autonomous governmental structures for the indigenous peoples of Eastern Siberia. As early as 1921 two Buryat-Mongol autonomous regions (near Lake Baikal) were formed. In 1923 they merged into the Buryat-Mongol Autonomous Soviet Socialist Republic (renamed the Buryat ASSR in 1958). In 1922 the Yakut ASSR was formed, and the year after the Khakass national district, which in 1925 was reconstituted as an area and time. In a number of places national districts and rural Soviets were organized for the small Region. The Taimyr (Dolgan-Nenets) and the Evenki National Areas were also formed at the national groups living there. In 1937, when the administrative division which is still in effect was set up, the eastern and western regions of Buryatia formed separate entities: the Ust-Orda and Aga Buryat National Areas. In 1944 the Tuva People's Republic voluntarily joined the USSR as an autonomous region, and in 1961 it became an autonomous republic.

In the national regions of Eastern Siberia industrial development moved ahead at a more rapid pace than in the country as a whole. In 50 years the industrial output of the country multiplied by 84 times; in the autonomous republics of Eastern Siberia the figure was much higher: in the Buryat ASSR by 440 times, and in the Yakut ASSR by 190 times. The more rapid development of the national regions led to changes in the distribution of the country's productive forces. Large-scale modern industry was built up in the outlying districts of Eastern Siberia over the years of socialist construction, particularly the mineral extraction and processing industries.

Gold output has increased markedly in the Yakut Autonomous Republic, and such gold-mining areas as Aldan, Dzhugdzhurek and Verkhne-Indigirsky have grown up. A first-rate diamond mining industry and installations for extracting tin, mica, coal and other valuable minerals have been built.

The Taimyr National Area has the North's largest ore-mining center, Norilsk (copper, nickel), the Tuva Autonomous Region supplies asbestos, the Buryat Autonomous Region produces tungsten, molybdenum and gold, and Khakassia copper, iron ore and gold. Industries connected with fishing and timber are in production almost everywhere in the northern national regions.

Ulan-Ude, the capital of Buryatia, has become a major machine-building and metal-working center for the eastern part of the country. There are industrial plants in Yakutsk, Abakan and other cities of the autonomous republics and regions.

Industrial development has created a local working class and a local engineering-technical intelligentsia. Before the Revolution factory and office workers formed a negligible percentage of the small peoples; now over 80 per cent of the Khakass, 40 to 60 per cent of the Yakuts and Buryats and 25 to 38 per cent of the Tuvinians and Evenks are factory and office workers. The number of qualified specialists is growing rapidly. Thus, the number of engineering and technical personnel among the Yakuts in the past 20 years has increased by 5.4 times and among the Buryats by 3.3 times. There are 6.8 times more Buryat doctors and 2.9 times more Yakut doctors.

Basic changes have taken place in agriculture, hunting and fishing. Farm collectivization has touched all corners of Eastern Siberia.

Practice has shown that collectivized farming is most efficient for both the advanced and the formerly backward national areas. Socialization of the means of production has affected farm growth favorably. Thus, compared with the prerevolutionary level, the sowing area in Buryatia has multiplied by almost four times, and in Khakassia by 25 times. Khakassia, Buryatia, Tuva and the Aginskiy Buryat National Areas are now the Soviet Union's major sheep producers, with a total of over four million head.

After the Revolution a school system on all levels—primary, secondary, specialized secondary and higher education—was built throughout Eastern Siberia. A mass campaign eliminated the widespread illiteracy in short order. Now the once backward peoples are ahead of many large nations in level of education and number of students. Thus, there are 227 general education school students per 1,000 people in Tuva, 229 in Yakutia and 226 in Buryatia. The corresponding figure for Britain is 159; France, 161; the Federal Republic of Germany, 199; Italy, 121; Japan, 202.

In Soviet times all the peoples of Eastern Siberia have developed their own written languages. Instruction in schools and the publication of books, newspapers and magazines are done in the national languages. Clerical work is also done in the national languages.

The culture, art and literature of all the nations and peoples of the country are fostered by the Communist Party and the Soviet state. The declaration of Lenin: ". . . We help in every way the independent, free development of each people, the growth and spread of literature in each people's native language . . ." is carried into life. The work of representatives of small peoples like the Chukchi Yuri Rytkheu, the Yukagir S. Kirilov, the Nanai G. Khodzer and the Nivkh V. Sangi are widely read

Departments of the Siberian Branch of the USSR Academy of Sciences have been set up in Yakutsk and Ulan-Ude, and integrated research institutes founded in Abakan and Kyzyl. There are eight research and four higher educational institutions in Ulan-Ude, capital of Buryatia. They employ 665 research workers (311 of them Buryats), including five doctors and 185 candidates of science (122 of them Buryats).

The rise in living and cultural standards has led to an increase in the population of the indigenous peoples of Eastern Siberia. Between 1926 and 1970 their number increased by 57 per cent. The population of Eastern Siberia has grown faster than, say, the population of the Russian Federation as a whole.

Large-scale communist construction signifies a new stage in the development of national relations in the USSR, characterized by the nations drawing closer together. This is a product of the economic development of the national areas, of better distribution of production, of stronger economic ties between individual national regions as a result of a more extensive territorial division of labor. This process of rapprochement is expressed in the elimination of national barriers, diverse ties with other nations and peoples, the adoption of the attire and utensils of other peoples, mixed marriages and cultural exchange.

Not only has the political equality of the small peoples been achieved since the Revolution, but their economic and cultural inequality has been completely eliminated.

*Vladimir Lenin, *Collected Works*, English edition (Moscow: Progress Publishers, 1966), vol. 31, p. 244.

Singers leading the choral dance Osuokhai. *Traditionally, the words are improvised. The drawing is by Vladimir Karamzin.*

Sun Fete at Mount Khunkhada

By Yuri Semyonov
Photographs by Valeri Shustov

The Evens, a numerically small northern people, claim—only half in jest—to have originated modern hockey. A popular game called *baikun* has been played in the Far North for as far back as anyone can remember. The name is derived from the Even word for the stick with which a wooden cube is driven into an ice goal. The local young people, of course, go in for modern hockey, but traditions are tenacious. The most exciting part of the reindeer breeders spring festival held in many Yakut districts is the national sports match, which includes a *baikun* game, as you might expect.

Left: Deer race winners.

A sunny smile, the fete symbol.

ONCE A YEAR the nomad reindeer breeders and hunters gather in Tompo village where their families live. At a general membership meeting of the state farm, they evaluate the year's work, decide matters that need action and make plans for the future. This annual conference is rounded off with a sun festival at Mount Khŭnkhada, which rises high on the bank of the Tompo River.

A long time ago the ancestors of today's Evens also gathered in this remote area when they were driven from the southern regions of Yakutia by warlike tribes. Here they considered plans to recover pastures rich in reindeer lichen—the reindeer's main staple—and woods that abounded in fur animals. Following the wise maxim, "A weak reindeer cannot lead the herd," the tribal chiefs held sports contests for the young hunters and reindeer breeders from whom they would be choosing future leaders.

We got to Tompo, some 300 miles from Yakutsk, by plane.

The two-story hotel could not accommodate the many guests who had arrived from all over the republic for the festival. They were put up in the village club and library, the local gymnasium and the boarding school for reindeer breeders' children. Their parents had taken them home for the holidays so it was empty when we got there. Among those specially invited from Yakutsk were journalists and actors of the Musical National Theater.

The deer sleigh race is tricky, with many sharp dips and turns.

The men gathered a few miles from Tompo, where the reindeer selected for the contests were grazing, while the women stayed in the settlement checking the harnesses, adding decorative touches to the fur clothes their husbands and children would compete in, and preparing tasty dishes of fish, game and venison.

The *khomus,* a national wind instrument of the northern peoples, announced the opening of the festival. An *argish,* a reindeer sleigh train with drivers in bright motley colored outfits, pulled up on the still firm ice of the river. Spectators gathered round. The names of herdsmen and hunters who led in socialist labor emulation were announced from an improvised rostrum. They were presented with bonuses—a month's wages (from 270 to 350 rubles) and prizes: transistor radios, cameras, rifles, carpets, down quilts, sleeping bags, tents and the like.

Then the high point of the festival: Rockets were shot into the air and, impelled by the guttural cries of drivers and the yells of the spectators, reindeer teams dashed from the starting line.

The program included reindeer sleigh

Reindeer sleigh racing is the most popular sport in the north country and is usually the opening event at the Khunkhada festival. It takes real skill on the part of the drivers to keep from being thrown out of the sleighs as they go bobbing up and down the snow hills at breakneck speed.

To race a reindeer takes a lot of knowing. The rider has to hug the withers. One small slip back and the deer slows down or sits on its haunches.

and reindeer-riding contests, wrestling and lassoing matches, races in fur footwear through the deep snow, choral singing and dance competitions, and a national dress contest.

Toward the end of the day the judges announced the winners. First place was won by Pyotr Pogodayev's team, half of it made up of members of his own family. The team leader himself was top man in the lassoing match and was judged the best choir leader. His wife Marfa and daughter Masha, a veterinary doctor's assistant, were the winners of the national dress contest. His elder son Mikhail, a student in the zootechnical department of Yakutsk University, came in first in the reindeer sleigh race, and his youngest son, fifth grader Alyosha, won the reindeer-riding race. The Pogodayevs bagged the largest number of prizes.

The merrymaking at Mount Khunkhada, eyewitness to the centuries-old traditions of the Even people, continued till sunset.

Impromptu spectator stand. The referee comes equipped with field glasses and a walkie-talkie. The fur clothing is not just traditional festive wear, it's a must in Yakut winters when the temperature drops to way below zero. The local people make these handsome fur jackets, hats and footwear, decorated with colored beads, silver and mammoth bone.

MODERN SOVIET MEDICINE starts looking out for the child long before it is born. Specialists in genetics are everywhere available to advise a couple wanting to start a family. When indicated, tests are made to forestall the birth of a child who shows positive signs of congenital deformities.

From the very first days of pregnancy the woman has her obstetrician-gynecologist, who is resident at the maternity consultation center in the expectant mother's home district. There are now 45,800 obstetrician-gynecologists and over 300,000 midwife-medical assistants in the USSR. Like all other medical services, care of expectant mothers is free. It is also compulsory. If for some reason a pregnant woman does not show up at the center for her scheduled medical checkup, she gets a home visit from her physician. The consultation centers are required to give monthly medical examinations to pregnant women, to make the necessary tests and to call in specialists when the need is there.

Soviet law gives expectant working mothers certain special privileges: They may not be assigned to a specified list of jobs that are physically difficult or hazardous; at industrial plants, if the condition of a pregnant woman's health requires it, she is given a lighter job at her current wage; on a doctor's recommendation a pregnant woman is sent to a special sanatorium or rest home.

A recent development in prenatal care is the special inpatient departments and maternity hospitals opened for pregnant women suffering from chronic diseases. There are cardio-obstetrical departments for expectant mothers with cardiovascular diseases and blood circulation insufficiency and special maternity hospitals for those suffering from diseases of the kidneys, affections of the central nervous system, diabetes and a threatening Rh factor.

Scientific and technological progress has influenced the field of obstetrics, just as it has every aspect of medicine. With modern electronic apparatus the functional condition of vitally important fetal organs can be observed in the last weeks of pregnancy and during labor. The apparatus has been used successfully at the Tbilisi Institute for Obstetrics and Gynecology by physicians directed by Professor Konstantin Chachava, corresponding member of the USSR Academy of Medical Sciences. We can now take electrocardiograms, electroencephalograms and rheoencephalograms of the fetus. The data are a considerable help to the obstetrician, who can judge with greater reliability the changes in the respiration and cardiac activity of the infant about to be born. If these changes point to the slightest danger, the obstetrician can take timely measures for immediate delivery. New methods of functional examination of the fetus will sharply reduce the number of cases of asphyxia and birth trauma in newborn infants.

The work of Soviet scientists on electrical anesthesia in labor has great interest for specialists, in fact for everyone. Modern medicine and expectant mothers no longer accept the ancient belief that the birth of a child must be accompanied by pain. After a careful study of the mechanisms and possible effects of impulse current on the organisms of the woman and the future child, scientists have come to the conclusion that electrical anesthesia is not only absolutely harmless but that it facilitates labor, completely relieving the woman of any painful sensations. The Soviet apparatus for electrical anesthesia in childbirth has already been proven successful.

By Leonid Staroselsky
Candidate of Science (Medicine)

Steps to save newborn infants who have suffered from birth trauma and those with severe oxygen insufficiency immediately after birth have been worked out by the Institute of Obstetrics and Gynecology of the USSR Ministry of Health. Special formulas of helio-oxygen mixtures used to treat such conditions, as well as other measures, have cut by half the mortality of infants born in a condition of asphyxia.

From the moment a child is born, the responsibility for observing and checking its health and that of its mother is strictly divided between the pediatrician of the maternity hospital and the obstetrician-gynecologist. The obstetrician sees to it that the postnatal period takes its normal course in the woman, while the pediatrician observes the condition of the newborn infant from the very first day of its life. After birth all infants are examined by an orthopedist and by other specialists as well if any pathology is suspected. There are specialized medical institutions in the country for the care of children's sight, hearing and other functions. Their job is to discover and correct any abnormalities in the child's development as early as possible. And so for some 15 years now an operation to correct congenital cleft lip, called harelip, has been general medical practice. The operation is performed while the infant is still in the maternity hospital. The early correction of this deformity makes it possible for the baby to nurse like any other infant.

Some Understandable Problems

Under Soviet law there is no compulsion whatever for people to have children. Though the state is encouraging an increased birthrate, a young married couple may not be inclined to raise a family. The twentieth century has had to recognize a paradoxical demographic situation: The higher the standard of living of a society, the

Some 46,000
obstetrician-gynecologists
and over 300,000
midwife-medical assistants
provide free medical
care to Soviet women.
Expectant mothers
are entitled to 112 days'
maternity leave
(56 days before, and 56 days
after, childbirth) at
100 per cent of their wages.

EVERY DAY NEW BABIES

less economic interest it has in the large family. Some 50 to 100 years ago every new child was looked upon as a potential supporter of his parents in their old age; now, with the high standard of material security in old age, the need for children's support has actually disappeared in our country. More often the reverse is true—it is the parents, who have retired on pension and are provided for, who help their young married sons and daughters.

Bringing into life a new being is the stuff of poetry, but practical problems have to be considered. When they think of raising families, future parents are seldom troubled by the total society's demographic problems. They are more interested in how much bringing up children will cost them. Not so much what things the future baby will need; these expenses take a relatively small part of the family budget. The major consideration, with the birth of a new member of the family, is that the mother usually has to leave her job for a while, sometimes a rather lengthy period.

How is this problem handled by Soviet law? Until recently expectant mothers were entitled to one paid eight-week maternity leave beginning with the thirty-third week of pregnancy and another of equal length after the birth of the child. If a woman's length of service was over eight years, she received 100 per cent of her wages, if it was shorter, two-thirds. If she gave birth to twins or if her baby was born prematurely, the paid leave granted after childbirth was proportionately extended.

The latest government resolution of August 1973 (Decision by the Council of Ministers of the USSR on Improving the System of Allowances During Pregnancy, Childbirth and for Taking Care of a Sick Child) provides for a maternity leave of 112 calendar days (56 days before, and 56 after, childbirth), at 100 per cent of a woman's wages regardless of her length of service. This holds for all working women without exception, including those in offices or on collective farms, whether they belong to a trade union or not. When calculating the size of the allowance, not only the total monthly earnings of a woman, but also all the bonuses and other awards are included.

When a child is eight weeks old, it may be placed in a nursery, where a physician is always in attendance. The nursing mother can then go back to work. But the law gives her certain prerogatives: She may not be asked to do heavy work, to work evenings or night shifts, and she gets breaks during the working day (in addition to those employees regularly have) to nurse her baby.

However, not all parents want to place such small babies in nurseries. So if the mother prefers staying home, she can until her child is one year old. She is not paid, but her job is held for her during that period. Nor does this time out make a break in her length of service, an important consideration in working out the amount of her future pension.

Until recently, if a child fell ill and there was no one to take care of it at home because all the adult members of the family held jobs, the mother was placed on the sick list for three days with pay. If more time was needed for the child to get well enough to go back to the kindergarten or nursery, the mother could get more leave but without pay. The new rules give her seven paid days in such a contingency; unmarried mothers, widows and divorced women are allowed 10 days. The history of this practice shows that the term is usually sufficient for the complete recovery of a sick child. There is no limit to the number of times a mother may go on sick leave to take care of a child; the frequency is determined by the child's health alone. These provisions of the government resolutions of August 1973 will cost the state an additional half billion rubles a year.

The Opinions of Some Foreign Obstetricians

The Seventh International Congress of Obstetricians and Gynecologists was held in Moscow in August 1973. Free time between the sessions of scientific discussion gave the delegates an opportunity to acquaint themselves with our network of maternal and child institutions. Many of the foreign specialists thought highly of Soviet work in the field.

Professor Hubert de Watteville, Secretary General of the International Federation of Gynecologists and Obstetricians, said that maternal and child protection must be organized on a national scale so that everyone can benefit from the achievements of science. It was regrettable, he pointed out, that in West European countries new developments in science were not more accessible to people generally. Professor de Watteville concluded his discussion with the statement that he was much impressed with the care given in the Soviet Union and with the country's work in public health.

Professor K. Randall, from the United States, said that American specialists had come to the USSR to see the Soviet system of public health in action. He made particular mention of our achievements in research and their application in medical practice.

These comments and others we could cite speak for themselves. The Soviet state is doing everything to guard the health of mother and child. In words and action we greet each of the 12,000 infants born in the Soviet Union every day: "Welcome, new citizen!"

Around the Country

TRADE CENTER

A center of international trade and scientific-technical ties with foreign countries, designed by Soviet and American architects, is to be built in Moscow. The agreement was signed in New York last September by the USSR Chamber of Commerce and Industry and Occidental Petroleum of the United States.

The future complex—a 25-story administration building, two 24-story apartment houses for members of the staff and their families, a 20-story hotel and other buildings—will be located on the bank of the Moskva River in front of the Ukraina Hotel.

The plan also calls for a 2,000-seat conference hall and a pavilion where industrial and commercial exhibitions of foreign companies will be held. The administration building will have space for the representatives of 400 exhibiting firms at a time.

CHILDREN'S BOOKS

The Detskaya Literatura (Children's Literature) publishing house, one of the best known in the country, celebrated its fortieth birthday last September. Over the years it has issued a total of some three billion books—one for each reader on our planet.

SEED BANK

Soviet plant breeders ... evolved over 1,000 new ... ties of farm crops, using seeds ... the unique collection of plant ... the USSR Institute of Plant Bree... ing, Leningrad.

This genetic bank, includi... over 200,000 kinds of plants, is ... constant use. Seeds are period... cally sown in zones with conditio... similar to those of their country ... origin. Some of the plant spec... are sown every other year, othe... every third or fourth year. Th... fresh seeds, with descriptions ...

AMERICAN FISH IN THE KUBAN

Several species of American fish —the perch, buffalo, stream sheatfish and others—are successfully acclimatizing in the Kuban region on the Black Sea.

Two fish species—the steelhead salmon and the striped perch, which is one of the most valuable fish in North America—have been released in the sea. The young fish are adjusting rapidly to their new habitat.

DEEP-FREEZE SURGERY

Cryogenic substitutes for the surgeon's scalpel have been developed by the Odessa Technological Institute of the Refrigeration Industry. The units are small thin-tipped tubes in which liquid nitrogen circulates. The nitrogen lowers the temperature at the end of the tube to between minus 160 and minus 180 degrees centigrade. The surgical effect is bloodless because of the instantaneous deep freezing of the specific area of the body touched. The operation takes only a few minutes.

Cryogenic substitutes for surgical instruments have been tested in Odessa hospitals and clinics.

SHIPBOARD SCHOOLS

Teachers of mathematics, physics, chemistry, history and literature spend almost two months a year sailing the Arctic Ocean aboard icebreakers of the Soviet fleet. They teach in fully equipped classrooms right on the ships.

Over 100 young seamen attend such schools on icebreakers in the eastern part of the Soviet Arct... alone. Almost all of them are pre... paring to enter higher and spe... cialized secondary schools. Ever... third seaman in the Soviet mer... chant marine has a higher o... specialized secondary education.

PORTABLE POWER PLANT

Production of portable powe... plants of the Druzhba-A type ... each weighing just 57 pounds, ha... started in Yoshkar-Ola in the...

TWO MILLION BROILERS A YEAR

A new poultry farm is under contruction near Sverdlovsk. It will be the largest such facility in the Middle Urals, with a rated capacity of two million broilers a year. The first section recently went into operation.

COMPOSER'S PEACE CONTRIBUTION

Soviet composer Dmitri Shostakovich has contributed to the Soviet Peace Fund the 60,000 Danish kroner he received with the Sonning Foundation Prize. The prize is awarded annually in Copenhagen to the world's finest musicians.

VAN CLIBURN RECORDS

Melodiya has issued an album of Van Cliburn records. They include compositions played by the American pianist at the Moscow Conservatory during his latest concerts. Featured are the works of Tchaikovsky, Rachmaninoff, Liszt, Chopin, Scriabin and Prokofiev.

CAUCASUS RAILROAD

An 88-mile-long electric rail... road, the Krasnodar-Tuapse ... is under construction in the moun... tains of the Caucasus. It will cu... travel time from Moscow and the ... central regions of the Soviet Union ... to the eastern coast of the Black ... Sea and Transcaucasia by near... two hours. This is one of the majo... rail construction projects of the ... Ninth Five-Year Plan (1971-1975). ... By 1975 the country will have 3,0... more miles of track.

More than 30 bridges and major ... viaducts are being built along the...

...d capacity and resistance to ...se and climate, are packed ...xes and kept till the next ...ng.

...ch year the institute sends ... to experimental stations and ... breeding centers in the Soviet ... and abroad. In exchange, it ...ves samples of seeds and ...s to replenish its collection.

...EOLITHIC CAMPSITE

...eolithic people once camped on the site of the future reser... of the Sayano-Shushenskaya ...droelectric Power Station in the ...per reaches of the Yenisei River. ...heologists have unearthed ...ments of beautifully orna...nted pottery and scrapers for ...cessing animal skins. The find ...proves the theory that the ...isei valley was unpopulated in ...mitive times.

MIKHAIL ZENKEVICH, POET AND TRANSLATOR

The oldest Soviet Russian poet, Mikhail Zenkevich, died recently at 82. His first poems were published in 1906.

Zenkevich was also a pioneer translator. His special interest was American poets, many of whom he first introduced to Russian readers. In 1939 he and Ivan Kashkin, the critic and first Soviet translator of Hemingway, published an anthology titled *American Poets, Twentieth Century*. It includes his translations of poems by Edgar Lee Masters, Edna St. Vincent Millay, William Carlos Williams, Robert Frost, Alfred Kreymborg, Robinson Jeffers and Langston Hughes, with critical forewords. The collection won the unanimous approval of critics. In 1946 Zenkevich published another anthology, *From American Poets*, followed by a collection of poems by Joe Hill. He also translated Walt Whitman and modern English and American novelists.

ANCIENT SCULPTURES

A gallery of sculptures carved by ancient masters in pillar-shaped blocks of red sandstone has been found in the vicinity of the Inylchek Gorge in the central Tien Shan region.

The figures, dating back to the sixth century A.D., are thought to be monuments to dead warriors of the Turkic nomadic tribes. With one hand they hold a cup, the other rests on the handle of a sword or knife. The characteristic headgear, garments and decorations can be made out on some of the sculptures.

The statues testify to the high artistic level of the ancient Kirghiz nomads.

FOSSIL WHALE FOUND

A rare find, a fossil whale, has arrived at the Permafrost Research Institute in Yakutsk. It was unearthed by hunters in the tundra near the Arctic coast.

The 80-foot skeleton is well preserved; permafrost is an excellent natural refrigerant. Preliminary dating indicates that the animal died at least 30,000 years ago.

But how did the whale reach dry land? Scientists believe that a giant ocean wave flung it ashore and it was buried by landslides.

LEAVE FOR WORKING MOTHERS

In August 1973 the USSR Council of Ministers made improvements in two types of benefits for working mothers: maternity leave and time off to care for sick children.

The new regulations provide for a total of 112 days' maternity leave with allowances equal to a woman's wages regardless of how long she has worked. This applies to all factory and office workers and collective farmers, whether or not they are trade union members.

If a child is sick and needs home care, the mother may take seven to ten days of paid leave.

...lga area. Packed into a box or ...cksack, the station can easily be ...ried to a place where there are ... sources of electrical energy. It ...erates a three-phase, 230-volt ...rrent with a frequency of 200 ...tz and is designed for all-...ather outdoor operation.

MOSCOW PHILHARMONIC

...e Moscow Philharmonic Or...chestra has opened its new ...son with programs featuring ...e works of Russian classical, ...odern Soviet and Western com...sers.

Special concerts will commemo...te the anniversaries of Berlioz, ...sky-Korsakov, Borodin, Britten ...d Gershwin. Special Sunday and ...ldhnee lecture concerts have been ...anged for schoolchildren.

CENTENARIANS

Georgia has nearly 2,000 people who are at least 100 years old. Most of them live in mountain villages and on the Black Sea coast.

Staff members of the Georgian gerontological center believe that altitudes of 1,640 to 5,000 feet above sea level where mountain and marine climates combine are the most favorable for longevity.

Studies of the centenarians' way of life show that all of them have been doing manual work since their youth. As a rule, they do not smoke. They prefer the highly seasoned Georgian food, eat a good many vegetables, honey, cheese and other milk products, and drink mainly grape wines.

Nearly all the centenarians are married.

TOLSTOY'S LIBRARY

The recently published *Library of Lev Nikolayevich Tolstoy in Yasnaya Polyana* describes the author's extensive book collection now preserved at his country estate.

Some 22,000 books and journals in 35 languages are stored in 25 bookcases and a large box at the Yasnaya Polyana museum. Tolstoy had a good command of French, German and English. He read Homer and other Greek and Latin writers in the original. He also had some knowledge of Spanish, Italian, Czech, Polish and Bulgarian.

STREET ELEVATORS

Tbilisi, capital of Georgia, needs an area of about 15 square miles to build the new apartment houses called for by its development plan. Since the city is hemmed in by mountains on all sides, new construction will be sited on the natural terraces. Elevators will take the residents to their apartments and carry people up and down the steep streets.

METAL SUBSTITUTE

Lignamon is a new kind of wood plastic developed at the Institute of Wood Chemistry, Latvian Academy of Sciences. It is expected to have a number of applications in industry as a substitute for nonferrous metals.

Czechoslovak chemists have expressed interest in the production of lignamon and are working jointly with their Soviet counterparts to develop the necessary equipment.

...ke. Near Tuapse the road will ... through a tunnel under the ...ler Caucasus range.

YAMAL OIL AND GAS

A Soviet geological party has arrived on the shore of the ...ara Sea to prospect a new area, ...e Yamal Peninsula, in the Far ...orth of the Soviet Union. The ex...loratory borehole to be drilled ...re will be the northernmost in ...e Soviet Union. Seismic data in...icate that major oil and gas re...rves are concentrated in the area ...d that they spread into the shelf ...ne of the Arctic Ocean.

...xperts believe the seabed can ... mined even under the rigorous ...tic conditions. At present, off...ore petroleum extraction is un... way in the Caspian and at the ...eparatory stage in the Black Sea.

HEART INSTITUTE

The Yerevan Institute of Cardiology is a major center of cardiovascular research. Its staff exchanges information and holds symposiums with heart specialists in a number of countries. The institute is presently engaged in cooperative studies with American cardiologists.

It is housed in a new 12-story structure that includes laboratories, a 300-bed clinic and an outpatient department. A research building is under construction nearby.

OUTDOOR GEOLOGICAL MUSEUM

Odoyevsky Street on Vasilyevsky Island in Leningrad will soon become a unique outdoor museum. Large specimens of jasper, marble, labradorite and other minerals typical of the Leningrad region will be displayed there.

The museum will be a kind of monument to geologists' discoveries. It will include 100 specimens from deposits in other parts of the country.

U.S. GRAPE GROWERS IN THE USSR

A group of California grape growers recently toured the vineyards of the USSR. After a visit to the country's largest grape center—Massandra in the Crimea—delegation leader Maynard Amerine said that the experience of the Crimean grape growers should be of considerable interest in the U.S. The guests from California thought highly of Crimean table wines, many of which meet the highest international standards. The American and Soviet growers agreed to continue exchanging information.

GIANT FREIGHTER

The Soviet Union's largest freighter for grain, coal, iron ore and other bulk cargoes has put to sea from the Black Sea port of Nikolayev. Its eight holds have a total capacity of 2.2 million cubic feet and can take 55,000 tons of cargo (the equivalent of about 20 railroad trains).

The ship is 700 feet long and 105 feet wide. Its 13,700-horsepower diesel plant allows it to develop a speed of 15 knots. The plant is completely automated and needs only one operator. The vessel can cruise 20,000 miles without refueling or replenishing its food supply.

Another such ship is under construction.

For Humanism in Film Art

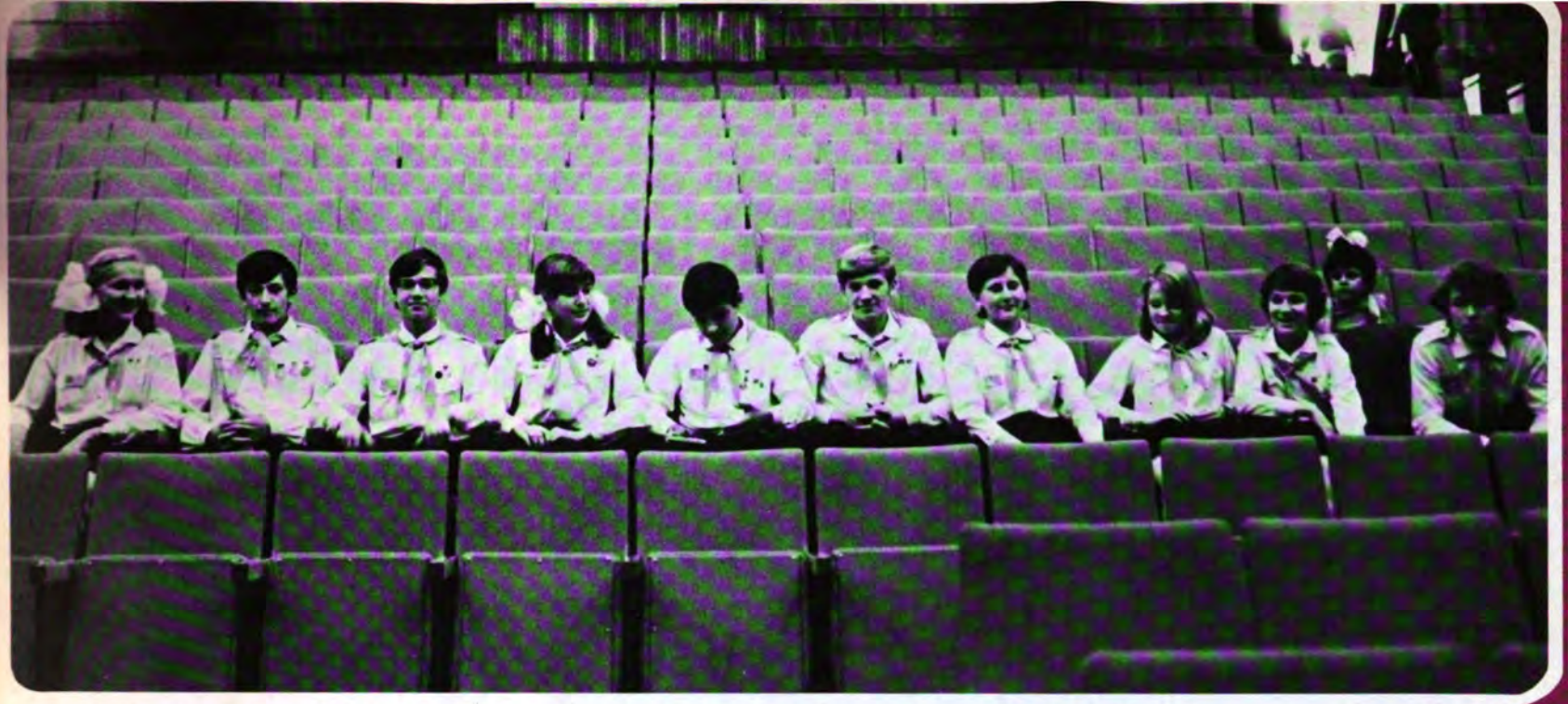
By Marina Khachaturova

Photographs by Galina Kmit

Soviet director Sergei Bondarchuk presents the International Festival Gold Prize to Stanley Kramer for his movie Oklahoma Crude *and for using humanist themes generally in his films.*

Juror George Stevens recalled his meetings with Russian soldiers in World War II.

Soviet film star Nadezhda Rumyantseva makes a point to Richard Burton.



Jury for children's films. It awarded Tom Sawyer *a special certificate for the best screen adaptation of Mark Twain's book.*

THOUGH several months have passed since the Eighth Moscow International Film Festival, the questions raised are still being discussed by movie makers the world over, and the trends it showed continue in new pictures.

The Moscow festival—the first took place 15 years ago—has held to its traditional motif, "For Humanism in Film Art, For Peace and Friendship Among the Peoples." All the participating countries—those whose cinematography goes back as far as Louis Lumière and those which are just starting film industries of their own—submit pictures with related themes. At the Eighth Moscow Festival the Gold Prize went to Stanley Kramer, not only to mark the merits of his current **Oklahoma Crude,** but also for the consistent humanism of his pictures.

Freedom and progress, protest against social injustice and the denial of human rights—these were the subjects of many of the festival films. The theme of Vitautas Zalakevicius' **That Sweet Word—Liberty!**, which won the Gold Prize, is that people cannot take refuge in their own personal life when everything around them is evil. They must be citizens in the full sense of the word, or they become corrupt. The story concerns the escape from prison of three democratic legislators in one of the Latin American countries. The simple plot is garnished with exciting adventure and probing psychological and political portraits. The director followed the credo he had enunciated in an earlier film, **Nobody Wanted to Die**—that everyone must take a stand. He also remained true to his type of hero—the champion of justice.

The press used the term "political film" to describe many of the pictures, among them the French **Conspiracy**, directed by Ives Boisset (Silver Prize), the Italian **Matteotti Assassination** by Florestano Vancini (Special Jury Prize) and the Venezuelan **When I Want To Cry, I Can't Cry** by Mauricio Walerstein. Director Zalakevicius said in an interview: "The political film treats the burning issues of the day; it shows the greatest comprehension of our era. A film is effective when the conflicts in it are topical, clear, understandable to everyone."

Irina Miroshnichenko, who has one of the main roles in **That Sweet Word—Liberty!**, describes her heroine as "a woman who loves: her husband, her people, her country, freedom."

Love is the name of the third film awarded the festival's Gold Prize. Film director Ludmil Staikov of Bulgaria highlighted the figure of a woman at home, with friends, at work. He showed that in our time the inner world of individuals must be related to the world they live in, that both in war and in peace love must accompany such concepts as honor and responsibility.

Stanley Kramer's **Oklahoma Crude** deals with the oil boom of the twenties. The drama of the individual's struggle against the corporations is heightened by the fact that this individual is a woman, one whose life has made her both harsh and tough. Watching Faye Dunaway's talented performance, you feel that people cannot be broken, even when they are persecuted, badgered, beaten within an inch of their lives. The film ends on a symbolic note: The oil well dries up, and the only employee—a tramp (beautifully portrayed by George Scott)—quits. As he goes off, Dunaway calls him by his first name, and he stops. No one has used his real name since he was a child. The inference is that even a woman as hard-bitten as Dunaway's heroine cannot survive without human warmth and compassion.

The films at the festival reaffirmed the worth of human beings, regardless of their social status or age. This was equally true of the offerings at the International Festival of Children's Films held within the framework of the Moscow Film Festival and at the same time—in July.

Children's Films

Each year the Moscow Festival of Children's Films—this was the fourth—earns more prestige. This time, too, it showed that what is of interest to children is also of interest to adults. Among the most popular offerings was the musical **Tom Sawyer,** produced by Don Taylor of the USA. It was rated the best film of the festival by the children's jury. The grownups' jury, presided over by the well-known Soviet children's writer Sergei Mikhalkov, awarded **Tom Sawyer** a

For Humanism in Film Art

special certificate for the best screen adaptation of Mark Twain's classic, and the Union of Composers added another prize for its music. The grownups saw one thing in this picture and the children another, but both groups loved it.

That was also true of the Gold Prize film **Pinocchio** by Luigi Comencini of Italy. The children's jury awarded a prize to six-year-old Andrea Belestri (the hero of **Pinocchio**) for the best performance by a boy. Comencini's picture teaches children to distinguish good from bad.

A good many pictures at the children's festival attracted both youngsters and grownups: Their subjects touched all ages. The importance of the film's influence on children cannot be overrated. As they enjoy watching a movie, they learn to respect such qualities as kindness, nobility, honesty, compassion. The films at the festival contributed to this end. Not that the problems raised in them were solved in every case. The critics reported that this last festival had fewer lighthearted films. Obviously not because they are not being made. Simply, each country submitted films intended to do more than just entertain.

Shorts

Human beings can do anything, I decided after seeing the fine American film **Solo.** Later, I learned that it was awarded a special certificate in the short category for its conceptual and artistic merits. Through the whole 20 minutes, the audience was completely involved. The picture showed an alpinist (the director himself) climbing a peak. The sense of coparticipation was so strong that we felt as though we too were jumping over crevasses, cutting footholds, scraping our hands, slipping off of ledges. At last the slow, difficult ascent ended, and the view from the peak was so grand that we felt it was worth all the trouble of getting there. Then, in contrast to the first part of the film, began the fast, joyful descent to the valley, from the white silence to the world of people, color and sound.

Interest in the documentary, in facts, has increased noticeably in our time. The shorts were all well attended. Pictures of practically every genre were shown: documentaries, popular science, plays, topical reportage, philosophical essays, travel films, ethnographic and biographical sketches. The majority, however, were natural science films, showing the seemingly endless diversity of life on Earth. One of the best was the British **Undercurrents** by Robin Lechman, which won the Silver Prize for its excellent underwater shots. The British also submitted another fine film, **The Flying Birds** by D. and K. Yori. This picture included many unique sequences of birds taking wing, soaring and alighting.

Many of the films were devoted to that universal concern of humankind—the protection of nature. The Soviet **Coming Through the Fire** (about fighting forest fires) received a prize.

Every Moscow International Film Festival reveals new talent among film writers, actors, directors. An early festival find was Kaneto Shindo of Japan, director of **The Island,** which after its success in Moscow made a triumphal round of the screens of Europe and America. Ten years later Shindo again received the Gold Prize, this time for his **Live Today and Die Tomorrow.** The famous Italian director Federico Fellini was awarded the Gold Prize for **8½.** Pierre Etaix won recognition and a certificate for his first independent film, **Le Soupirant** Armando Robles Gody of Peru received the Gold Prize in Moscow for **There Are No Stars in the Selva.** The list could be continued indefinitely, but the point lies not only in the awards. The Moscow competition makes it possible for film people to get together and learn more about movie making and about each other.

Maya Gordeyeva interviews foreign visitors to the Eighth Moscow International Film Festival last July.

"Individual Responsibility"

George Stevens, Sr., veteran Hollywood director and juror at the festival

Q: How did it feel working on an international film jury?

A: I didn't think of myself as an American, but as a citizen of the world with a responsibility to the festival for selecting the best films.

I feel the jury did an excellent job and was completely fair in its choices. I welcomed the large number of awards because so many films were outstanding in their communication of ideas or had artistic merit or unusually good photography. There was a division of honors in a number of cases. We tried to gear our selections to the slogan of the festival—for harmony, for humanism, for peace. That's one of the best orientations people can have. It was a beautiful thing working together in an international group.

Q: What are your feelings about Soviet-American relations and cultural exchange?

A: The Russians were my friends during World War II. I remember Berlin and the Russian Army when I was in the U.S. Army myself. We came up with vehicles for the Russians. And at the end of the war—on the Elbe—when I saw those same trucks that came off the boat in 1943, they'd been all over and bore the marks of a good many battles. I knew what it was like for the soldiers. One of the best Soviet films by Sergei Bondarchuk, *The Fate of a Man*, is the story of a simple soldier in the war. It was one of the most beautiful and humanistic pictures I have ever seen.

It's up to every American and every Russian to see that it does not happen again and to maintain a lasting friendship between our two great peoples. That's a matter of individual responsibility. I've always felt it applied to me. Every chance I get, I use my voice—although it's not particularly loud or strong—in the interests of Soviet-American friendship.

"My Armchair Politician's Belief"

Richard Burton, film star

Q: What were your impressions of Moscow?

A: The distinctive thing about the city, of course, is the Kremlin with its onion-shaped domes. I was also tremendously impressed by the crossed metal rods symbolizing the antitank barricades about 12 miles out, where the Germans were halted.

I'm not nearly as interested in scenery as I am in people—their attitudes, their work. Anybody could write a travel book, but what I find much more significant is how the people behave and what my reactions are to their behavior.

Q: What do you see as the main objectives of improved international relations, to which festivals like this might contribute?

Participants' View of the International Film Festival

A: The most important thing, of course, is to assure lasting peace. After that there are other urgent problems like the population explosion and the world food shortage. Probably about half the people on Earth are underfed. How do you remedy this? A single person can make a tiny effort, but much more significant is the fact that within the last 10 years the cold war atmosphere has begun to thaw. It is my personal armchair politician's belief that relations between the Soviet Union and the United States have vastly improved. The détente is of considerable importance to me personally, because I would like all my six children to live at least until they are 50. The oldest is 20 now.

Q: You've done Hamlet a number of times. What do you think of the Soviet film version?

A: It was marvelous, I thought. I missed the original language, of course, but the acting, the settings and the photography were superb, especially Smoktunovsky in the part of Hamlet. I enjoyed it very much.

Q: Will you be coming to Moscow again?

A: I hope so. I'm here because I've just done a film in Italy—Carlo Ponti's *Massacre in Rome*—and I wanted to see Moscow, Siberia and the golden city of Samarkand, the subject of one of Giles Fletcher's great poems. Unfortunately I have to start another movie sooner than I thought, so I'll be in Moscow only one day.

I've met a number of Soviet directors, but it would take at least three months to get the feel of the country. After traveling almost everywhere else in the world, I'm eager to see the Soviet Union.

"A Well-Traveled Route"

Tom Luddy, program director of the Pacific Film Archives, Berkeley, California

Q: Did you have a chance to get acquainted with the multinational cinematography of the Soviet Union?

A: Yes, and I've found that the Soviet people are enthusiastic moviegoers: They produce something like 150 films a year. Ordinarily I'm lucky to see five or ten, but here in Moscow I've attended about 20 Soviet films. The Georgian film makers are particularly interesting and creative. I saw two films by Yeseliani—*Listopad* and *There Was a Singing Blackbird*—and consider him a superb artist. There are others, too. The Shenghelaya brothers are very fine directors. *Pirosmani*, I think, will be quite a successful film about the Georgian painter. We saw two interesting comedies and the feature *When Almond Trees Are in Bloom*. So my first impression is of the vitality of the Georgian and also the Kirghiz cinema.

My favorite Soviet film of recent years was *The First Teacher*. It used to considerable advantage a story by the Kirghiz writer Chinghiz Aitmatov, who is at the same time creative and harshly realistic. Aitmatov's scripts are tough, unsentimental—he sees things as they are. *The First Teacher* was directed by Konchalovsky, who did an excellent job. I though the film was magnificent.

Yesterday I saw another outstanding movie by a Kirghiz director, Tolomush Okeyev. It is called *Reverence for Fire* and deals with the period of collectivization and the struggle with the kulaks. It was one of the strongest films I've attended. I also saw *Gamilya,* based on a story by Aitmatov. So my over-all impression is that there's a lot happening in Georgian and Kirghiz cinema that people in America should know more about. I also thought the Moldavian film *Lautars* was good. I found it completely authentic and loved the music.

Q: Do you think people in America would like to see some of these movies?

A: I am hoping we can circulate some at Berkeley, at the university. It's important for us to present films from the various Soviet republics in the U.S., because too many Americans think of the Soviet Union as just Russia. I'm sure you're aware of that oversimplification. I think that American minorities, particularly, should be acquainted with the fact that there are 15 republics in the Soviet Union, and that each has a national culture which it is developing in the cinema as well as in other areas. I'm hoping that we will be able to present at our own festival the best films of the past five or ten years—including documentaries—from the Soviet national republics. I understand the national studios have produced some excellent documentaries and children's films.

Q: Would you like to travel in the Soviet Union?

A: Very much. I've gotten a fascinating picture from Soviet movies of the different republics and the vitality of the new cities, Tashkent for example. It's been rebuilt and looks like a city of young people who are accomplishing a great deal. I'm hoping to go to Siberia and bring a selection of American documentaries there. We're based in San Francisco, on the Pacific Ocean, and Siberia is on the Pacific, too. I'm hopeful that relations will continue to improve and that there will be more and more contacts. There's a well-traveled route now from New York to Moscow and from San Francisco to Vladivostok. I'd like to cover this route with some films under my arm and bring back films about life in Siberia. I hope the West Coast of America can establish contacts with the new society on the Soviet Union's East Coast.

"Peace and Understanding"

Stanley Kramer, Gold Prize winner at the festival

Q: I suppose many American moviegoers are familiar with the Moscow international film festivals. You are one of the long-time participants in these festivals, so your opinion of them should be of considerable interest to Americans.

A: The Moscow international festival is perhaps the most interesting of all because it is an opportunity for directors, writers and authors from the East and West to get acquainted and see each other's films. I think now that the barriers have been removed, there will be many more such exchanges. Besides films, we're sharing ideas and problems and getting rid of prejudices. For years I've been grateful for the Moscow festivals because they've given me this opportunity.

Q: Every one of your films shown in Moscow has been very well received. I think this is because Moscow audiences respond to the ideas of your movies even though the situations you dramatize are not typical of their lives. What contemporary moral and social problems do you consider most important; which of them would you like to reflect in future films?

A: I don't really know which can be called the most important. I suppose a great many of my films have found an appreciative audience here because they have a humanist direction.

In principle, I think, perhaps the most desirable quality is a humanist philosophy, by which I mean concern for other people and responsiveness to them. If we can achieve lasting peace and understanding, it will go a long way toward solving the world's problems. That idea alone could occupy film makers for the next hundred years.

Q: What do you think the prospects are for Soviet-American cultural ties?

A: The development of our contacts in the cultural field have been accelerated considerably by the lessening of the cold war and the recent exchanges of all sorts. After all, the cinema is people, and it's people who determine what kind of films will make their way and whether they will reflect today's and tomorrow's problems. I prefer to look ahead somewhat, I'm no longer as interested in reflecting what has happened as I am in speculating on what lies ahead. Soviet-American contacts in other fields, for example, in the exploration of space, can facilitate our cooperation in film making. I look forward to that.

Q: Space flights seem to be a very attractive topic for film directors. Are they for you?

A: Choosing a script is often a very practical matter. You read a story and say, "I feel I can do a film from that."

The basic idea of movies about space—about cosmonauts or astronauts—is certainly good. But such films should be primarily stories about people with their own particular problems and reactions to each other, set against a space background. I think this type is actually the most dramatic and evocative.

QUERIES FROM READERS

QUESTION: Is there any evidence that a highly industrialized society is conducive to high crime rates? Is there a connection between the social system and the incidence of crime?

ANSWER: Many Western sociologists see a connection between the growing crime rate in the advanced countries of the West and the rising living standards and growth of national income. This would seem paradoxical: The richer the society, apparently, the more frequently its laws are broken. But it can easily be explained if we consider not the production of material goods but how they are distributed, not the growth of public wealth but for what purposes society spends it.

Figures on national income, no matter how impressive, do not prove that poverty has been eliminated in a given country, and poverty, we know, breeds crime. The hungry cannot feed on the figures for per capita meat consumption, nor do the slums become more livable because there is luxury housing elsewhere for those who can afford it. Young people whose parents cannot send them to college are not likely to take comfort from the fact that world-famous scientists teach in their country's universities.

This is not to say that all poor people are potential criminals. But the uneven distribution of material wealth aggravates racial and national inequities from generation to generation. Even when secondary education is free, children from poor families find study harder than those with well-to-do, better educated parents. Schools in underprivileged areas are poorer than those where the well-to-do live. And the lower a person's educational level is, the less chance he or she has of getting a well-paid job. Statistics make it clear that crimes are committed mostly by people with little education, by those who are dissatisfied with their social status. In rich societies, where the distribution of material goods is inequitable, the resultant discontent often erupts in crime.

The crime rate depends to a large extent not only on how society distributes the national wealth, but on how it spends this wealth—in short, on the nature of its values. No matter how great the national income, the society that uses it for the arms race to the detriment of public health, education and culture cannot be called sound because it is undermining its own socioeconomic and moral foundations. If culture is commercialized, if books, movies and television glorify violence and pornography, then society is in danger of raising potential murderers, burglars and sexual aberrants. In a society where the superman is idealized and money is the chief incentive, such concepts as morality, love and compassion are incomprehensible. Corruption and criminal activity become the norm.

Thus, the cause of crime lies not in technical progress, but in the social relations that create a conducive climate.

In the Soviet Union crime is steadily declining, with a particularly sharp drop in the number of murders, robberies and rapes. Organized crime has disappeared completely. This is not accidental. Socialism, public ownership of the means of production, has undercut the economic foundation for crime. The steadily rising standard of living—higher wages, especially for people in the low and middle income brackets, free medical care, compulsory secondary education, the opportunity for every citizen to get a higher education free of charge, and very low rents—all whittle away economic distinctions.

Regardless of their incomes, people can spend their vacations at a health or vacation resort on the Black Sea because they can get accommodations free of charge or at a reduced cost (only 30 per cent). Anyone can go in for sailing, motorboating, show jumping, skydiving and other expensive sports for a modest 30 kopecks a year—the cost of membership in a sports society. All young people can choose a college to enter and a profession to train for regardless of their income or the income of their parents; the only limit is their own inclinations and abilities. That is why people in the Soviet Union do not feel deprived, resentful, they are neither at odds with the society they live in nor inclined to turn to crime.

Besides, the Soviet system of education, beginning with the kindergarten, instills in people a respect for the collective and the individual. Books and magazines, plays and films, art and television have one principal function—to educate harmoniously developed people who can combine their interests with those of society. All this helps erode both the social and psychological roots of crime in the Soviet Union.

QUESTION: What is the situation of mentally retarded, blind and deaf people in the Soviet Union? What chance do they have of getting jobs? (Jesse Bernal, California)

ANSWER: The Soviet system of educating mentally and physically handicapped children is supervised by the Institute of Defectology of the USSR Academy of Pedagogical Sciences.

When children with physical or mental defects reach the age of six, they are examined by a commission consisting of a defectologist, psychoneurologist, speech therapist, ophthalmologist and otolaryngologist. The commission decides which school they will attend.

There are schools for blind children and those with poor sight, for deaf children and the hard of hearing, for mentally retarded children, and for children with serious defects of speech and other functions. Many of them are boarding schools whose students receive full maintenance from the state. The level of education and the length of the course depend on the defect. Children with sight or hearing disabilities finish primary and secondary school in 12 years instead of the usual 10. Mentally retarded children take the primary (four-year) course for 12 years.

In addition to a general education, the children receive training in a trade. Physically or mentally handicapped young people who do not want to or are not equipped to attend college are given jobs. Thus, in Moscow School No. 30 mentally retarded girls are taught to sew and, when they graduate, go to work at a clothing factory. The boys learn the trade of fitter or joiner.

Jobs for the mentally or physically disabled are provided by the local Soviets (government bodies). Besides, the societies of blind and deaf people have their own enterprises, from small workshops to factories—furniture plants, for example. Many technical schools, universities and institutes have departments for the blind and the deaf. The June 1973 issue of our magazine carried an article about four graduates of a school for blind and deaf children who are majoring in philosophy at Moscow University.

Mentally or physically handicapped people, both those who work and those who do not, get state pensions.

QUESTION: What is required for college entrance in the Soviet Union? (A reader from Seattle, Washington)

ANSWER: The requirements boil down to the necessary interest and ability. Money is a secondary consideration because tuition is free, almost all students get stipends, and those who come from other cities are entitled to dormitory accommodations. Anyone who has received a certificate permitting him to leave school or who has a technical school diploma is eligible to take the entrance exams. Those who pass are admitted. If there are more applicants than vacancies, the exams are competitive. The admissions committees give preference to young people who have worked for at least two years (the passing grade is somewhat lower for them). Discrimination because of nationality, race or religion in admission to colleges and in employment is punishable by law.

QUESTION: What kind of music is popular in the Soviet Union?

ANSWER: All kinds: classical and modern, symphony and chamber, folk and jazz, Russian and the music of other nations and nationalities of the USSR, Western music, operas, operettas and musical comedies. Music of all centuries, from the Middle Ages to the present, and of all nations is played in our concert halls, and always to packed houses. However sophisticated the selections, you will find factory workers and collective farmers in the audience.

Music is very popular, and music education is generally accessible. In every town and, now, in the villages there are music schools where children are not simply taught to play the piano, violin, cello or harp, but where they study the history and theory of music.

ELIMINATING EPIDEMICS

Weapons of the Invisible Front

The World Health Organization (WHO) calls the Soviet Union one of the world's most fortunate nations as far as prevention of epidemics is concerned. Nonetheless, the USSR continues to turn out every year billions of vaccine doses for immunization against smallpox, plague, influenza, measles and other infectious diseases. It maintains a highly efficient antiepidemic service and does intensive research in this field. Professor Otar Andzhaparidze, director of the Institute of Virus Preparations of the USSR Ministry of Health, explains why.

IMMEDIATELY after the October 1917 Revolution the first efforts were made to reduce the incidence of epidemics. At the time, all of the world's infectious diseases could be found in our country, which covers one-sixth of the Earth's area. In czarist Russia millions of lives were lost every year to smallpox, cholera and diphtheria, and over 70 per cent of the people suffered from trachoma. One in four newborn infants died of scarlet fever.

What caused these epidemics?

Central Russia's impenetrable swamps had long been a breeding ground for malaria, its taiga forests for encephalitis, and the hot areas of Transcaucasia and the Volga region for cholera. From these sources of disease, given favorable conditions, epidemics would spread.

And such conditions were always present: Millions of people in the vast empire were victims of malnutrition and poverty, denied the most elementary domestic conveniences; for the majority of the population even running water was a luxury. Considering that Russia had no adequate public health service and there was a shortage of physicians generally, it becomes clear why practically every infectious disease in the book could be found there.

Each infection has its own character and requires a specific approach. The number of typhus cases went down in 1922, after the Civil War ended and the struggle against poverty, hunger, homelessness and slums got under way. Intestinal diseases were checked by strict controls on drinking water and other preventive steps. Smallpox, cholera, plague gave way before mass immunization.

But whatever the methods of dealing with one or another infection, success, in the final analysis, does not come without a complex of measures—both social and medical—applied on a countrywide scale.

Today teachers in Soviet medical institutes cannot find a fresh case of smallpox, plague or trachoma to demonstrate to students. Diphtheria and poliomyelitis have both become very rare. The majority of dangerous infections are known to the current generation of physicians from textbooks alone. However, the struggle against infectious disease is never-ending. No country on Earth can guarantee that its citizens are entirely safe even from diseases it has learned to control, because there are still infection sources in some parts of the world. In a matter of hours pathogens can be transported by plane across national boundaries, continents and oceans.

This is what happened in 1965 and again in 1970, when cholera bacillae were brought into the Soviet Union. The Sanitary-Epidemiological Service of the Ministry of Health rose to the emergency. This is what Dr. P. Favori of the French Ministry of Public Health said at the European Conference on Cholera: "For the first time in the history of cholera control, the Soviet Union has become a barrier to the spread of epidemics from east to west. There was not a single instance of cholera being transferred from the Soviet Union to its neighbors."

The experience with cholera demonstrated once again how enormously valuable a state-supported health service can be in the struggle against infectious disease. In this case, it permitted us to limit entrance to cities with isolated cases of cholera. Seemingly healthy people who might have had contact with the sick were sent to hospitals for examination. Their stay was paid for by the state.

Because sources of infection still exist in some parts of the world, the Soviet Government is continuing to appropriate large sums for the maintenance and improvement of the Sanitary-Epidemiological Service. This is an invisible front of which we become aware only when we are threatened by disease.

The Sanitary-Epidemiological Service watches not merely our own country, but others where epidemics may break out.

Most Soviet physicians have never seen a smallpox patient. However, our institute has a special laboratory for the detection of this formidable disease. The laboratory has become a reference center for the World Health Organization and provides aid in smallpox diagnosis to physicians of many countries. Planes bring the specimens taken from patients, and the physicians, some of whom live thousands of miles away, get an accurate diagnosis from Moscow by plane or telegraph.

In our opinion, infections will continue to be a threat until the natural sources of diseases are eliminated by the joint effort of all countries. The Soviet Union is committed to such combined effort. Thus, in 1956 WHO approved a program worked out by Soviet epidemiologists for wiping out smallpox throughout the world. Having summarized our own experience, we not only gave reasons for undertaking a complex of counter-epidemic measures, but also proposed to offer practical assistance: the vaccine which was instrumental in eliminating smallpox in our country.

The number of vaccine doses dispatched from the Institute of Virus Preparations to other countries runs into the billions. Every year we put at WHO's disposal over 150 million doses of smallpox vaccine. The vaccine is offered free to countries that need it.

Although we say that infections are no longer the main problem of the Soviet health service, some of them still give a great deal of trouble, both to health and to the economy. An example is influenza, which can affect whole continents.

In the last four decades a number of countries have been doing research on anti-influenza vaccines, but without perceptible success. The influenza virus keeps changing its properties with each new epidemic, so that vaccines quickly become obsolete. However, the new preparation developed at our institute may solve this problem since its manufacture takes eight to ten weeks, rather than a year. Thus, we are able to isolate a new type of influenza virus in August and have the vaccine ready for use by October.

In influenza epidemics the number of patients runs into the millions. Tests on the new Soviet vaccine show that it reduces the incidence of the disease by two or three times, has no harmful side effects even in one-year-old children, and lessens by more than 10 times the risk of the most fatal complication—pneumonia.

Influenza heads the list of infections that have not yet been effectively controlled. This is why numerous laboratories in the Soviet Union are studying the characteristics of the flu virus, the reasons for its variability, its relationship to the organism and possible methods of immunization.

Measles is another common health hazard. It has always been considered an unavoidable childhood ailment. There are methods of treatment, gamma globulin injections, for instance, but the disease weakens the child's organism and occasionally induces chronic illnesses.

Anatoli Smorodintsev, a member of the USSR Academy of Medical Sciences, developed a virus vaccine for immunization against measles. In 1966 mass vaccination was begun in the USSR. The Institute of Virus Preparations turns out 12 to 14 million doses of this preparation each year. It has reduced the number of measles cases to a tenth.

The antimeasles vaccine has won high praise from Hungarian health specialists, who have been using it for the past several years. We turned over manufacturing instructions and specimens of the virus from which it is prepared to the health services of Bulgaria, the German Democratic Republic and Rumania. All children in these countries now receive vaccination against measles.

Recently the state institute that controls drugs, including virus preparations, developed at Soviet laboratories authorized the production of another vaccine—for mumps. This ailment, while not as frequent as measles, is still a common childhood disease. The new vaccine is to be produced in quantity in the very near future. According to available evidence, it protects practically all vaccinated children against mumps.

IN 1922 a Moscow doctor, Leonid Isayev, wrote to his wife from Central Asia: "To rid these parts of disease will require the mobilization of vast scientific forces. Malaria is just one aspect of the trouble. The Bukhara people also suffer from the rishta, a huge worm that lives in subcutaneous tissue, while in the outlying areas the fatal kala-azar is rife. Skin leishmaniasis disfigures the faces of men and women. We cannot tolerate this scourge. We must set up an institute for tropical diseases in Bukhara."

Doctor Isayev was in Central Asia on an important mission. The Soviet Government had sent him to help the friendly Bukhara Republic fight a malaria epidemic. But instead of confining himself to malaria, the young doctor set to work on a whole series of local diseases. The letter to his wife contains what was, in effect, a long-term program. Doctor Isayev did set up the Bukhara Tropical Institute, the first medical research facility on a territory stretching from Guryev in the north to Kushka in the south, and from the gulf of Kara-Bugaz-Gol in the west to Lake Issyk-Kul in the east.

When the Uzbek Soviet Socialist Republic was formed (October 27, 1924), the institute was moved to Samarkand and renamed several times, but its basic purpose has remained unchanged over the last 50 years. This is how Isayev himself formulated its aims: "If mankind's progress is to be measured by the degree to which it eliminates

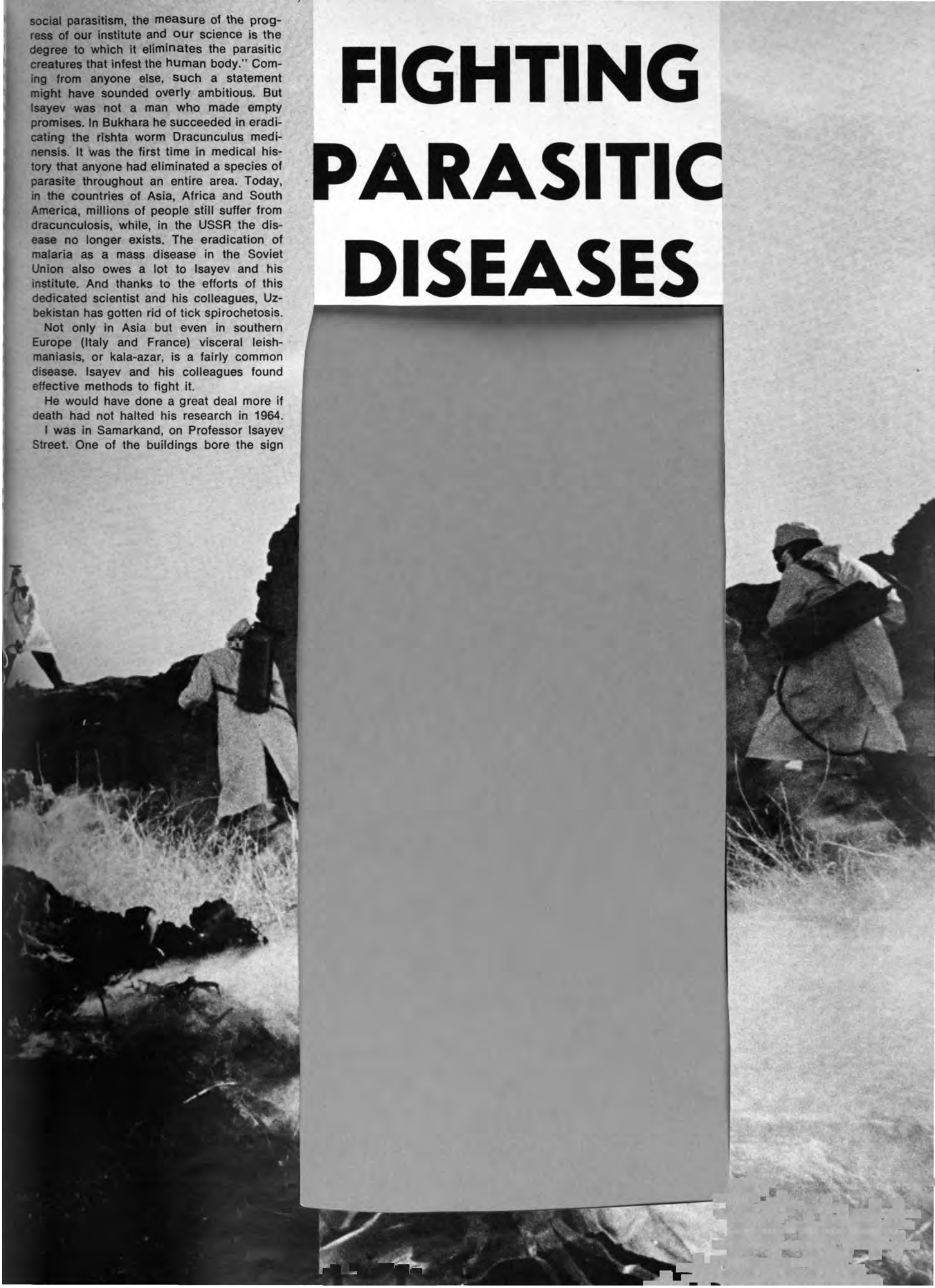
FIGHTING PARASITIC DISEASES

social parasitism, the measure of the progress of our institute and our science is the degree to which it eliminates the parasitic creatures that infest the human body." Coming from anyone else, such a statement might have sounded overly ambitious. But Isayev was not a man who made empty promises. In Bukhara he succeeded in eradicating the rishta worm Dracunculus medinensis. It was the first time in medical history that anyone had eliminated a species of parasite throughout an entire area. Today, in the countries of Asia, Africa and South America, millions of people still suffer from dracunculosis, while, in the USSR the disease no longer exists. The eradication of malaria as a mass disease in the Soviet Union also owes a lot to Isayev and his institute. And thanks to the efforts of this dedicated scientist and his colleagues, Uzbekistan has gotten rid of tick spirochetosis.

Not only in Asia but even in southern Europe (Italy and France) visceral leishmaniasis, or kala-azar, is a fairly common disease. Isayev and his colleagues found effective methods to fight it.

He would have done a great deal more if death had not halted his research in 1964.

I was in Samarkand, on Professor Isayev Street. One of the buildings bore the sign



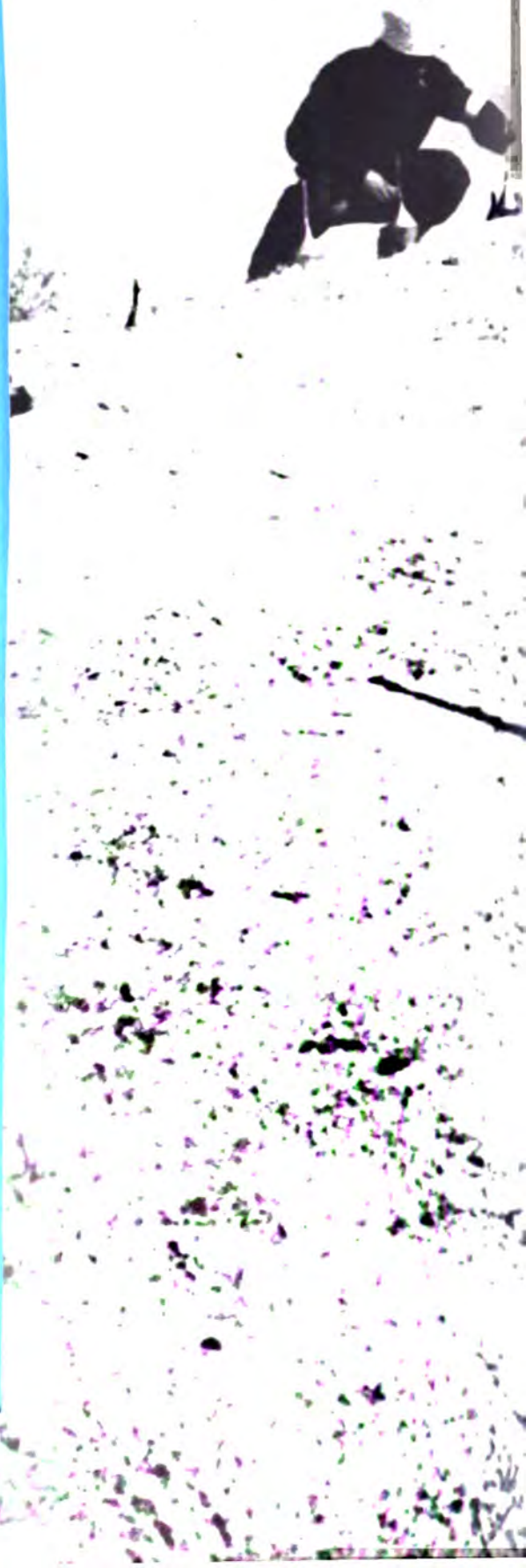
Long before many towns in Central Asia appear on the map, scientists from the Isayev Research Institute of Parasitology check and clean up areas infested with mosquitoes that carry diseases sick ge

"L. M. Isayev Research Institute of Parasitology of the Uzbek Republic." I had come to see this institute founded half a century ago, to find out who was continuing the work started by that remarkable man during the Revolution and the Civil War.

What strikes your eye first as you enter the spacious grounds are the many cars, trucks and minibuses. This fleet of vehicles bears witness to the institute's mobility, the readiness of its staff to dash off to wherever a focus of infection has been reported.

Central Asia, with its great empty expanses, is being developed at a fast rate. The geologists, builders and cotton growers inevitably affect the age-old relationships between the desert's animals and insects, the carriers of disease. The ecosystem is changing to include human beings.

For example, a mosquito feeds on the blood of sick gerbils and then invades a newly built human dwelling. Before long, danger of skin leishmaniasis, peshekhurda, as it is called here, threatens a young settlement on the edge of the desert.



But Professor Isayev's successors are as vigilant as he. Long before many of today's towns and roads appeared on the map, Vsevolod Ipatov with a team of workers explored the sites where settlers could expect to be bitten by a mosquito carrying disease from a sick gerbil. Thousands of gerbil holes and tens of thousands of mosquitoes were examined. The result was a detailed classification of all potential sources of skin leishmaniasis in Uzbekistan. Scientists predicted where the disease was likely to flare up and gave practicing physicians the weapons to fight it.

Many of these methods have proved themselves in practice. For instance, not far from Bukhara cotton growers irrigated a big chunk of desert, and at once peshekhurda appeared in the area. The usual thing, in such a case, was to plow up the gerbil holes and surround the settlement with a two-mile gerbil-free zone. This method had been used very effectively in the Hungry Steppe. In Bukhara, however, it had been a complete failure. So the new generation of disease fighters decided to tackle the problem differently. On the advice of the Samarkand institute, Olga Belozerova of the Bukhara Regional Sanitary-Epidemiological Station carried out mass immunization of the oasis dwellers. She used a vaccine obtained from a culture of skin leishmaniasis. The patients were under a doctor's care with a modified form of the disease and already out of danger. Where formerly there would have been as many as 700 leishmaniasis cases, after the immunization campaign was completed, there were only two. Today the institute staff is developing even more effective vaccines for use against skin leishmaniasis and other parasitic diseases. Doctors from many countries come here to learn. Recently the World Health Organization held a seminar at the institute on ways of fighting leishmaniasis.

Director Babakul Rustamov drew my attention to still another group of diseases the institute has been tackling: helminthiasis—worm infestations. In the 1920s and 1930s, when malaria and other epidemic diseases were taking a deadly toll in Central Asia, doctors could not be bothered with intestinal parasites. Modern studies have shown, however, that while these helminths may not kill their victims, they can do a great deal of harm—especially to children. Unfortunately, it is much more difficult to fight helminths than, for instance, malaria, since they are excellently adapted to man's internal and external environment.

The doctors got to work on the problem and set up a headquarters for controlling hymenolepiasis, the disease caused by infestation with the dwarf tapeworm. The staff included not only doctors, but representatives of mass organizations. Methods of diagnosis and treatment with the Soviet drug phenasal were worked out in minute detail. As a result of this determined campaign many thousands of people have been cured of tapeworm.

Still, complete victory over helminths is a long way off: Even if all infested people are cured, there will still be three times more tapeworm eggs left in the soil than there ever were in human bodies. Samarkand scientists are therefore working jointly with chemists from the Institute of Vegetable Substances on ways of cleansing the soil. More than 500 preparations have already been tried; many are quite effective. But before they could treat the soil, researchers had to know how long parasite eggs could survive in it—one year, two, perhaps five? As a result of that study, science was enriched by another important bit of information—that the eggs of ascarids can live in the earth as long as 10 years, and during the whole of that period they can infest human beings. Thus the search for preparations that will cleanse the soil must proceed simultaneously with that for helminthiasis cures.

Uzbek doctors have set themselves the goal of eradicating the fundamental causes of parasitic diseases. There is every indication that in time these dangerous enemies of human health will be eliminated completely.

Courtesy of *Soviet Union* magazine

Photographs by Yuri Shalamov
Soviet Union magazine

Flying is a popular sport in the Soviet Union. Lyudmila Gasyuk, a member of the Chkalov Central Air Club in Moscow, tells how she became a flyer.

ONLY IN FLIGHT

By Lyudmila Gasyuk

YESSENTUKI, where I grew up, is a small mineral spa in the Northern Caucasus, but it has a good flying club. Many of us spent every free moment we had at the club. We'd go there before school—as early as five in the morning—and right back after school. That was our class on wings! Some of my classmates came to the club as a result of books they had read; there are many interesting children's books written in our country about flyers and skydivers. Besides, we have a space tradition: Gagarin came from an air club, and Tereshkova was a skydiver.

For a year and a half I parachuted, made 280 jumps, every one different. At first you're happy just to make the jump, then you try to refine it: land right on the bull's-eye, in the center of a circle. That was even the subject of a club joke: In school we tried to get five, the highest mark, and in the club—zero!

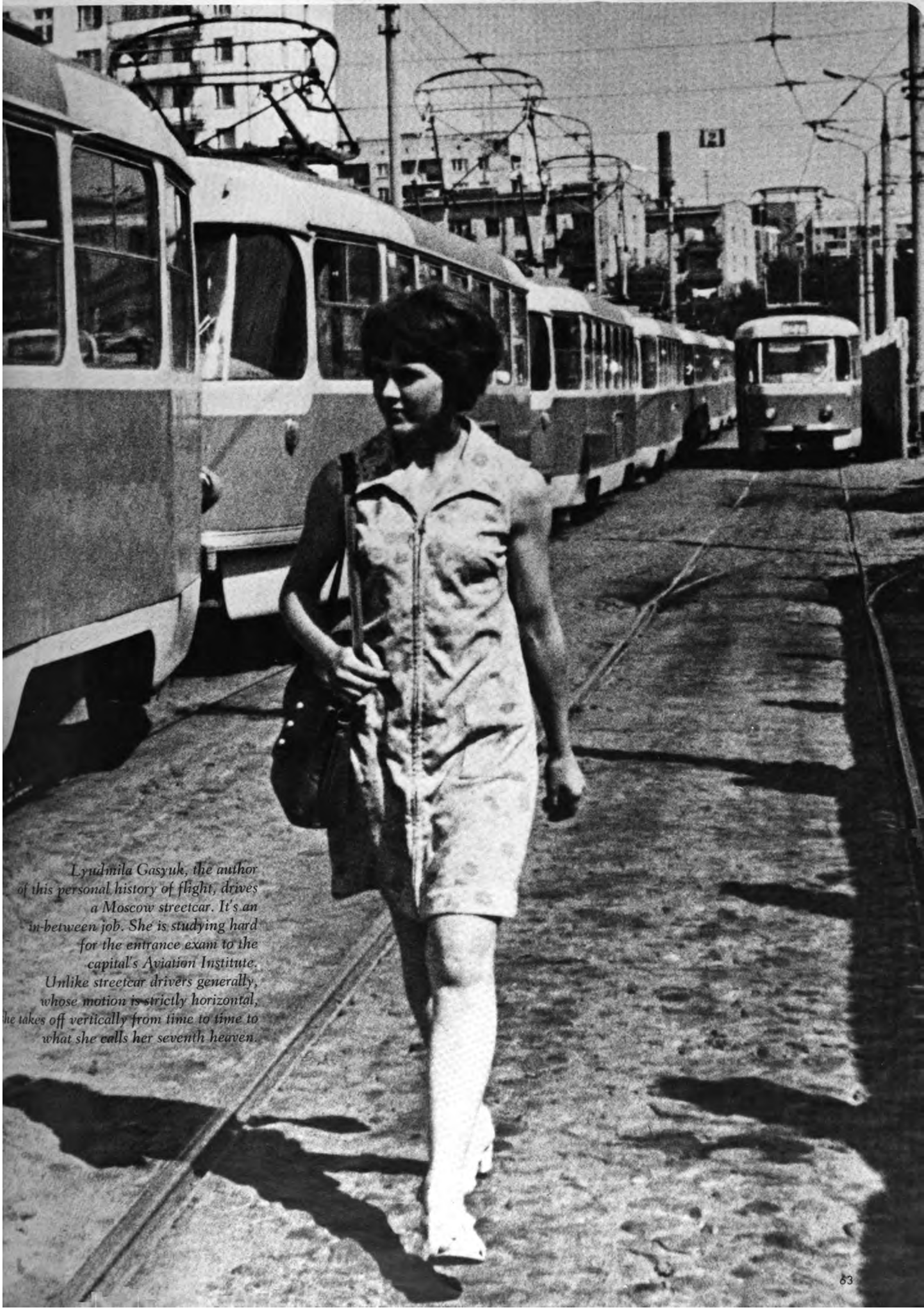
When I was 18, I took another stride into the sky—I flew a glider.

From Cloud to Cloud

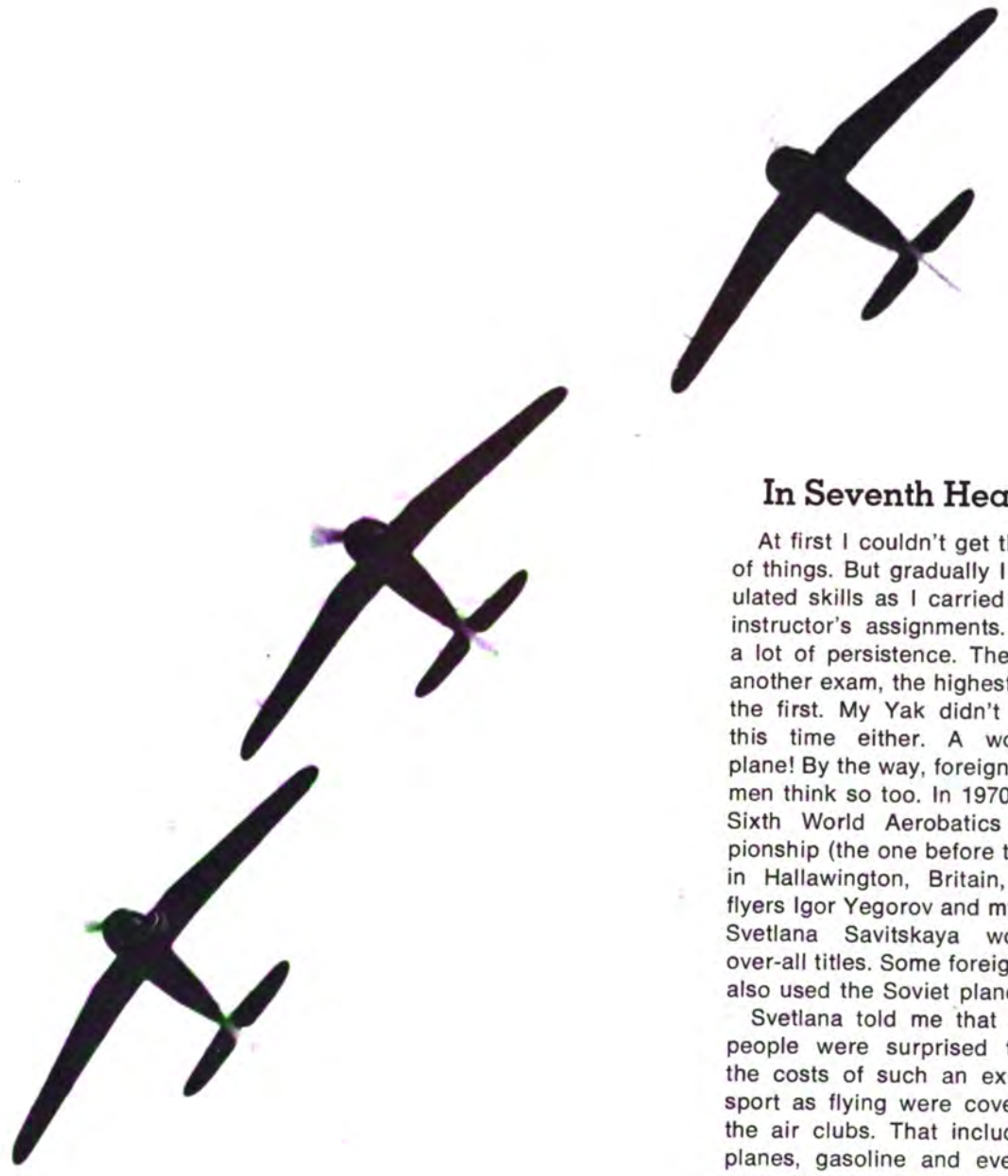
The glider is the closest thing to man's ancient dream of putting on wings. It's true you are lifted into the sky by cable, but after that you really fly. There is no engine on a glider so that you have to make use of the wind, the rising and falling air currents. Your ally is the clouds. They point to the rising drafts of warm air, the best for soaring. You hop from cloud to cloud.

However, it was not the parachute or the sailplane but the airplane that was my passion. A lot of Czechoslovak sports planes arrived at our club. By then I had finished a theoretical course, had trained a lot on an old machine under an instructor's guidance, and was ready for independent flight. I made my first solo flight on August 18, 1970, Aviation Day, a holiday in the Soviet Union. I was lucky—I got an excellent rating for that flight. It must have been that very day I made up my mind to enroll at an aviation institute, not only fly but build planes.

I went to Moscow for the competitive entrance exam but failed mathematics. I got a job and, of course, joined the air club in the capital. I began to fly a Yak-18p, a Soviet sports plane. That's when I reached seventh heaven, but it was not easy.



Lyudmila Gasyuk, the author of this personal history of flight, drives a Moscow streetcar. It's an in-between job. She is studying hard for the entrance exam to the capital's Aviation Institute. Unlike streetcar drivers generally, whose motion is strictly horizontal, she takes off vertically from time to time to what she calls her seventh heaven.



"It was not the parachute or the sailplane but the airplane that was my passion."

In Seventh Heaven

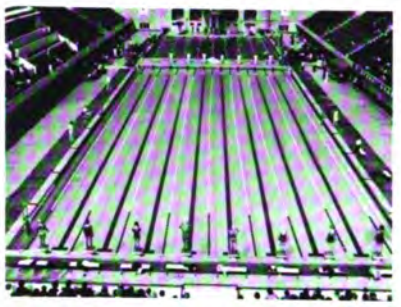
At first I couldn't get the hang of things. But gradually I accumulated skills as I carried out the instructor's assignments. It took a lot of persistence. Then came another exam, the highest rank—the first. My Yak didn't fail me this time either. A wonderful plane! By the way, foreign sportsmen think so too. In 1970, at the Sixth World Aerobatics Championship (the one before the last) in Hallawington, Britain, Soviet flyers Igor Yegorov and my friend Svetlana Savitskaya won the over-all titles. Some foreign pilots also used the Soviet plane there.

Svetlana told me that English people were surprised that all the costs of such an expensive sport as flying were covered by the air clubs. That includes the planes, gasoline and everything else. It's no accident that our contestants, for the most part, were not professional flyers; they included a miner, an engineer and student. By the way, Svetlana, a senior at the Aviation Institute, is helping me prepare for the entrance exam to this famous school.

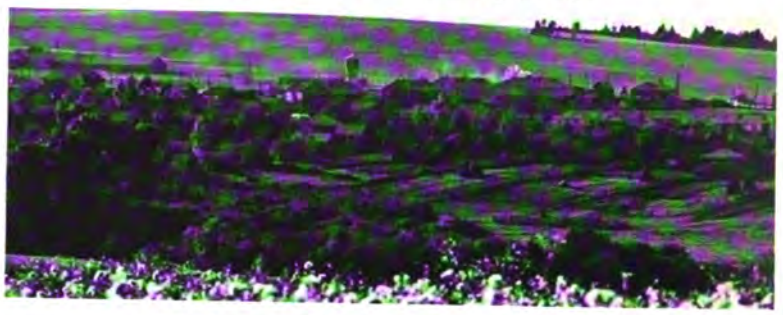
In the meantime I am working as a streetcar driver.

Very early in the morning, while the city is just awakening, I start on my route through Tushino, a new section of the capital, near the airport where we train. In clear weather I can see the red-winged Yaks taking off. From the air a special view of Moscow unfolds: the green of the landing field marked off with lines for takeoff and landing, the new residential districts, the clouds resting on the roofs of tall apartment houses. All this you see only in flight.

NEXT ISSUE



Despite its cosmic speeds, for most people the twentieth century is a "sitting" age. Futurologists have pointed out that this is the cause of widespread obesity and a number of diseases. The alternative, of course, is participation in sports and physical fitness programs on a mass scale. Typical of this emphasis in our country is Moscow, where some one million people go in for sports regularly. Olympic-scale meets are held there, and the showings often compare favorably with Olympic records. A group of articles describe physical fitness programs and facilities in the capital and in the nation generally.



On the Lenin State Farm in the Ural village of Toikino is a birch grove that once housed a tent colony of American tractor drivers. In 1922 members of the Friends of Soviet Russia Society came to the farm bringing American-made equipment to demonstrate how the yield of the former czarist lands could be increased. Farm people from miles around gathered to watch the Americans and their unfamiliar machinery. Today agriculture in this region is highly mechanized, as it is throughout the country, and the collective farm workers live in modern urban-type housing. An illustrated story about the farm as it looks now, and as it was 42 years ago.

The People's Theater of the Likhachov Auto Plant opened February 10, 1937, the centennial of Pushkin's death, with a recital of the poet's work. Each year since then it has staged a Pushkin program. The group has built a sizable repertoire that includes Shakespeare and Mark Twain. Often the company will write its own plays or adapt novels and poems. Recently the actors celebrated the thirtieth anniversary of *The Friends from Pittsburgh*—their version of *The Adventures of Tom Sawyer* and *Huckleberry Finn*. An article about the Likhachov company, one of the 1200 amateur theater groups throughout the country.

Special correspondent Vladimir Surkov of the newspaper *Izvestia* describes his experiences with a glaciological expedition of the USSR Academy of Sciences, which recently observed a mudflow that threatened to engulf a mountain village in the Pamirs.

A story about the breadbaskets of the Soviet Union, whose output is rising, especially in irrigated areas like the Volga steppes and the virgin lands of Western Siberia.

A section on American-Soviet cultural contacts tells about recent trips to the USSR by the José Limon dance troupe, American pianist Susan Starr and author Erskine Caldwell.

Late last year a group of U.S. astronauts arrived in the Soviet Union for another round of training for the joint Apollo-Soyuz flight. Their story appears in the April issue.

COMING SOON

Factory workers

Almost Spring
Photograph by Anatoli Yurin

SOVIET LIFE

PEACEFUL COEXISTENCE

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17. Mytishchi Shooting Range
18. Nogatino Sports Complex
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    volleyball
20. Kurkino Bicycle Path

APRIL 1974, No. 4 (211)

SOVIET LIFE

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LETTERS TO THE EDITOR

It is the business of a state to maintain and promote the well-being of its people. The czar's government failed in its obligation to the people and was rightfully abolished. And by a justified revolution the people established a new government whose task is the well-being of the people. The greatness of a people is the caliber of the man and woman constituting the membership composing that society.

In other words: That nation will have achieved its goal of greatness whose people all are highly educated and productive and ideal-minded.

I would love to know how much nearer is the Soviet socialist society in succeeding to build a greater, better, nobler man and woman, to make the better society, the hope of all mankind.

Meyer Chariff
Miami, Florida

While subscribing to SOVIET LIFE, I would like to make this brief note.

When the Soviet Photo Exhibition (USSR PHOTO-70) came to New York, it captivated me with an awareness of intelligence and beauty.

I have kept the USSR PHOTO-70 booklet *Soviet Union Today* as a souvenir. Well, reading, from time to time, the souvenir booklet (I enjoyed the photography best), I decided to write to SOVIET LIFE. Incidentally my two and a half year-old niece likes the picture of the baby in the blue walking suit, and Y. E. Maximova and V. Vasilyev of the Bolshoi Theater.

Daniel A. McMahon
Plainfield, New Jersey

In the last 17 years I have read many of your articles in SOVIET LIFE. The things I am most impressed by are the advances in technology which were stepped up very fast when Lenin came to power in 1917.

Keeping up with the rest of the world could not be done without great sacrifice. No American understands how the *people of Soviet Russia* have the *great strength and courage* to win this *long long* fight to lead the world in modern technology.

Your magazine proves that the Soviet Union is supporting an ongoing aviation program. Articles on history and archeology prove that it took 1000 years for your people to come together and form a great nation before Lenin put your people on another course or direction.

The picture *Zaporozhye Cossacks* shows one instant in the long struggle against many great enemies who tried to destroy them and they bore it with great spirit. The 1941 invasion was only one of the great forces your people have had to fight.

"The Letter from Antiquity" shows you are opening up a field of history that is little known in the West. The Greeks were one of the greatest cultures of all time.

Dan Burns
Omaha, Nebraska

people and events

USA City Officials in the USSR

Louis Wozar, president of the Town Affiliation Association, spoke for his delegation, which made a two-week tour of the USSR last July, when he said that the international atmosphere was favorable for friendly contacts between the cities of the USA and the Soviet Union. The group also included the chairman of the association's board of directors, Frederick W. Brittan; its vice president and the mayor of Santa Fe Springs (California), Betty Wilson; and its executive vice president Thomas Gittins.

Another group of American mayors and city officials was visiting the USSR at this same time. It was headed by the then president of the National League of Cities, Roman S. Gribbs, mayor of Detroit. After a talk with Moscow mayor Vladimir Promyslov in the Moscow City Soviet, Gribbs said: "What we Americans are always curious about are the progressive changes that have been made in other cities which we can adapt for our own use back home. I was particularly impressed by the way the city of Moscow is treating its waste—so that the water is returned to the Volga River basin as clear as it was when it was taken from the source. This is something that many cities in the United States are just beginning to do. Within the next 10 or 15 years we hope to achieve your level."

Allen Pritchard, Jr., executive vice president of the Cities organization, spoke of other concerns: "We have been very much impressed with the comprehensive plan for the city of Moscow—the major emphasis on housing and on transportation, both of which are critical problems for many of our major cities—and with the attention that is being given to providing both of these and at the same time preserving a reasonable amount of green space."

The visiting Americans met with officers and members of the Union of Soviet Societies for Friendship and Cultural Relations with Foreign Countries (SSOD) and of the Institute of Soviet-American Relations.

The deputy chairman of SSOD, Mikhail Peslyak, hailed the visits of both groups of Americans as an expression of the closer relations developing between American and Soviet cities and peoples.

Junior Farmers

Last October our country celebrated its annual Farmers Day.

Over-all agricultural achievement was announced, and the best farmers honored. There were awards to youngsters who helped their parents on the collective farms during school holidays.

Natasha Veretennikova won a machine-milking contest held in Stavropol Territory (the southern part of the Russian Federation). The contestants were all high school students.

Taxi Driver's Book

The second edition of *From the Taxi Driver's Seat,* by Yevgeni Ryzhikov, a Moscow hackie, sold out its hundred thousand copies within a matter of days.

Ryzhikov had nursed the idea of writing such a book for a long time. "I made a habit of jotting down interesting things that happened to me and other drivers. After the notes began to pile up, it seemed like a good idea to work them up into the story of our profession," he said.

The book has been entered in a contest sponsored jointly by the Union of Writers of the USSR and the All-Union Central Council of Trade Unions. The theme of the contest is the contemporary working class.

Port Vanino

Construction of the Soviet Far Eastern port of Vanino is in full swing. New piers and a storage area are being built in the timber export district. An industrial TV installation is going up, rail lines are being expanded and a new electric power station is nearing completion.

At the same time modern multistory housing is girdling the surrounding hill in terraces that drop to the sea, and, close by, there will be shops, schools, polyclinics and kindergartens. Higher up, at the top, stands the Palace of Culture; behind it are athletic grounds that include a stadium, indoor swimming pool and a sports palace.

Port Vanino will be one of the biggest harbors in the country. With other Far Eastern ports—Nakhodka, Vladivostok, Kholmsk and Nagayevo—it will play an increasingly important role in developing the rich mineral areas of the Soviet Far East.

PEACEFUL COEXISTENCE: LENIN'S CONCEPT, TODAY'S FOREIGN POLICY

By Georgi Zisman

WHEN VLADIMIR LENIN formulated the basic principles of Soviet foreign policy in October 1917, he concluded that the peaceful coexistence—or "peaceful cohabitation," as it was then called—of the capitalist countries and the first socialist republic was both possible and vitally necessary. That conclusion was rejected not only by the bourgeois world but even within the working-class movement itself. It was not immediately understood and aroused doubts and criticism.

It took half a century for Lenin's idea to win the support of the majority of the world population, for the principles of peaceful coexistence to be widely recognized by governments and nations as an objective necessity. The principles, said Leonid Brezhnev, General Secretary of the CPSU Central Committee, at the World Congress of Peace Forces in Moscow in October 1973, "are becoming more and more specific in content, and are gradually becoming generally accepted as a standard of international relations."

The experience of peaceful historical development, interrupted by bitter wars, proved the scientific verity and historical inevitability of Lenin's idea. It answers the interests of all nations, all countries that wish to avoid the horrors and misfortunes of destructive wars, of all who strive to strengthen international security, who work for mutually advantageous cooperation and economic and cultural contacts between countries.

The strength and correctness of Lenin's idea lies in its scientific nature, in its conformity with the real processes taking place in the world. Like all the teachings of Marx and Lenin, peaceful coexistence is not a brilliant guess or a wishful thought, but a thoroughly substantiated conclusion and an integral part of a profoundly scientific theory, the product of a close study of humanity's past and present development.

Even before the Great October Socialist Revolution in Russia Lenin had come to the conclusion that there would be a long historical period, a whole epoch of transition from the old social system to the new one, when the capitalist and socialist countries would live side by side.

This conclusion was confirmed by history after the first socialist state was formed in 1917. For almost 30 years the Soviet Union was the only representative of the new, socialist system and consistently pursued its peaceable, democratic foreign policy in an atmosphere of ill will and hostility created by the Western countries.

After the defeat of the Nazis in the Second World War a new stage of development began. Other countries chose socialism, and it became a world socioeconomic system. The coexistence of the two systems, socialism and capitalism, became an objective necessity.

One of Lenin's great contributions was that he indicated the only wise, the only possible, course of international relations in the era of the existence of the two world systems.

The Revolution and Peace

From the moment the Soviet state was founded, Lenin perseveringly advanced his policy of peaceful cooperation with the capitalist countries. On the day of the triumph of the Socialist Revolution, October 26, 1917, he made his Report on Peace to the All-Russia Congress of Soviets of Workers' and Soldiers' Deputies. It was his first public address after the Soviets took power. In this report and in his Decree on Peace, he declared the struggle for peace to be the main task, the general line of the foreign policy of the Soviet Government, and urged all belligerent countries to begin immediate negotiations for the conclusion of a just and democratic peace, a peace without annexation or indemnities.

As the head of government, he took every opportunity—public speeches, talks with foreign diplomats and journalists, official documents—to underline the peaceful nature of Soviet Russia's foreign policy. The resolution of the Seventh All-Russia Congress of Soviets, which met in Moscow in December 1919, written by Lenin himself, stated:

> "The Russian Socialist Federative Soviet Republic wishes to live in peace with all peoples and devote all its efforts to internal development in order to establish the smooth running of production, transport and government affairs on the basis of the Soviet system; this has so far been prevented by the intervention of the Entente [1] and the starvation blockade." [2]

In its first years, the Soviet state had to defend itself in a bitter, sanguinary war, to repel the attempts of reaction at home, supported by foreign imperialist forces, to overthrow the power of the people and restore capitalism. For almost three years a civil war raged on the huge territory of the former Russian Empire. During this whole period Lenin and the Soviet Government declared time and time again to the peoples and the governments of the world that Russia wanted peace. To solve the chief and most difficult task of the Socialist Revolution, the task of the restoration and development of the national economy, to build a new life, "we need peace, a firm and lasting peace," he said.

The united forces of the home and foreign counterrevolution were routed by the Red Army, the armed forces of the workers and peasants. And as soon as the war ended and a period of peaceful coexistence of the Soviet Republic with the bourgeois countries set in, Lenin defined the aim of its foreign policy:

> We shall do our utmost to preserve peace in the future . . . having started on our work of peaceful development, we shall exert every effort to continue it without interruption.[3]

Here is manifest evidence that the peace policy of the Soviet Union and all socialist countries is not a temporary, transient phenomenon and not a tactical maneuver. It derives from the vital interests and needs of the peoples of the socialist countries, from their aspirations to increase their material well-being as soon as possible, to build socialism and communism, from the conviction that their chosen path is the right one.

Cooperation, an Integral Part

Lenin repeatedly pointed out that in the major imperialist countries there were statesmen and businessmen who, viewing events realistically, were interested in cooperation and in normalizing relations. In this connection, he emphasized, it was not without reason that the attempts of the reactionary circles of the West to isolate

[1] The alliance of Britain, France and czarist Russia, formed in 1907 to counterbalance the alliance of Germany, Austria-Hungary and Italy. The formation of these alliances was dictated by the desire to recarve the colonial possessions and led to the First World War of 1914-1918.

[2] Vladimir Lenin, *Collected Works*, English edition (Moscow: Progress Publishers, 1965), vol. 30, p. 231.

[3] *Ibid.*, vol. 33, pp. 149, 151.

Soviet Russia were hopeless and that the economic blockade of the Soviet Republic did direct damage to these countries themselves. In December 1921, at the Ninth All-Russia Congress of Soviets, he said:

> As for the blockade, experience has shown that it is an open question as to who suffers from it most, the blockaded or the blockaders.[4]

And a little later in a speech to the All-Russia Congress of Metalworkers, Lenin, referring to the business representatives of the countries that had invited a Soviet delegation to the Genoa economic conference, said:

> We know perfectly well that by no means all of you want to fight.[5]

But peaceful coexistence means more than the preservation of peace between states with different social systems, although it is indisputable that rejection of war as a means of settling differences is the decisive factor here. An integral part of this policy is the recognition of the possibility and the necessity for cooperation. In his very first speech on the foreign policy of the Soviet Government, in the very Report on Peace mentioned before, defining the attitude of the new government to the treaties concluded by czarism and the bourgeois Provisional Government, Lenin said:

> We reject all clauses on plunder and violence, but we shall welcome all clauses containing provisions for good-neighborly relations and all economic agreements; we cannot reject these.[6]

In the first years of the Soviet state, Lenin and his comrades had to defend the concept of cooperation with the capitalist countries—the necessity for establishing, through treaties, mutually advantageous relations with them—not only in polemics with anti-Soviet ideologists but also with opponents of this policy in the ranks of the Russian Communist Party. A grouping of so-called "left Communists" opposed the peaceful policy of the Soviet Government, criticizing it particularly for pulling out of the imperialist world war and concluding the Brest-Litovsk peace with Germany in March 1918. Ridiculing their position as unrealistic, Lenin wrote:

> A socialist republic surrounded by imperialist powers could not, from this point of view, conclude any economic treaties, and could not exist at all, without flying to the Moon.[7]

But in coming out for cooperation—political, economic and cultural—Lenin insisted that it would be successful and fruitful only if there were strict respect for the sovereignty and territorial integrity of all countries; noninterference in their internal affairs; unconditional recognition of the right of every nation to settle independently the problems of its internal life and its political and economic system; equality in relations between countries and consideration of the interests of the cooperating partners; recognition that mutual advantage is an imperative condition of economic cooperation and international trade; strict adherence to treaties and commitments undertaken.

In this connection he warned more than once that economic, cultural or diplomatic cooperation becomes impossible if it is hedged about with conditions that permit interference in the internal affairs of the Soviet Republic.

Lenin regarded the economic relations of the Soviet Republic with capitalist countries as an objective historical necessity. In his last speech before the Eleventh Congress of the Russian Communist Party in 1922 he developed this thought:

> The fact of the matter is that the most urgent, pressing and practical interests that have been sharply revealed in all the capitalist countries during the past few years call for the development, regulation and expansion of trade with Russia. Since such interests exist, we may argue, we may quarrel, we may disagree on specific combinations—it is highly probable that we shall have to disagree—this fundamental economic necessity will, nevertheless, after all is said and done, make a way for itself. . . . We can say with a fair amount of certainty that regular trade relations between the Soviet Republic and all the capitalist countries in the world are certain to continue developing.[8]

In this connection he stressed:

> There is a force more powerful than the wishes, the will and the decisions of any of the governments or classes that are hostile to us. That force is world general economic relations, which compel them to make contact with us.[9]

The present state of international relations serves as one more proof of the validity of Lenin's theses. But the concrete embodiment of his theses, correct as they were, required long and persistent efforts. Lenin's ideas on international cooperation have formed the basis of the country's foreign policy at all its stages. In the first years of the Soviet state, in the period preceding the Second World War and in the cold war period which followed, the efforts of Soviet statesmen and diplomats were concentrated on the implementation of the Leninist principles of peaceful coexistence, on ensuring the just and democratic peace Lenin called for, a peace founded on respect for the rights and interests of all nations.

In recent years a profound and qualitative change has been taking place in the minds of men all over the world, in the activities of statesmen and parliamentarians in the majority of countries. Regarded from the aspect of the struggle between the ideas of peace and the ideas of militarism, the essence of this change lies in the recognition, full or partial, that peaceful coexistence is the only realistic approach to international relations in the present-day world. This change in sentiment is finding practical expression in the changed relations between countries. Its direct application in international life is the present shift from cold war to détente, from military confrontation to peaceful cooperation.

Now, when prospects for the preservation of world peace are more hopeful, when the danger of a world nuclear-missile war which threatened mankind for almost a quarter of a century has lessened, the Leninist principle of peaceful coexistence is becoming a generally accepted standard of international life. That, to a considerable extent, determines the course of events. It explains the turn toward constructive cooperation of the socialist countries with the countries of Western Europe: France, the Federal Republic of Germany, Italy and a number of others. Concrete examples of these changes are the treaties concluded by the Soviet Union, Poland and the German Democratic Republic with the Federal Republic of Germany.

The change in the relations of the two superpowers, the United States and the Soviet Union, has a tremendous influence on events. The visit of the President of the United States to the Soviet Union in May 1972 and the visit paid by Leonid Brezhnev, General Secretary of the CPSU Central Committee, to the USA in June 1973 paved the way for the transition from confrontation to détente, from cold war to mutually advantageous cooperation. There is no doubt that considerable difficulties still lie ahead, no few obstacles still have to be overcome, but a solid foundation has been laid for continuing the positive dialogue hailed by all peace-loving people.

The effectiveness of Lenin's principle of peaceful coexistence is confirmed by the fact that more and more Western statesmen are showing a desire to break through the cold war inertia, to join the peaceful dialogue with the countries of socialism. In the struggle under way in the Western countries between the champions and opponents of détente, more authoritative voices are being raised by those who have a sober and realistic approach to the basic problems of the present-day world and accept the idea of peaceful coexistence, not only as an attractive slogan, but as a practical foundation for relations between countries.

The Soviet state expresses the will of its people for a stable peace. Three years ago, at its Twenty-fourth Congress, the Communist Party of the Soviet Union advanced a comprehensive peace program, which met with the approval of all peaceable people. This program is being carried into effect persistently; it is no accident that it has become known as the "Soviet peace offensive" in the West.

It outlines a feasible way of eliminating the hotbeds of tension in all areas of the world, of freeing mankind from the specter of a thermonuclear catastrophe. It leads to a stable and irreversible détente.

[4] *Ibid.*, p. 152.
[5] *Ibid.*, p. 220.
[6] *Ibid.*, vol. 26, p. 255.
[7] *Ibid.*, vol. 27, p. 71.
[8] *Ibid.*, vol. 33, p. 265.
[9] *Ibid.*, p. 155.

Members of the Apollo crew visited the Soviet Union at the end of last November. Their trip was another stage in the preparations for the joint American-Soviet space flight.

THE APOLLO CREW IN MOSCOW

THE STAY of the American astronauts in the Soviet Union divided itself into two more or less related parts: work and sightseeing. The first consisted of studying the Soyuz spaceship, listening to lectures, viewing technical films and going over flight documents. The astronauts were shown the equipment at the Cosmonaut Training Center, including the simulators used by Soviet spacemen, which are as close as you can get to actual flight. Much attention was given to language study, and everybody took a great interest in the joint sports program.

The diverse activities and classes involved many others besides the future Soyuz and Apollo crews. It gave specialists at the Cosmonaut Training Center their first practical experience with a joint project.

Spaceships, like planes, have fundamental similarities that make it easier to get acquainted with another country's craft. But there are, of course, decided differences between the Soyuz and Apollo, and these differences were the subject of special study by the Americans.

Apparently the commanders lead their crews in language study, as well.

The training and meetings over, some of the Soviet specialists were asked to comment on results.

Academician Boris Petrov, Hero of Socialist Labor, Chairman of the Intercosmos Council, USSR Academy of Sciences:

"The present meetings have gone beyond getting acquainted with unfamiliar equipment. They required that the crews take a good look into the principles behind the systems and understand the why of their operation. We feel we've accomplished this —we're very pleased with the progress."

Vladimir Timchenko, a representative of the Soviet technical director:

"We are now elaborating and coordinating documents that I would call functional, for example, the plans for testing different systems and the work schedules of the ground control centers. Recently the Johnson Space Center in Houston ran a dynamic docking test of the American and Soviet systems, but there was no discussion of docking units during the meeting. Both the American and Soviet directors of the project are devoting their attention to planning classes and training sessions for the crews.

"On the whole, the work of the Soviet and American sides is proceeding according to schedule, what we call first-level schedule. This applies also to the experimental work, which has kept up with the agreed deadlines."

Valeri Kubasov, cosmonaut, Hero of the Soviet Union:

"In July 1973 we visited the USA and attended lectures on the theory of the Apollo design. The American astronauts were on a similar mission to the Soviet Union, studying the Soyuz. The first item on the agenda of these visits was a theoretical acquaintance with the other country's spaceships. Joint training directly on simulators will be next—in Houston in July and Stellar Town in September.

"One of the problems now is language. The two countries use different terminology in space research—for the design of ships and on-board systems, and so on. We are working out a single technical terminology.

"Personal meetings and regular contacts are of great importance for the participants in the forthcoming joint flight. I thought the visit was particularly useful in that regard."

On the eve of the American astronauts' departure for home, our correspondent Alexei Gorokhov put a number of questions to Vance Brandt, a member of the first Apollo crew, and Alan Bean of the second Apollo crew.

With what feelings are you leaving Moscow?

Brandt: "I found my first trip here very pleasant. I made a good many friends and saw a number of interesting things. What impressed me most, I think, were the museums, the Kremlin and some of the old cities we visited."

Bean: "I have just been to the Soviet Army Museum. It gives an excellent picture of the history of the Soviet people from the end of World War I—the Revolution—to the present. I realized there that the Soviet people are highly interested in their country's past. Since we are going to be working so closely with the cosmonauts, I think it is important to understand Soviet history. I can see now that the Russians I have met here are very heroic types, stoic and strong. These museums tend to convey that picture."

What are your impressions of Stellar Town and the equipment at the Cosmonaut Training Center?

Brandt: "It's a very modern city. I was impressed by the fact that there is so much construction going on and that you have such good facilities there already for training cosmonauts. The Soyuz is an excellent spaceship."

You visited Kaluga, the home of pioneer space scientist Konstantin Tsiolkovsky, and

The sightseeing was no less intensive than the working part of the visit. It included trips to the ancient Russian cities of Vladimir and Suzdal, a tour of the Moscow Kremlin, meetings with well-known Soviet stage people at the All-Russia Theater Society and, of course, a visit to ancient Kaluga, where Konstantin Tsiolkovsky, the founder of modern cosmonautics, worked and lived and where the Museum of the History of Cosmonautics is situated.

That city on the Oka is 110 miles from Moscow. In the museum Eugene Cernan, with Alexei Leonov as guide, went through the Vostok spaceship, the first manned space vehicle. Alan Bean must have used a half mile of film in Kaluga.

"Any country would be proud of a museum like yours," General Thomas Stafford, leader of the U.S. astronaut team, said later. Stafford's Russian, incidentally, is quite good —he has been studying the language of his future partners for five months. Alexei Leonov's English is also up to expectations.

Moscow reporters interview the American and Soviet spacemen after their meetings.

saw the Museum of the History of Cosmonautics. Will you comment on that trip?

Bean: "I wanted especially to see the museum because I had heard about Tsiolkovsky long ago, when I first became interested in space. He is well known in our country. I was also curious about the exhibits of the automatic spacecraft that had orbited the Moon and taken the first pictures, investigated Venus and soft-landed a capsule on Mars. I thought they were beautifully displayed. I had my camera with me, and I hope the pictures come out because they're very good."

Brandt: "The cosmonautics museum was one of the high points of the trip. I don't think we have anything yet that is comparable. It's a good way to preserve a record of the early history of space flight for our children."

Where were you on April 12, 1961, when Yuri Gagarin made his flight?

Bean: "I was in Jacksonville, Florida, at the time. I wasn't surprised, because when you launched your Sputnik, I knew it would not be long before you put a man in orbit. As a pilot myself, I was elated. Pilots all over

Time out for recreation in a busy work program in preparation for the joint flight.

the United States felt good for him and wished they could be there with him. We wanted to join the space program, too. There were some astronauts training, but I wasn't one of them."

How do you appraise the meetings with Soviet spacemen?

Brandt: "I'm enthusiastic about our joint flight. We have a very good mission coming up, and I feel I've got more than enough energy for the job."

Bean: "Alan said it for me."

There are two trends in space research—the use of automatic craft and of manned ships. Which is your choice?

Brandt: "I think we need both. Some projects turn out best with automatic craft. An example is weather satellites, because they must stay in orbit sometimes for years and observe the atmosphere through cameras on a regular daily basis. Other flights call for manned craft. Space stations, for instance, need people to conduct a large variety of experiments, to study the Earth and the Sun, and to handle unexpected failures that may occur, as you could see with the Skylab.

"So it turns out that both methods are useful. The Soviet and American space programs have both, and I think we will continue in this direction."

A visit to the State Museum of the History of Cosmonautics in ancient Kaluga.

On to Stellar the Amer try some spac

Soviet cosmonaut Alexei Leonov (far right) doubled as guide on a tour of the museum exhibits.

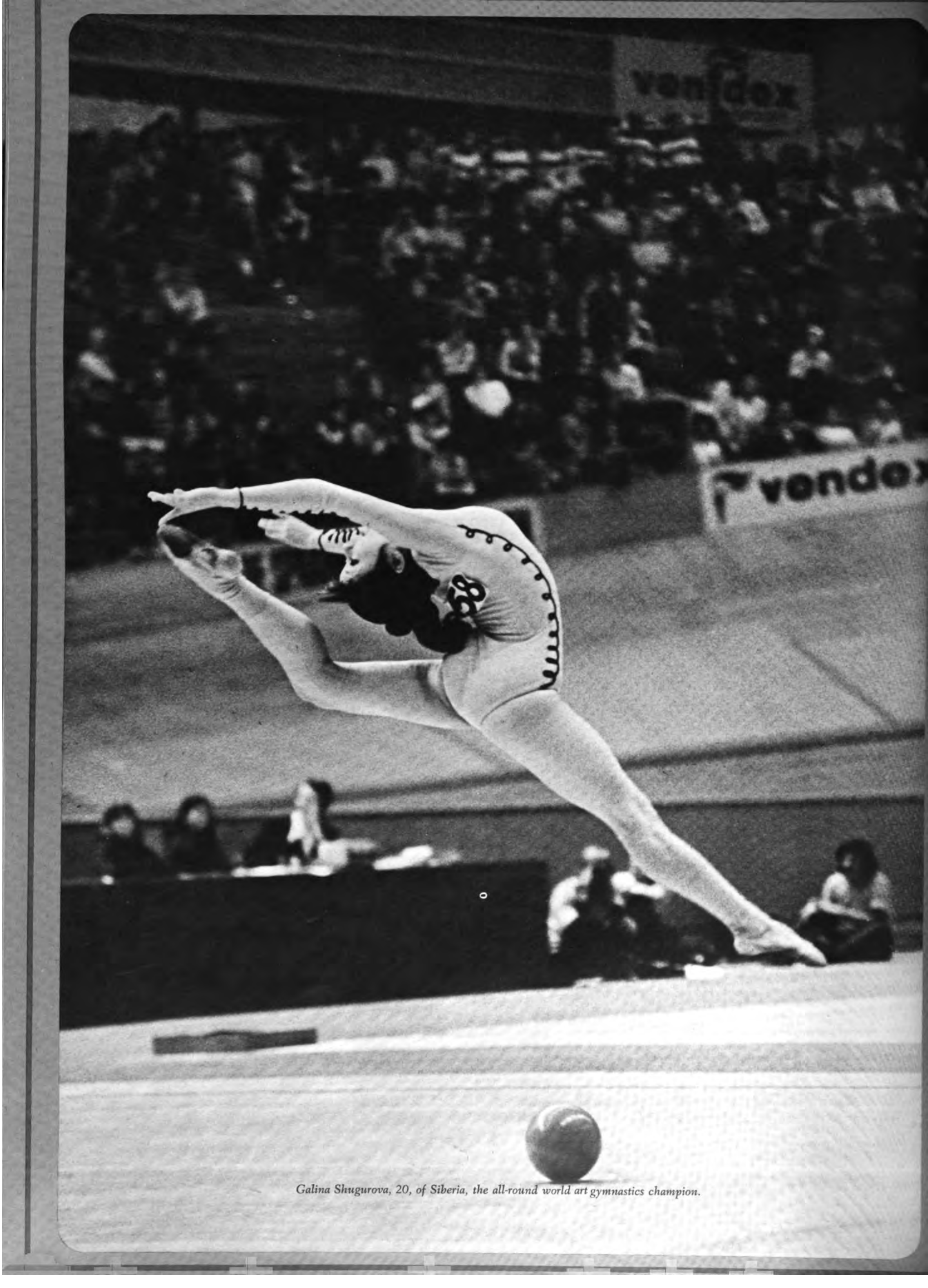
Would you like to take part in a joint mission to, say, Mars?

Brandt: "I hope that someday our cooperation will expand to include other joint missions, to places like Mars. Of course, any project of that size would probably require the cooperation of several countries.

What will you say about this trip when you get home?

Brandt: "That the Soviet cosmonauts are a great bunch of guys. We've come to know each other and get along very well. I have the greatest confidence that the joint flight will strengthen the friendship between the United States and the Soviet Union."

Bean: "Your country is much more attractive and enjoyable than I had imagined. People are friendly here and easy to get along with. It's one of the most fascinating places I've been to. When I get home, I'm going to tell my friends about my new impressions of Russia and the Russian people. I think it will change a good many concepts. This is a beautiful country, and I'm glad that we will be working together."



Galina Shugurova, 20, of Siberia, the all-round world art gymnastics champion.

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**Moscow is sports-minded.
Last year 227 of its young men and
women became USSR champions
and 80 won world and European titles.**

SPORTS IN MY LIFE

Mikhail Gromov, Hero of the Soviet Union, Honored Master of Sports, test pilot

I've been a physical culture addict from early childhood. Way back when I was a little boy, my father introduced me to the trapeze and the dumbbells.

I went in for outdoor games like *lapta* (a Russian ball and bat game), soccer and volleyball, and running. All this developed my muscles and coordination and gave me the self-confidence later to fly a Farman-3 plane on my own before my friends in an aviation club had the nerve to.

There's no denying that physical culture has been something of a fairy godmother for me all my life. Not only did it put me in that plane; I could count on it to be a reliable companion on the most hazardous flights.

Let me give you an example. I remember testing one of our new planes in 1927. It turned out to be quite unpredictable, and I went into what pilots call a flat spin. On the twenty-second spin, when I knew the situation was hopeless, I parachuted out of the plane. I wouldn't be here to tell the tale if it were not for my background in physical culture and sports. I had to muster every bit of strength I had to leave the plane, which was pointing inexorably toward Earth (at the time there were no catapults). They told me it was the first parachute jump from a spinning plane.

Now I like watching soccer and ice hockey. But I don't intend winding up just a spectator. I always start the day with exercises and a good jog. And when I can, I also do some swimming.

Alexander Dmitriyev, fitter at the Vladimir Ilyich Electromechanical Plant in Moscow

I grew up in the thirties. They were tough years for our country, but sports were a big thing. Especially for teenagers. I went in for gymnastics and ice hockey, and soccer, of course—for us youngsters soccer was the king of sports. No boy today could imagine how and where and in what outfits we used to play. Stadiums, sports grounds, goals, real boots? They didn't exist for us, even in our dreams. Things are so different today.

Why do I value sports so much? Because they have helped me. During the Second World War I suffered terrible wounds—my central nervous system was affected and I lost my hearing. I was given up by the doctors, a hopeless case, bedridden for life. I was left to help myself: I started to move one finger, then another, I would raise my hand an inch and then rest an hour. I worked up a program of physical exercises and kept on, day after day, getting one muscle after another to move. In three months I could run. I forgot all about being a chronic invalid. I went back to the front and ended the war as a senior lieutenant.

Today, in my fifties, I still play volleyball, do some running, and ski and skate all winter. Whoever thinks that manual labor is a substitute for physical culture is mistaken. Quite the opposite. The more tired I get at work, the more I train to get over the fatigue.

Igor Kio, magician, winner of an international magician's prize

Before becoming a magician, I had to learn the simple fact that practice makes the performer. All the miracles we bring to pass in the circus, all the bright colors, dazzling costumes, everything the spectator sees and everything that makes him love what we do is only the proverbial tip of the iceberg; underneath is the sweat and the tears the audience never sees. All my experience tells me that the skill of the circus artist demands physical strength and good form. That's where continuous and regular sports activity comes in.

Our circus does in fact have a long sports history. It was in the circus that the talents of sports stars Vladimir Zamotkin and Yuri Bykovsky really blossomed. They were at one time national acrobatic champs. The famous animal tamer Walter Zapashny was a circus acrobat for some years. He also qualified for the Master of Sports title in weightlifting, gymnastics and diving.

I wish I could add my name to the list, but I didn't get involved in sports to any degree. Most circus artists begin working in the arena at a very early age. I knew as a very young child that I would follow in my father's footsteps—he was a circus magician. My interests at the time were limited to school, the circus and soccer. But soon I had to give up regular practice in my favorite sport, I had to go on tour with the circus from one place to another. But I haven't given up soccer. On tour we try to arrange friendly games between the circus team—I'm the captain—and local teams. We get a lot out of these soccer games. The change in activity helps us relax from the nervous strain of performing.

Yakov Belopolsky, head of an architectural office, winner of the Lenin and State Prizes

We are living in a time of tremendous psychological strain, whether our work is in industry, science or art. Sports and intellectual endeavor are, I am convinced, mutually supportive, interdependent. Sports are an absolute must for a stable personality. No other activity helps so much to relieve the stress and strain of the age.

In my younger days I went in for many sports. But my love of chess had the greatest effect upon me. It taught me to think, to plan ahead. A game of chess became a mental exercise, developed in me the gymnastics of three-dimensional thinking—indispensable for an architect.

I like soccer, it gives me an esthetic pleasure. I am no worshipper of fantastic records. Much more important, I believe, is the mass enjoyment of sports. I don't care much for the kind of basketball game where supergiants toss the ball into the basket with no effort at all. The score seems to become the sole aim of the game, and the excitement is completely gone.

Our era must emphasize a continuing and well-rounded physical development. We architects have an obligation to participate in that purpose; we must design and build sports grounds, swimming pools, gyms close to where people live, literally in their own back yards.

Alexander Gitalov, head of a tractor brigade, twice Hero of Socialist Labor, Deputy to the USSR Supreme Soviet

Farming is no occupation for the weak or the sickly. Generally speaking, we farmers can't complain about our health. Those who work the soil, like Antaeus, seem to gather strength from it. However, while nature has taken care to give us good health, it's up to us to nurture it. And nature's best helper is physical culture and sports.

I don't think I have to go into what harvesting involves. The work and the fruits of a whole year can hang on one short hour. That is when the machine operator needs triple stamina and strength, he must call upon the tremendous amount of energy he has stored up. Regular sports training will build up that reserve. My tractor-driver friends and I have been put to the test more than once.

I do my daily dozen regularly in the morning or, rather, at dawn. I'm an early bird and get up before the sun does. I love *gorodki* (Russian skittles) and volleyball, and we have pretty good courts in the village. There is also an excellent soccer field. I'm a little too heavy now for the game, but the younger fellows keep chasing after the ball way into the evening. We have a new coach at the farm who's good at many sports. A lot of the boys from my tractor brigade train with him in gymnastics, volleyball and cycling. I don't have to worry about them, they stay in shape.

Figure-skating pair Irina Rodnina and Alexander Zaitsev. Below, an aspiring but still wobbly duo.

With Alexei Ulanov, Irina Rodnina has taken top honors four times at European and world championships and won the gold medal at the 1972 Olympics. Since spring 1972 she has been skating with Alexander Zaitsev. In 1973 they placed first at the world and European championships.

Children's Figure-Skating School

By Irina Rodnina

Olympic, World and European Figure-Skating Champion

HIGH SPEEDS and giddy leaps, graceful movements, music, sparkling ice—that is figure skating. But how much energy goes into the training for this beautiful spectacle?

In our country figure skating is one of the most popular winter sports. Thousands of girls and boys train at the many rinks.

Soviet figure skating is world famous and so are the leading skaters: Lyudmila Smirnova and Alexei Ulanov (pair skating), Lyudmila Pakhomova and Alexander Gorshkov (ice dancing), Sergei Chetverukhin and Yuri Ovchinnikov. They have won repeatedly at world and European championships and at the Olympics. I'm happy that I too have been able to contribute to this sport.

The figure skater's career begins at the children's skating schools, whose number is increasing from year to year. There used to be only two main figure-skating centers — Moscow and Leningrad—but at the recent junior championships youngsters from Sverdlovsk, Kiev, Kirov, Kazan, Tallinn, Gorky and other cities competed. Over 60,000 children now go in for figure skating.

These are some of the 300 four- to ten-year-olds in the children's figure-skating school of the Soviet Army Central Sports Club. To get into the school, you have to be physically fit, supple, and have a good sense of rhythm. Left: Irina Rodnina enrolled at the school when she was six. Here she is

The future skaters I am going to tell about attend the children's skating school at the Soviet Army Central Sports Club. I began studying there at the age of six and still train at its rink.

Applicants to the school must pass intensive tests for physical fitness, musicality, rhythm and plasticity. Skilled specialists train the children, among them Stanislav Zhuk, a former figure skater, silver medal winner at three European championships and the best coach in the Soviet Union; Alexander Gorelik, silver medal winner at the 1968 Olympics; and Victor Ryzhkin, several times the champion of the USSR. Choreographers, composers, musicians and costume designers create the compositions and plan the programs.

At the disposal of the students are all the necessary equipment, facilities and medical services. The tuition fee is a token five rubles a month; after two years instruction is free.

It's not easy to become a good figure skater; both the students and coaches must follow an intensive regimen. Success comes only to the most persistent and stubborn. But the years spent at the school leave their mark. Though not all the youngsters become champions, they grow up healthy, resourceful, with a keen sense of beauty, and that is the goal of Soviet sports.

The Rossiya, the biggest hotel in the capital, has accommodations for nearly 6,000 guests. It faces the Moskva River embankment, along which bicycle races are usually held.

INVITATION FROM MOSCOW

By Konstantin Andrianov
President of the USSR Olympic Committee
and Member of the International Olympic Committee Executive Board

IT IS IMPOSSIBLE to imagine Moscow without its broad range of sports activities: from neighborhood soccer to international meets and physical culture festivals.

Every four years in Moscow the flags of all the Soviet republics greet the finalists of the USSR People's Games. In scope and showing the games easily measure up to the Olympics.

Many major international contests are held in the capital. In recent years it has developed into a meeting ground for holding world and European championships, contests for continental cups and just plain friendly games. Representatives of international sports associations, journalists, trainers and athletes themselves say that meets held in Moscow are always well organized, that ground conditions, housing and social programs are excellent and the atmosphere warm and friendly.

All these considerations must have had a good deal to do with the choice of Moscow for the 1973 World University Games. A record number of athletes (more than 4,000) came from 72 countries. Dr. Primo Nebiolo, president of the International Federation of University Sports, said after the games:

"Though there is no direct connection between the University Games and the Olympic Games, I can say for myself that Moscow has all the necessary sports facilities for the Olympics and, as has been shown, great experience in the organization and staging of contests."

Soviet athletes have been competing in the Olympic Games since 1952. In the last two decades about 2,000 of the best of them participated in winter and summer Olympics, more than 600 medals were won. Soviet sportsmen, together with those of other countries, have made their contribution to peace, mutual understanding and world sports at the stadiums of Helsinki, Melbourne, Rome, Tokyo, Mexico City and Munich, on the snow-covered slopes of Cortina d'Ampezzo, Squaw Valley, Innsbruck, Grenoble and Sapporo. And it is interesting to note that Muscovites always seem to constitute our Olympic vanguard. Some 200 citizens of Moscow have won Olympic titles.

But it is not only, and not so much, a matter of titles. More important is the extent of mass involvement in sports and their general accessibility. More important is the fact that almost a million Muscovites of all ages, every seventh person in the capital, are sports participants, not just spectators. The city has 70 stadiums, 6 sports palaces, 26 swimming pools and more than 1,000 gyms.

Our chief sports center is the Lenin Central Stadium in Luzhniki, with 140 facilities spread over half a square mile. The most impressive is the Big Sports Arena (the stadium proper). It has grandstands for 101,000. Under the grandstands are 14 training halls and more than 1500 auxiliary areas, including a hotel, two restaurants, a movie house, a sports museum, a clinic and an international telephone and telegraph office.

The Sports Palace, seating 17,000 and with room for 15 different events, is the second largest sports arena in Luzhniki. Four million patrons annually flock to sports attractions, official and otherwise, in which sportsmen of many different countries compete.

It would probably take more than a day to go through all the Luzhniki facilities. A staff of hundreds of workers and specialists look after swimming enthusiasts, the children in their own sports grounds, visitors at the Small Sports Arena and the tennis courts, the soccer fields and the various ball courts. There is room for 23 simultaneous events if all the facilities are in use.

Other sections of Moscow have modern sports installations also. On Leningrad Prospect are the popular Dynamo Stadium, with grandstands for 60,000 people, and the Young Pioneer Stadium, which has a cycling track. Elsewhere are the halls of the Central Army Sports Club and the Krylia Sovetov Palace.

Major international contests are held at the Locomotive Stadium, the shooting range in Mytishchi, the modern pentathlon base in Planernaya and the Khimki rowing center, which is of recent construction but already has played host to oarsmen competing for the 1973 European championship. It deserves special mention. The two courses (the width of the main one is 136 yards and the return route—81) stretch a distance of 2515 yards. No traffic of boats, kayaks and canoes is allowed the other way. The canal is filled with dead water.

Though Moscow already has many stadiums and halls, courts and swimming pools, the Master Plan for the development and reconstruction of the capital, approved in 1971, includes something more, notably sports complexes right in the residential areas. In addition to stadiums intended specifically for the residents of the given neighborhood, there will be sports halls, swimming pools and sports grounds citywide. Major facilities will be concentrated in four districts. Centers are to be built in the southeastern and northeastern zones of the capital; the two which have been in operation—in the southwestern district (where Luzhniki is located) and the northwestern (along Leningrad Prospect)—will be expanded.

The southeastern district of Moscow is not yet able to offer much in the way of sports. But it has a promising future, a big ensemble is slated for Nogatino. This complex is to be built along a picturesque bend of the Moskva River parallel to a speedway. An area of almost half a square mile will have a big stadium, general purpose halls, a cycling track and a swimming pool. The Nogatino complex will be able to schedule international meets in seven different events —soccer, basketball, cycling, swimming, diving, volleyball and archery.

In the northeastern zone are two of Moscow's biggest and most beautiful parks, Sokolniki and Izmailovo, where national and international expositions are held frequently. The Institute of Physical Culture moved there recently on its fiftieth anniversary. The new complex consists of five spacious buildings with classrooms, rooms for medical services, an indoor arena with a 218-yard circular track and two rifle ranges.

Several hundred students can work out at the same time in the institute's gyms and halls, though it is not yet completed. It will have a stadium, an indoor swimming pool, courts and a soccer arena. A complex of hotels to accommodate 10,000 tourists will be built near the institute.

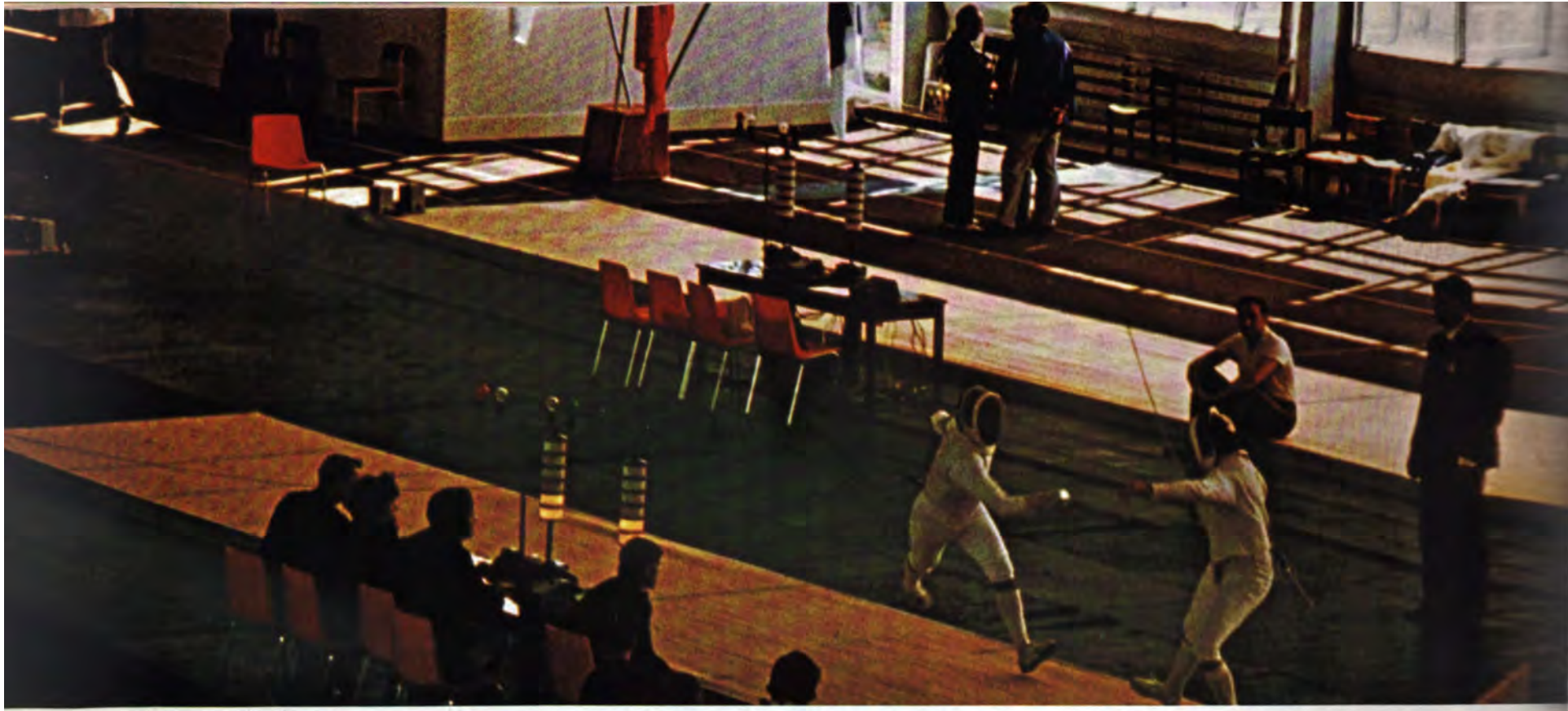
In the neighborhood, in the green zone of Izmailovo Park, a fine site has been chosen for an Olympic village. Architects are planning for three skyscrapers and other buildings.

The village will have a concert hall and a hotel, with most of the suites designed for two. Guests will be able to choose among four restaurants, several buffets, a number of bars and shops.

All four sports zones in Moscow will be connected with each other and the whole of the capital by convenient transportation (Metro, bus and trolley bus). After the reconstruction of the capital's transport network and the addition of another circumferential highway within the city limits, Moscow's sports zones will be interconnected by additional speedways.

In short, the capital of the USSR is well prepared for any international meet, even the Olympics.

And so, Moscow extends an invitation.



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WILLY DAUME
President
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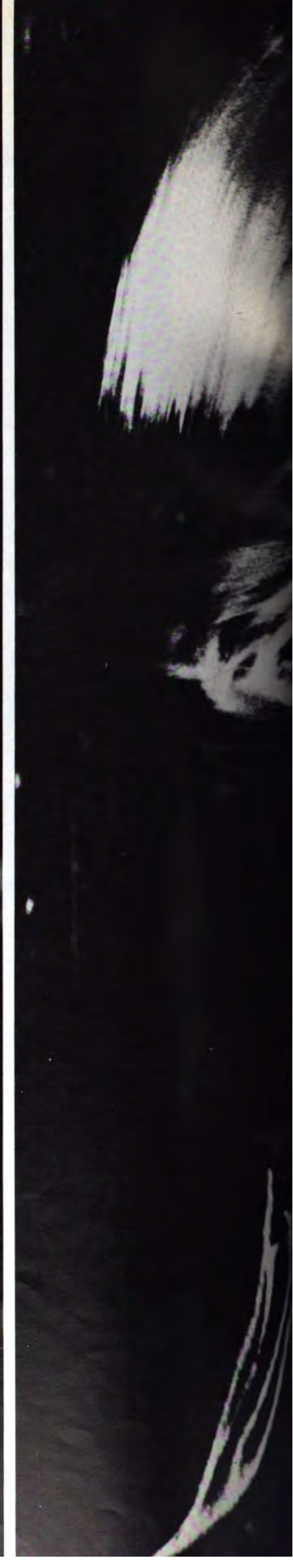
of the Olympic
Games in Munich



Modern photography can stop an acrobatic jump in all its fascinating drama, but the living presence is still unequaled

NO SPEED LIMIT HERE!

Racing is not just a spectator sport in the Soviet Union. A lot of young people compete, especially students, who very often prefer to build their own cars.

The amount budgeted for public health and physical fitness grows from year to year. In 1959 it was 4.8 billion rubles, in 1966 it went up to 5.8 billion rubles, and in 1971 to 9.3 billion. The trade unions, which finance most sports clubs, will spend some two billion

KEEPING FIT IN MOSCOW

By Victor Kuprianov

A PHYSICAL FITNESS boom has hit Moscow. I made the discovery quite accidentally.

It all started when one of my wife's friends asked her at a luncheon, "Don't you think your husband is putting on weight?"

Instead of saying, "I like him that way!" my wife made the mistake of inquiring, "Well, what can I do about it?"

I don't know what they told her, but you can surmise what she told me.

The very next morning I was shepherded to the Lenin Stadium (in Luzhniki) to enroll in the fitness course for the past middle-aged. I had never regarded myself as past middle age, but I found that there were thousands more who had suddenly made the discovery and decided that they wanted to keep fit.

The first step was a medical checkup at my local polyclinic, where they gave me a certificate listing all my ailments. Deep down inside I hoped that with a list of ailments that long they'd turn me down and let me enjoy life my own way. But that isn't the way it worked out.

Exercise is for everyone and every condition, I was told, and they introduced me to a group of joggers who had all had—and forgotten—major coronary disorders.

At the stadium all newcomers are divided into groups according to the state of their health. Exercise sessions are held twice a week under the supervision of a physical education expert. They start with a warmup to let you know that you've still got muscles. The course also includes swimming, volleyball and skiing in winter. It's lots of fun, that is, after you get over the embarrassment of being referred to as past middle-aged. Some members of the group are nearing 70 so I still regard myself as young.

Popular is hardly the word for these courses. The stadiums and sports clubs are having trouble coping with the influx of fitness fans.

I remember when the fad just started, the skeptics were telling this joke:

"Why are you jogging?"

"Because I want to die healthy."

Now no one laughs. The keep-fit bug has bitten the public hard. Morning and evening the city's boulevards are full of jogging citizenry. Jogging too is under medical supervision. Your local polyclinic gives you all the necessary advice and instructions.

Statistics recently published show that one Muscovite in seven goes in for sports and physical fitness activities. There is a countrywide program in operation to involve everybody from age 10 to 60. You have to meet certain qualification norms to earn a handsome pin that millions wear with pride. I am in Grade 5 (age 50 to 60), which means that to qualify for the pin I must be able to jog 15 minutes, ski 3 miles in as long as it takes me, swim 150 feet (no time limit) and hike six miles. Boys and girls 10 to 13 are in the first group. Their simple program consists of morning exercises and instruction in hygiene as well as sports of their own choosing. In short, training and qualifying for this physical fitness pin is really enjoyable.

All sports facilities invite people to come and train and take the necessary tests. So it can become a family affair. In fact, many industrial plants and offices make the arrangements for their employees and families to use the facilities.

One of the results of this program is that everyone's doing the morning exercises on TV and radio. For fellows like me, who hope to get away with sleeping through the broadcast, they sell long-playing records with the exercise explained and a musical accompaniment. The embarrassing moment is when you buy one of these records and the clerk, usually a young thing, asks, "For what age group, please?" The temptation to flex your muscles and say: "For the Samson class" is great, but with all eyes and ears focused on you, you just mumble, "For me" and you keep your fingers crossed, hoping that the young lady behind the counter will wrong-guess your age by at least 30 years and say it out loud.

Hiking is another activity interesting more and more people. We Muscovites are lucky: We have ideal woodland to ramble through and a network of hiking clubs that keep planning new trails. There is nothing formal about membership in these clubs—anyone who wants to come is welcomed. The hikes are held every weekend. A bulletin board near my house, put up by the local club, announces the hike of the week, giving the time and meeting place. It's a come one, come all affair.

The hikes I've gone on have attracted the older generation mainly, but the schools arrange such outings on a large scale, and they do not restrict them to the Moscow area.

Speaking of outings, which seem to be the favorite weekend activity of Muscovites, the trade unions at all enterprises arrange weekend mushroom hunts; without question the number of participants eclipses the figure for any other sport or weekend pastime. My office charters buses to take us out to the choice mushroom areas, and there we are turned loose—each one carrying a basket so spacious it holds more mushrooms than we could find in a year. Still, it is a prestige symbol that also marks the optimist. In the winter ski jaunts are arranged with chartered trains (health trains, we call them) that not only take us out but provide dressing rooms and hot meals.

Some of my cronies prefer ice fishing, and the trade union at the office takes care of that too.

It's great fun if you don't mind getting up before dawn to drill your fishing holes in the ice and get settled. This used to be exclusively a male pastime, but the women moved in. I think it must have been the terrific number of fish stories we told at home that got our wives curious to see what the one that got away actually looked like.

Summer fishing is also attracting lots of people, and we have regular contests. I blush to admit that the women beat us men at the last one, which took place on the outskirts of Moscow this past summer.

While the city is expanding its sports network, back yard athletics are rapidly catching on. A recent government ruling says that all new housing projects must have sports facilities, depending on the size of the community: They range from soccer fields to ministadiums, gyms and swimming pools.

For boys from the age of 11 we have countrywide back yard championships in soccer and ice hockey. Upwards of three million boys competed in each sport last season. The hockey tournament is open only to boys who do not belong to the regular junior sports clubs. Here in Moscow ice is no problem. The house management provides the area for the rink, which the boys themselves make. One of the rules for team qualification in the tournament is that it must make its own rink. Of course, the house management helps with the side boards and lighting. And there is usually someone in the neighborhood who has played the game himself or knows enough to act as coach.

In hockey the rules are simplified; in soccer the boys play by rules that vary from field to field and from one day to the next. In fact, in my back yard the boys have modified the game so much that the rest of the world might like to know in what respects. To begin with, there is no time-keeping. The game breaks up only when irate mothers march their sons in to supper. The second great innovation is the player-referee. Since no one wants to referee a game (and who listens to a ref anyway!), they combine the two. The system works, I have discovered, although sometimes high-decibel shouting weighs more heavily in the scales than skillful technique.

One thing the Soviet sports program has achieved is continuity. From school sports the boy or girl graduates to institute athletics. One in three is active in sports. That is ensured by the pattern of intermural tournaments and intramural activities. Institutes field more than just one varsity team. They may have as many as nine basketball teams competing for the championship, and ranking is calculated on the aggregate showing of all of them. Students can choose any sport, including mountain climbing and aerobatics, at no cost whatsoever.

Boys and girls who do not go on to an institute but take jobs are also involved in sports through the different sports societies. Membership dues are a modest 30 kopecks a year, and that covers the use of all facilities, equipment, coaching and medical supervision, no matter what the sport.

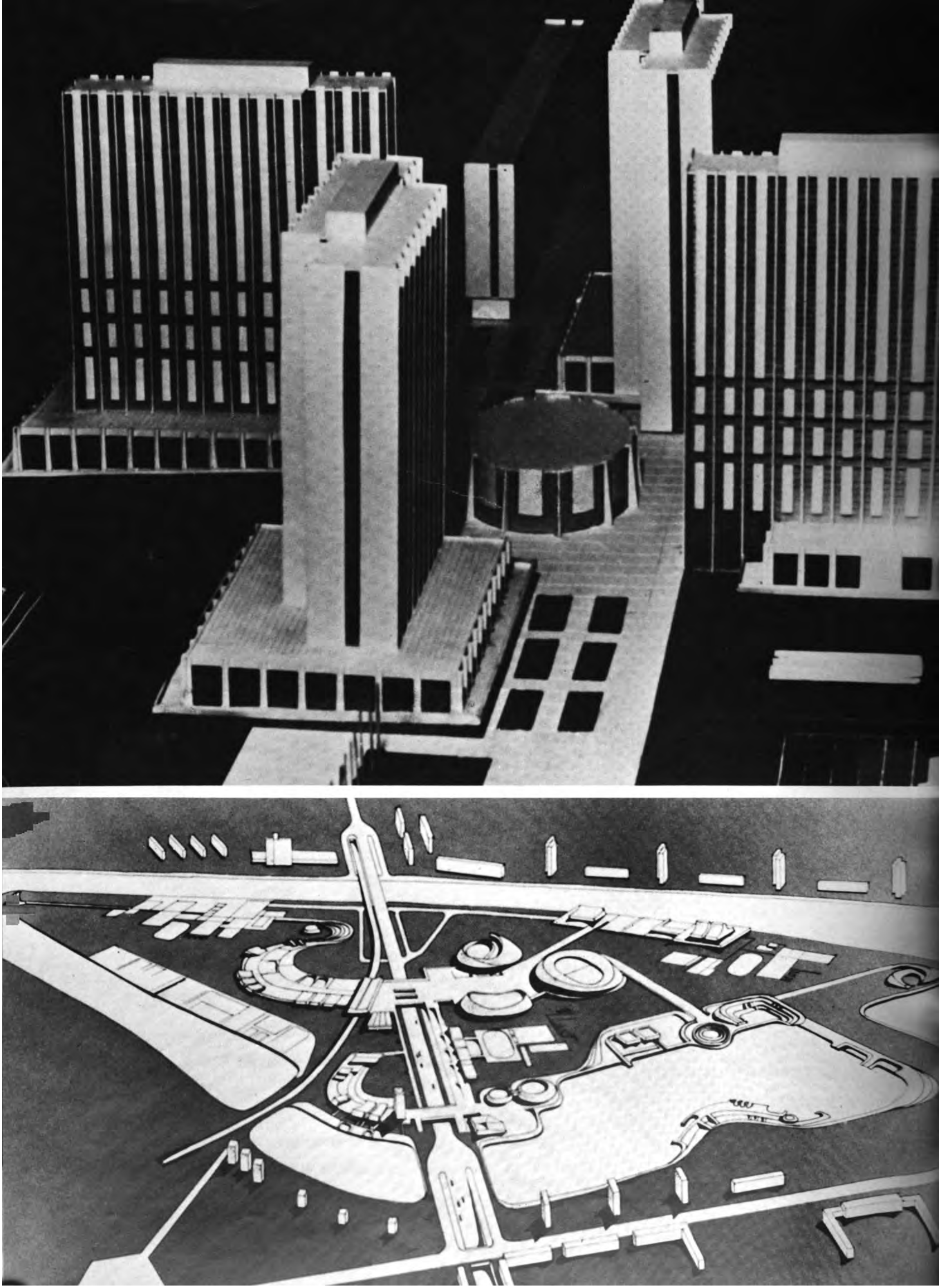
The traditional USSR People's Games (Spartakiad) will begin in 1974 and extend over a two-year period. The purpose is not just to scout Olympic talent but to popularize sports and get more people involved. At the games held four years ago, a participation figure of about 45 million was registered. The attitude here is that the Olympic year is not only for the Olympic stars. We hold local tournaments that match the Olympics in involvement and excitement.

The Soviet sports program has given the conventional stadium a new look. The stadium is not merely a place to come to watch sports; it is there for everyone to use. Admission to stadium grounds is free, and everyone is invited to take part in the sport of his or her choice.

Lenin Stadium in Moscow invites boys and girls from the age of five to learn to skate, swim and even play tennis. What's more, we have special children's stadiums exclusively for the school generation. At the top of the popularity list for girls are figure skating and gymnastics. Some girls are already doing Olga Korbut's routines.

There is one big string attached to all these children's activities: Good marks at school are a must. One failure is enough to get suspended—and they are very strict about this rule. At tournaments the player may even be asked to show his report card.

We want sports to be a grassroots movement and provide facilities for all. The Soviet Union spends billions a year on its sports and physical fitness program; there's no ruble-pinching. We believe that when we invest in sports, we are investing in good health.



Blueprints of a hotel for the projected Olympic village in Izmailovo. Below left: The Nogatino sports complex. Below right: The new facilities of Moscow's Central Institute of Physical Culture.

FUTURE SPORTS CONSTRUCTION IN THE CAPITAL

SPORTS are being given considerable prominence in Moscow's general development plan. The provision of sites for athletic and fitness activities and outdoor recreation is a matter of daily concern. Experts are planning sports facilities ranging from neighborhood playgrounds to multipurpose city centers.

Accessibility and mass participation are the main principles in such siting. Thus, smaller facilities will be built in the residential areas and the extensive network distributed evenly throughout Moscow's center and suburbs. Larger sports complexes, each catering to between 250,000 and 400,000 people, are to be erected in each housing development. The plan also envisages municipal sports centers that will accommodate national and international meets. There will be four such centers: Luzhniki in the southwest, Leningrad Avenue in the north, Izmailovo in the east and Nogatino in the south. The first two have been operating for some time, but they are to be expanded. Eventually Nogatino will become as well known as Luzhniki.

New athletic facilities are under construction in the city center, as well. A multipurpose indoor stadium, shaped like an oval, will be built in a quiet part of downtown Moscow where old buildings are being razed. The stadium will have a regulation-size soccer field with stands seating 40,000 to 50,000. It can be used also for cycling, track and field, ice hockey, figure skating and speed skating. If necessary, the main arena can be divided into several smaller ones for fencing, boxing, basketball, and so on.

School sports come in for special attention in the general development plan. All schools are now being built with gyms and sports fields. Architects have suggested that in the new model housing developments the gyms of several neighboring schools be combined, with sliding partitions. These enlarged gyms can be used by young people in the evenings.

Sociologists have estimated that in the near future 55 to 60 out of every 100 Muscovites will participate in sports and physical fitness programs. That is why the development plan provides for 10.8 square feet of sports area per person.

TRAINING AND SCIENCE

THE WAY to new sports achievements is an up staircase whose steps are growing higher and more difficult. Champions of past decades would be surprised, not so much by present records as by current loads. Anyone who wants to be first these days really has to sweat for it. But there is a limit to the number of miles you can run and the tons of metal you can lift in a day. Intensive training by itself isn't producing the desired results.

So sports turned to science. Medical specialists, biologists, psychologists and engineers got down in earnest to finding a scientific basis for training sessions and even to predicting new achievements.

In our country research in sports is conducted at 21 physical culture institutes, 31 sports departments of teachers institutes and four research institutes of physical culture and sports located in Moscow, Leningrad, Kiev and Tbilisi. Some requests of sports organizations are also researched by scientific laboratories that have no formal ties with sports but are willing to tackle projects somewhat off the beaten track.

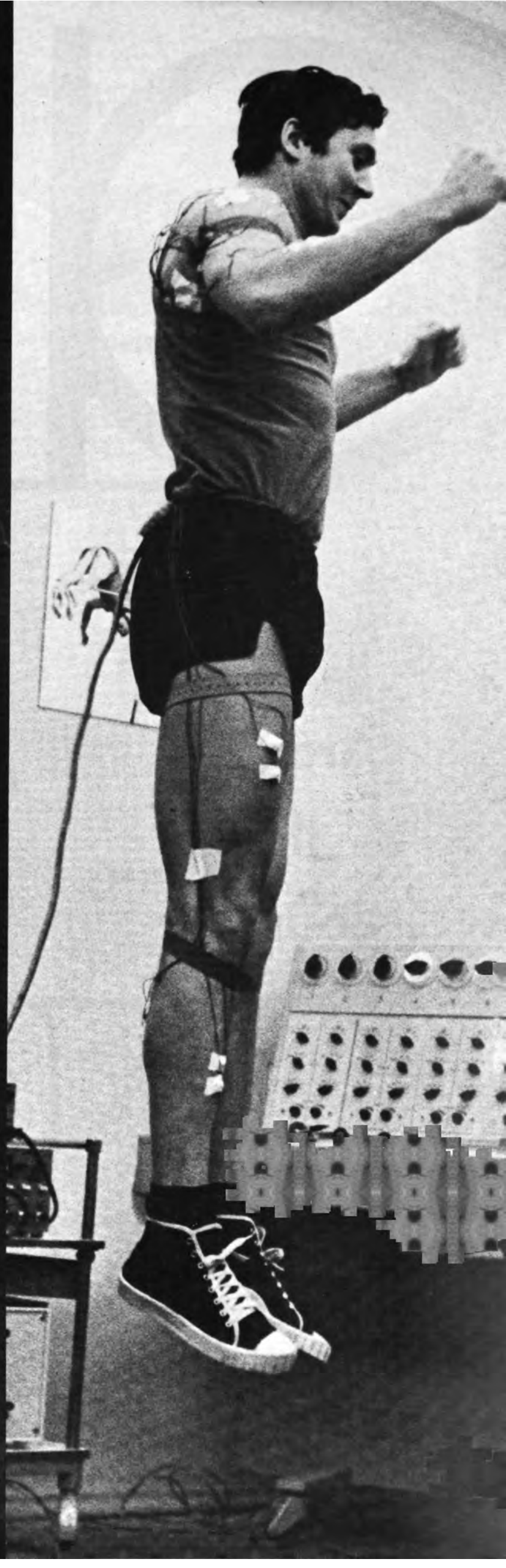
The volume of scientific information doubles every five to six

it takes both to break records

ars. This imposes special demands on coaches. They must be roughly versed in medicine, biology and psychology—have a unded education in all fields—if they want the confidence of their arges.

This is also a significant fact: Some of our outstanding athletes t their education in a scientific field and now, no longer in active orts, are working for the good of their young replacements. The ned high jumper Valeri Brumel is working on a graduate degree sports psychology. Arkadi Vorobyov, who won the Olympic weightling championship twice, has become a professor. He is writing doctoral thesis on the medical and biological characteristics of ightlifters.

Science and technology have made considerable amendments to record tables, but caring for champions is not their primary ction. The principal purpose of this research is to find out how derive the maximum benefit from sports for the health of millions people, for their harmonious development. That is the real reason specialists have come to the stadiums.



Dr. Yuri Verkhoshansky has made sports his field of science. Above: Alexander Repin in a wind tunnel test. Right: Measuring speed and coordination. Far right: Studies in muscle biopotential.

Around the Country

THEATER FIGURE

Georgi Tovstonogov, chief stage director of the Bolshoi Drama Theater in Leningrad, was awarded the Order of Lenin this year on his sixtieth birthday. The theater he has headed for some 20 years is considered one of the country's best. Shakespeare, Dostoyevsky, Chekhov and modern Soviet and foreign plays produced by Tovstonogov have all been major events in Soviet theater. Along with his work as a director Tovstonogov teaches at the Leningrad Theater Art Institute.

MALACHITE DEPOSIT

A new rich lode of malachite (a rare green semiprecious stone) has been discovered in the openworks on Mt. Vysokaya in the Urals.

The famous iron-yielding mountains Blagodat and Vysokaya have been feeding iron ore to the blast furnaces and iron and steel plants of the Middle Urals for two and a half centuries. Now Vysokaya will be mining malachite as well.

BYELARUS TRACTOR TESTED IN NEBRASKA

The tractor-testing station of the University of Nebraska has been operating for almost 50 years. Serving countries from all over the world, it compares various tractors, evaluates the products of different manufacturers and makes recommendations for improvements.

The 1,139th tractor to be tested was a Soviet Byelarus MTZ-80 which rolled out to the testing ground last October under the auspices of Tractorexport of the USSR. It passed examination with flying colors.

The test records will be sent to farm-machine operators all over the world and will also be listed in the tractor guide known as the Red Book.

HEALTH RESORTS FOR CHILDREN

A cardiology complex for children is under construction in Sochi, the health resort on the Black Sea coast famous for its mild climate and mineral springs. The complex will consist of treatment facilities, housing, schools, a movie theater and other services.

Health resorts for children are being set up in other Black Sea areas. The health camps in the two large resort complexes under way near Yevpatoriya and Kabardinka will accommodate 40,000 children at one time. The network of children's health facilities is growing in practically all the resort areas of the country— in the Baltic area and in Central Asia. The Soviet Union now has some 1200 health centers for children, accommodations for whom are maintained by the trade unions.

CALVES FROM THE USA

American businessman J. Macbarron and farmer Joseph Givhan recently gave Soviet cattle breeders three pedigree bull calves. Bonny Boy, the gift of Macbarron, is a Scottish Highland variety, a very productive and hardy breed. Their long hair helps these animals withstand cold winters, and because they are not fussy about their food, they fatten equally fast on both steppe land and Alpine pastures. Bonny Boy will live in the breeding center of the Altai Scientific Research Institute of Agriculture in the south of Western Siberia. Givhan's calves are the valuable Aberdeen Angus red breed, not generally raised in the USSR. The meat of this breed is of high quality, and when the Aberdeen Angus is crossbred, it passes on its good beef. The two bull calves have gone to the Kalmyk Republic in the lower reaches of the Volga.

RINGWORM VACCINE

A reliable vaccine to protect cattle against ringworm has been developed in the USSR. The fungus skin disease, widespread in Europe, Asia, Africa and America, affects wild and domestic animals

RAINBOW TROUT

Many fish-breeding farms in the Transcarpathian region, Ukrainian SSR, breed varieties of trout. One of the largest is in the Zhdimr Preserve near the little town of Svalyava. In a year the fishery produces some 44,000 pounds of trout, mostly raduzhnaya (rainbow). Compared with the more ordinary kinds, the raduzhnaya grows twice as fast but with no loss of flavor.

The Transcarpathian fish farmers do not neglect the everyday species either: Some 50,000 fry are let out into mountain streams every year.

The number of trout-breeding farms in Transcarpathia keeps growing. A new one, about to start, is expected to provide more than 150,000 pounds of trout a year.

NEW SOVIET CAR

Mass production of the Volynyanka has started at an auto plant in the West Ukrainian city of Lutsk, and the first consignment is already on sale. This multipurpose automobile, for rural use mostly, can carry six passengers or about a half ton of cargo and make a top speed of 43 miles an hour.

CHILDREN'S SOCCER SCHOOL

At the Pakhtakor Stadium in Tashkent, capital of the Uzbek SSR, children have been learning to play soccer for two years now. The soccer school has an excellent football field as well as various other sports grounds and gear. All this is free. So is the medical supervision.

FISH FOSSILS

Soviet paleontologists have made a number of interesting finds in Estonia. They discovered imprints of fish that inhabited the Earth 350 million years ago. The outlines of fish skeletons were well preserved in the soft clay.

Traces of other extinct sea inhabitants — predatory lobe-finned fish, some of them a foot and a half long—have also been found. The large size of these specimens makes it possible to study not only the skeletons of the fish but the structure of their internal organs as well.

AMERICAN LITERATURE IN THE USSR

American literature studies in the Soviet Union are expanding geographically. A center for specialists teaching American literature in the universities of the Russian Federation was set up in Krasnodar on the Kuban River a short time ago. The first in a series of publications with the overall title of *American Literature* and edited by Professor Nikolai Samokhvalov saw print recently.

The articles, centering on the development of romanticism and realism in the United States, are diverse in subject and approach. Soviet scholars seem to be interested in writers who are not much studied in the United States, as evidenced by the articles on Richard Harding Davis and George Lippard. Russian-American relations are another area of interest, as might be expected. One of the articles is devoted to John Reed, Albert Rhys Williams and others who were witnesses of the October Revolution.

OLD TREES

The State Committee for the Protection of Nature of the Ukrainian Republic has made an inventory of unique trees, boulders, rocks, waterfalls and caves.

As many as 3,295 trees over a hundred years old have been registered, including a 1300-year-old oak in the Yuzefin preserve in the Rovno Region, a 1,000-year-old oak in the Cherkassy Region and a 700-year-old oak in Khortitsa, Zaporozhye Region.

KAMAZ TRUCKS

Under construction now in the city of Naberezhnyye Chelny in the Tatar Autonomous Republic on the Volga is the Kama Truck Plant. It will be the Soviet Union's largest enterprise for the manufacture of heavy-duty vehicles. The Kamaz-55102 farm dump trucks will be produced there. Moscow and Minsk designers joined efforts to evolve this reliable vehicle. The six-wheeler with two axles does very well on rough cross-country terrain.

NEW YOUTH CLUB

A building of interesting design is under construction in Yerevan, the capital of Armenia. Basically a youth club, it will have a film and concert hall seating 1200, a hotel, rooms for some 20 hobby groups and for lectures and gymnastics.

A café will be perched at the very top on a rotating superstructure.

NATURAL GAS IN THE DESERT

Two more large gas deposits have been discovered in the Kara-Kum Desert in Turkmenia (Central Asia). They are near the industrial center of Chardzhou and close to the surface, which makes operations easy. Gas extraction is one of the 40 industries started in the republic in the Soviet period.

ELECTRIC DIGGERS

The first electrically operated excavators have started work in oilfields of Western Siberia.

The new machines have four times the efficiency of those used previously in the Siberian oilfields. Besides, no matter how freezing the weather, the engine does not have to be warmed up.

THE BOLSHOI MODERNIZED

The Bolshoi Theater is to be reconstructed and enlarged.

Audiences, however, will not be aware of any changes. They will see the same eight columns, the same Apollo's chariot over the entrance, the same lantern lights and the same auditorium, with seats for over two thousand opera and ballet fans. What will be changed is the back end of the building in order to provide more space for the many requirements and services of the modern theater.

QUEEN OF THE FISH

The Far Eastern Amur River is populated by 100 fish species, the kaluga among them. This variety of sturgeon, called the Amur Queen, is the world's largest freshwater fish; it grows to a length of 15 to 20 feet and a weight of several hundred pounds.

The kaluga is a relict fish, living only in the Amur and never leaving the river throughout its life cycle. It spawns three or four times a year and matures very slowly. The male becomes adult only in its seventeenth or eighteenth year and the female in the twentieth to twenty-second year. The life span of this giant fish is 300 years.

Research on the feasibility of sturgeon breeding in the Amur basin is under way in the Amur branch of the Pacific Institute of Fishing and Oceanography, and the migration pattern of the kaluga is being studied. A large fish-breeding farm will be built in the lower reaches of the Amur.

AIR QUALITY

The Sanitary and Epidemiological Service of Kaunas, one of Lithuania's largest industrial centers, has made a thorough inspection of the city air and taken necessary air-protection measures. For example, one of the city's factories was told to close down its foundry pending the installation of special filters. And a new traffic-regulation system has been put into effect, with the approval of medical men. It will eliminate traffic jams at crossings, where the largest volumes of exhaust gases are emitted.

AMERICAN MUSIC IN LENINGRAD

A new program, "American Popular Music in the Theater and Movies," was given its first performance recently by the Leningrad Concert Orchestra under the direction of Anatoli Badkhen at Oktyabrsky Grand Concert Hall.

This is not the first time works of American composers have been performed in Leningrad. On the boards right now are George Gershwin's *Porgy and Bess*, at the Academic Maly Theater of Opera and Ballet, and Leonard Bernstein's *West Side Story*, at the Komsomol Drama Theater.

The new program includes compositions of Gershwin, Cole Porter, Bernstein, John Lewis, Burt Bacharach and others.

One of its programs is dedicated to the seventy-fifth anniversary of Gershwin's birth.

BUILDINGS BRACED

A method of reinforcing buildings above subway tunnels or other underground facilities has been worked out in Leningrad. The building is "cut" into short sections, each of which is tightened along its perimeter with steel ropes pulled through special holes. If necessary, houses are levelled up with jacks. Tenants do not have to leave their apartments while the work is under way.

The new method is especially useful when an architectural memorial or a large industrial plant cannot be moved. It has already been utilized on a number of structures, including the landmark building of the former City Duma on Nevsky Prospect.

NEW ARMENIAN GOLD FIELD

Gold is being mined at a new field in the Armenian mountains, not far from Lake Sevan. In addition to placer and nugget gold, very rare crystalline formations of the precious metal have been found here.

A gold-mining combine will be in operation in the Ararat Valley in a few years.

WILDLIFE PRESERVE

The saigas, hoofed mammals inhabiting the steppes and semi-deserts of Central Asia, were on their way to total annihilation at the turn of the century. But as a result of wildlife conservation measures taken by the Soviet Government, several million now roam their own preserve.

These animals, prized for their horns, meat and skin, have been studied for a long time. Uzbek naturalists traced their migration patterns and selected for a hunting preserve an area of six and a half million acres in a spacious depression overgrown with tall grasses, where tens of thousands of saigas winter.

GOLD STAR TO INTOURIST

The International Organization of Tourism has awarded its Gold Star to Intourist, the official Soviet travel agency. Intourist is the first organization to receive this award; previously it had gone only to individuals who made significant contributions to the development of international travel.

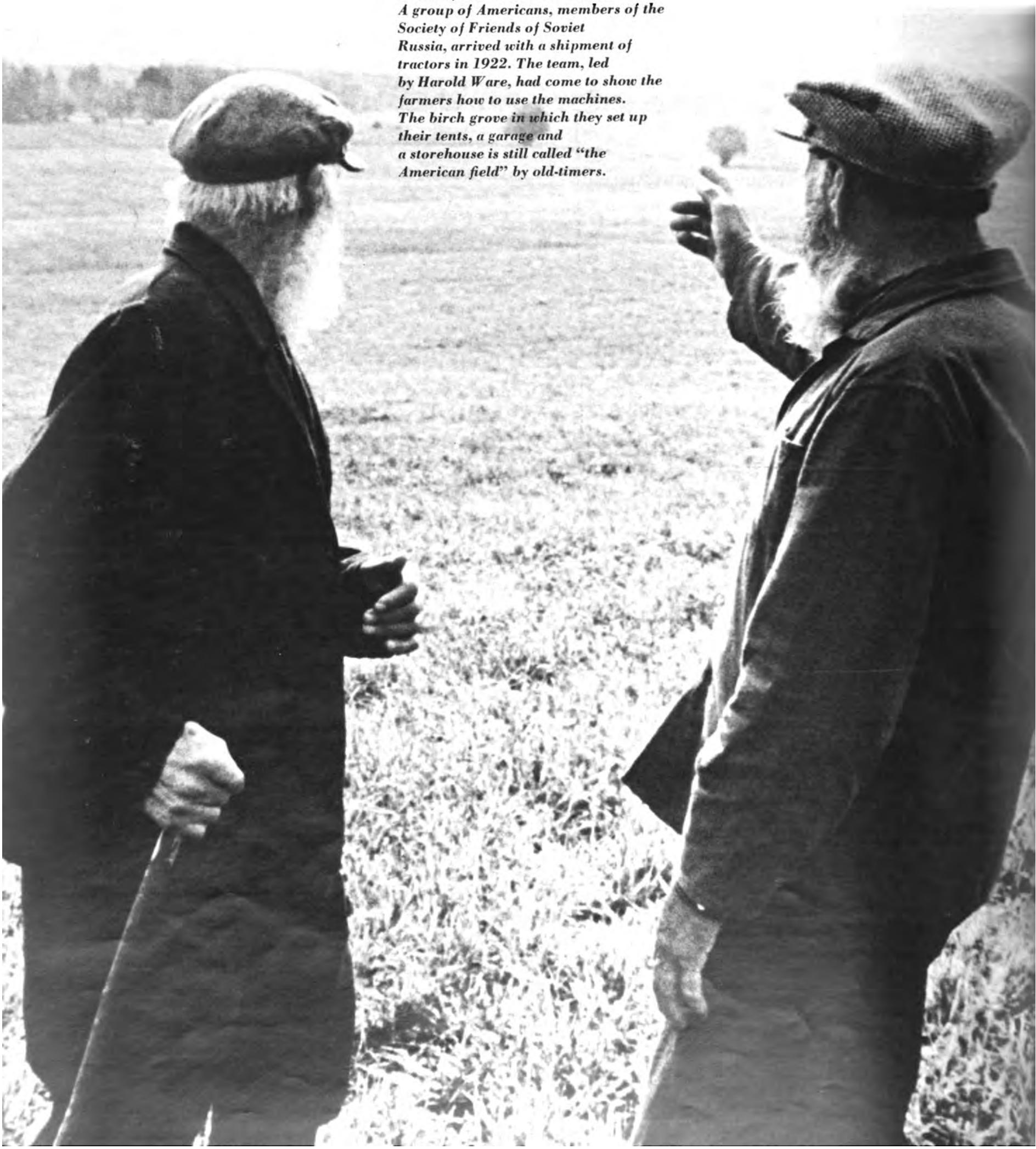
Intourist works with 700 travel agencies, air, ship and rail lines all over the world. Last year it served 2,340,000 visitors to the USSR from 150 countries.

THE FRIENDS OF SOVIET RUSSIA

By Lyudmila Borozdina

Photographs by Igor Zotin

Toykino, a small village in the Ural area of the eastern part of European Russia, is the directing center of the Lenin State Farm. *A group of Americans, members of the Society of Friends of Soviet Russia, arrived with a shipment of tractors in 1922. The team, led by Harold Ware, had come to show the farmers how to use the machines. The birch grove in which they set up their tents, a garage and a storehouse is still called "the American field" by old-timers.*



To illiterate peasants only a few years removed from the primitive farming of prerevolutionary Russia, the tractor brought by Harold Ware (left) was a strange machine. Today, the big collective and state farms use great fleets of them. Toykino children, who study English in school, look through an issue of SOVIET LIFE.

GRATITUDE EXPRESSED BY LENIN

To the Society of Friends of Soviet Russia in the United States

October 20, 1922

Dear Comrades,

I have just verified by special inquiry to the Perm Guberniya Executive Committee the extremely favorable information that was published in our newspapers about the work of the members of your society, headed by Harold Ware, with the tractor team at the Toykino State Farm, Perm Guberniya.

In spite of the immense difficulties, particularly in view of the extreme remoteness of that locality from the center, and also the devastation caused by Kolchak during the Civil War, you have achieved successes that must be regarded as truly outstanding.

I hasten to express to you my profound gratitude and to ask you to publish this in your Society's journal and, if possible, in the general press of the United States. . . .

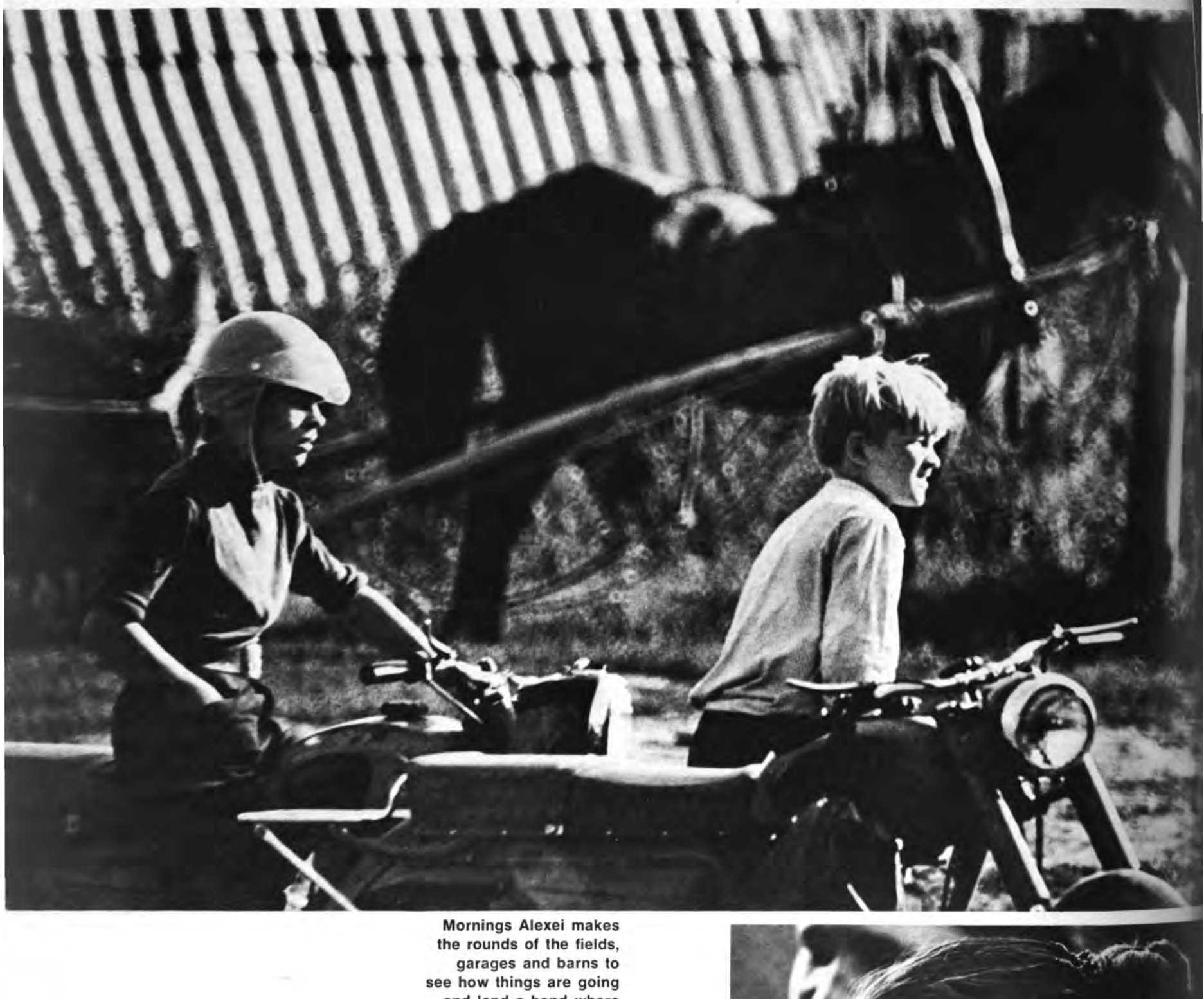
LENIN
Chairman of the Council
of People's Commissars

This 1922 picture was published in the newspapers of Perm, the regional center. The Sunday demonstration to show how much more work a tractor could do than a plow brought peasants from many villages around. Harold (standing) and Christa Ware (behind the wheel).

This letter, reprinted here in part, was published in the newspaper *Pravda* on October 24, 1922. It appeared somewhat later in the *New York World*. Lenin wanted the people of America to know that the 50,000 dollars they had contributed to the Help Soviet Russia Fund had not been wasted.

Continued on page 26

After secondary school team leader Alexei Shubin went to Perm and became a building worker. But he didn't take to urban living. "I got used to farm life," he says, "to work in the open." He is studying agronomy by correspondence and expects to get a diploma shortly. His wife Lyudmila was born and raised in Toykino. She has a degree in economics and is the farm's accountant. The young couple has two children, boys.



Mornings Alexei makes the rounds of the fields, garages and barns to see how things are going and lend a hand where needed. Lyudmila's province is figures: accounts, papers and reports. The farm grows winter and spring crops: wheat, rye, oats, barley, peas. All operations are mechanized. Dairy products and pigs are also moneymakers. Above: Alexei's boys fooling around with their father's motorcycle.

chines and harrows were unloaded on June 1, 1922. Nine Americans and two Italians—all members of the Society of Friends of Soviet Russia—came with the machines. The villagers knew nothing about either tractors or cars. In an interview with a correspondent from the newspaper *Izvestia,* from which, by the way, Lenin learned how things were going with the arrivals, Christa Ware said: "When we unloaded at Vereshchagino, we seemed to be faced with an absolutely insurmountable task—to drive heavy tractors for the whole 50 miles along bad roads. . . . There were no men in the nearby villages—the majority had been killed in the World or Civil wars—and the local population had no physical means of cultivating their plots of land. . . ."

It took several days to drive the tractors from Vereshchagino to Toykino. Bridges were hastily built over the streams and marshes, and gullies filled up.

There were several thousand acres of land near the village of Toykino that had lain fallow for several years. They had been owned by the royal treasury. It was on that land that Ware's tractor team was to show its skill.

The big, gently sloping rise, bearing the signs of habitation and overgrown with bushes, is still called the "American field." Everyone in the village knows it, from schoolboy to old-timer. Today's tractor and truck drivers or building trades workers, familiar with all sorts of machines and mechanisms, have to think back hard to the time when the villagers looked at tractors with wonder, sometimes even with fear.

The Americans used to work from dawn till dark. They lived in tents, camped out right in the field, about a mile from the village. They met with all sorts of difficulties —not enough gas, for one thing. The kerosene was no good in the tractors, there was no machine shop to make spare parts, no water nearby, the water had to be brought from the village. But these were people who were not discouraged by difficulties. They kept on working, learned Russian and taught the villagers to operate tractors and drive cars.

The Perm newspapers were quick to re-

spond to the first contacts between the American group and the Russian farmers. Describing a village meeting, they quoted one of the Americans. "We have come," he said, "not for concessions or to enrich ourselves at the expense of the labor of the people. We American workers know that to achieve a kingdom of labor you have to build up your agriculture and industry. That is why we came to lend you a helping hand."

The Americans were quick to win the gratitude and affection of the local people. They helped the poor farmers do their plowing. They spent what little spare time they had at the village club, dancing and singing with the young people. They left a profound imprint on the memory of the Toykino people, these Americans:

Harold Ware and his wife Christa Ware; Joseph Bronker, John Shlonberger, Felice Roffredo — mechanics; George Iverson, Charles Geck, Otto Enstren, Seaborn Irrikson and Mikke Meling—farmers; and Gudash—a doctor.

Harold Ware's Plan

Harold Ware and his wife were qualified agronomists. Before going to Soviet Russia, they had studied Russian soils to familiarize themselves with the conditions under which the tractor team would have to work. Ware mapped out for Toykino a long-range plan of land cultivation until 1926. He advised the state farm to specialize in grain growing and cattle breeding, to introduce four-plot rotation, with clover sowing as a must, and to do regular liming, particularly, of acid soils.

Ware's plan was the subject of our talk with Alexandra Sushentseva, the present chief agronomist. She is 45 and comes from a peasant family in the neighboring Bashkir Autonomous Republic. After graduating from an agricultural institute in the town of Perm, she was assigned to Toykino. She has been working there for more than 11 years now. The farm has four production teams, one from each village near Toykino, which is the base. A large fraction of Toykino's 17,000 acres is plowland and mowed area. The farm specializes in meat, milk and grain. Sushentseva said she believed that Ware's plan was right for this big but difficult to work stretch of land.

Without liming and crop rotation with clover, we couldn't possibly produce a good harvest. Hay fields and clover make cattle breeding possible. The farm has 1400 head of horned cattle and 3200 pigs.

A few words about state farms in general. They came into being in the very first years of Soviet power, when there were no collective farms and most of the produce was raised by individual peasant farms. State farms were set up on lands that had belonged to the royal treasury and had lain fallow. Workers on state farms have much the same rights as factory workers when it comes to wages, holidays, pensions and the like. The one difference is that they also have their own plot of land for personal use.

This was how the Toykino state farm was set up. It now has 460 rather well-paid workers. The farm has been building houses on a considerable scale. In the past three years 60 families moved into new apartments.

As a member of the local Soviet, Alexandra Sushentseva was well informed on Toykino. She told us about the housing and other projects under construction and showed us around a big village club, shops, a telephone exchange, a kindergarten, a new eight-year school and a hospital.

"We have begun supplying gas to the villages," she said. "Soon there will be no stacks of firewood near the houses; gas will be used for heating."

This Perm village five decades later would have pleased Harold Ware.

"He was a fine man with a strong will and a kind heart," recalled Akim Pustovalov, one of the first Young Communist League members in the village. "I wonder what happened to him."

We told him what we knew about Harold Ware.

In the spring of 1923, encouraged by Lenin's opinion of his work, Harold Ware went to the United States to collect more money and bring another tractor team to Soviet Russia. In the autumn of 1924, another tractor team did arrive. On Ware's initiative, a Russian-American Agricultural Association was set up on land in the Northern Caucasus provided by the Soviet Government. Ware worked with that association. Later he helped organize more state farms and was assistant director and production manager of the experimental Zernograd State Farm near Rostov (the southern part of European Russia). He spent 10 years on Soviet farms, beginning with Toykino. In 1932 he returned to the United States. Word came that he was killed in a car accident in 1935.

It was then that the People's Commissariat (Ministry) of State Farms of the USSR issued a special decree perpetuating his memory—Harold Ware scholarships were established for students of agricultural colleges.

As for the farm where Harold Ware's tractors made the first furrow, its green fields perpetuate his memory.

Solidarity

The Society of Friends of Soviet Russia was founded in the United States following Lenin's Appeal to the International Proletariat in August 1921. There was a bad harvest that year—35 guberniyas were stricken by famine. Hunger and typhoid fever took thousands of lives. It was a disaster for the young Soviet republic, with its economic system still in chaos after the World and Civil wars.

The Society did more than send foodstuffs, it sent tractor teams. Harold Ware's team, the first, came to Toykino. Both the Soviet Government and Ware knew that two dozen tractors, lost somewhere in the vast expanses of Russia, could not do much to relieve the famine or to move the countryside to mechanized production. But the assistance and the sympathy of the American working people who had contributed money for two tractor teams were dramatic expressions of international solidarity with the Soviet Republic.

In his letter to the newspaper *Pravda*, Ware noted: "We came in order to teach, but we learned much more ourselves. We know that Russia is strong and patient enough to cope with all the tasks and difficulties involved in one word: rehabilitation."

And it was indeed.

QUERIES FROM READERS

QUESTION: I have read that in your country the higher educational institutions are attended not only by secondary school graduates but also by young people who already hold down full-time jobs. What is the reason for this—is it the desire to earn more money or the fear of finding themselves unemployed because of automation?

ANSWER: Earnings can't be the main reason young workers want to continue with their schooling. The difference between what a highly skilled worker and the average engineer makes is relatively small. Nor is anyone in our country worried about automation, since there is no unemployment. In situations where a machine takes over jobs, the workers are placed elsewhere or retrained. They continue to draw their pay during the retraining period. The law requires that the new job pay at least as much as the old one.

The explanation lies elsewhere. Sociological studies show that the prime motivation for acquiring a higher education is the wish to do creative work, work that is fulfilling. Incidentally, more than half the six million members of the USSR Society of Inventors and Rationalizers are industrial workers, bench-workers. Besides, young people want more than trade or professional knowledge, they want to keep up with developments in science, to have a background in literature and the arts. They want to be considered cultured people.

QUESTION: Are there special schools that train artists, musicians and actors?

ANSWER: We have more than 7,000 music and art schools for children who show promise in these fields. The music school course is seven years. The children are taught the fundamentals of music theory and learn to play musical instruments. They study general education subjects at a regular school. Those who want to make music a career go on to a four-year school with a course of study that combines music and general high school subjects. Especially gifted children go to specialized secondary (10-year) music schools. Those who graduate from one of these two types of music schools are eligible for admission to a conservatory. The conservatory offers majors in piano, stringed instruments, wind instruments, folk instruments, singing, choral conducting, theory and composing, history and theory of music. Before the Revolution there were only five conservatories, now there are 23—in the larger cities and in practically all the capitals of the union republics.

There are 19 schools of choreography attended by 3500 boys and girls. Ballet dancers are also trained at 13 ballet studio-schools attached to music theaters and institutes of dramatic art.

Future artists and sculptors go to children's art schools and then to a four-year art school. When they complete the course of study, they are eligible for admission to industrial art schools. A higher art education is offered by special institutes with departments of easel painting, monument painting, graphics, sculpture, design.

Seventeen institutes of dramatic art train actors, stage managers, scenic designers and ballet masters for dramatic, musical, children's and puppet theaters. Future drama critics also study there.

Institutes of cinematography prepare script writers, film directors, actors, cameramen and film critics. Future writers study at the Gorky Literary Institute. Tuition at all schools is free, and students receive stipends besides.

QUESTION: Are there special courses for those who wish to study, say, music or acting in their free time?

ANSWER: Yes, there are. They are called People's Universities of Culture. They were formed on the initiative of many mass organizations, including the Young Communist League (Komsomol); most of the students are young people. They offer lecture courses in esthetics, history (of the theater, music, film), fine arts and literature. In addition, lectures, special concerts, plays, previews of films from the rich collection of the State Film Archives of the USSR and excursions to museums and art galleries are arranged. The lectures are given by prominent writers, artists, critics, theater and film directors, and actors at palaces of culture and clubs, urban philharmonic societies, and such organizations as the Union of Writers, Union of Composers, Union of Cinematographers and the All-Russia Theatrical Society.

QUESTION: Is it true that universal secondary school education is being introduced in the Soviet Union?

ANSWER: By the end of the current five-year plan period, that is, by 1975, the transition to universal secondary education will be completed.

QUESTION: Please describe the administrative structure of the Soviet Union.

ANSWER: The Union of Soviet Socialist Republics is a multinational socialist state in which all nations and races are equal. It is a socialist federation comprised of 15 sovereign and equal union republics: The Russian Soviet Federative Socialist Republic, the Ukrainian Soviet Socialist Republic, the Byelorussian SSR, the Uzbek SSR, the Tajik SSR, the Turkmen SSR, the Kirghiz SSR, the Kazakh SSR, the Georgian SSR, the Armenian SSR, the Azerbaijan SSR, the Moldavian SSR, the Latvian SSR, the Lithuanian SSR and the Estonian SSR; 20 autonomous republics; 8 autonomous regions and 10 national areas. The main administrative-territorial units are the territory, region, district, city and village. Big cities are divided into districts.

Each union republic retains all its sovereign rights: the right freely to secede from the USSR, the right to enter into direct relations with foreign states and to conclude agreements and exchange diplomatic and consular representatives with them, the right to have its own constitution. The highest organ of state power in a union republic is the Supreme Soviet of the union republic, and the highest executive organ of state power is its Council of Ministers. In the Soviet of Nationalities of the USSR Supreme Soviet each union republic is represented by 32 deputies.

An autonomous republic is part of a union republic. Each autonomous republic is represented in the USSR Supreme Soviet by 11 deputies and has its own constitution, Supreme Soviet and Council of Ministers. For instance, the Georgian SSR includes the Abkhazian and Ajarian autonomous republics. The territory of an autonomous republic, like that of a union republic, cannot be changed without its consent.

An autonomous region is a national territorial formation which, because of the specific national composition and mode of life of its inhabitants, enjoys administrative and political autonomy. It is represented in the Soviet of Nationalities of the USSR Supreme Soviet by five deputies. The organs of state power, state administration and the courts in the autonomous region, as in an autonomous republic and a union republic, use the language of the predominant local nationality.

Several districts constitute a region. An administrative-territorial unit consisting of several districts and one or more autonomous regions constitute a territory. For instance, the Jewish Autonomous Region is included in Khabarovsk Territory.

The small nationalities of the North are organized in national administrative units known as national areas.

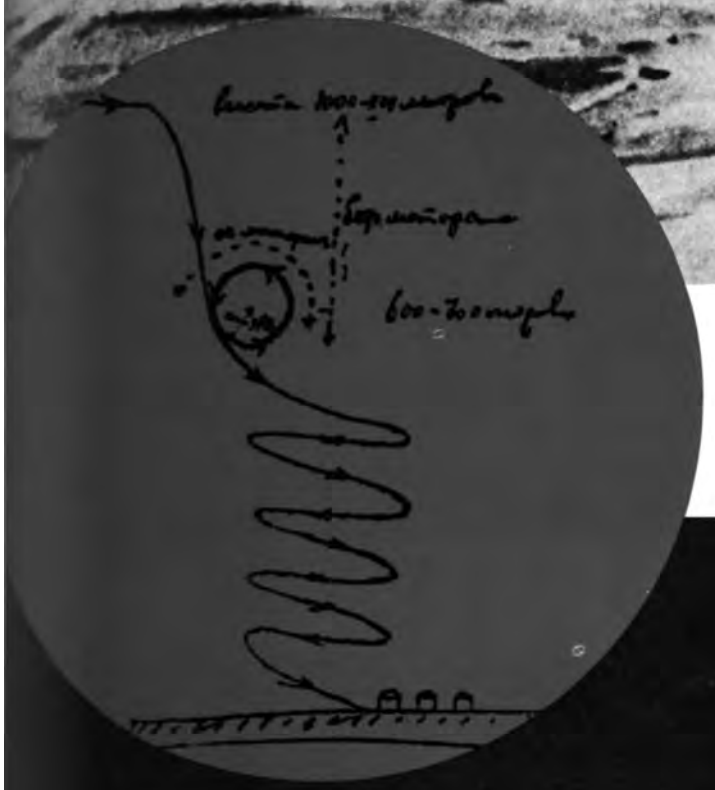
QUESTION: What languages are used for teaching in the USSR?

ANSWER: In grade and secondary schools the teaching is done in the language of the predominant local nationality. As there are some 120 languages in the Soviet Union (50-odd nationalities first acquired a written language of their own under Soviet power), the Russian language is the common language of communication between the nationalities. Therefore, the Russian language is a required subject in all national schools. Besides, all the national republics have Russian schools for the children of parents who consider Russian their native tongue. In cities with a population of several nationalities, schools have been organized where the teaching is done in the languages of these nationalities. For example, in Tbilisi, capital of Georgia, there are Georgian, Russian, Armenian and Azerbaijani schools.

At higher and specialized secondary schools the teaching is done in the language of the union or autonomous republic in which the given school is situated as well as in the Russian language. Every institute department has both Russian and national departments, and the students themselves choose the language in which they want to hear lectures, do their written work and conduct seminars and examinations.

Artseulov, a veteran Russian airman, pictured Nesterov's flight, wheels upside down, in this drawing.

Pyotr Nesterov, Russian Army captain, executed the first "dead" loop in aviation history. He was cited by the Kiev Aeronautics Society for risking his life to make this experiment in aerobatics.



KNIGHTS OF THE FIFTH OCEAN

By Mikhail Lvov

Nesterov with his plane.

CAPTAIN PYOTR NESTEROV of the Russian Army made the world's first correction of artillery fire from a plane and led the world's first group flight. But even if he had done nothing more than execute the first loop in the history of aviation, every flyer, past and present, would still be in his debt.

The loop he executed on September 9, 1913, was no accident. It was as calculated as the experiment of a doctor who gives himself a lethal inoculation to save the lives of others. Before performing the aerobatic maneuver he had thought up, Nesterov, with pencil in hand, did it mentally. Risky? In some languages it is called the "dead" loop.

". . . A pilot cannot do without aerobatics," wrote Nesterov. "Vertical turns and slips, rolls and loops must be part of the training program. . . ." He was right. Nowadays every flyer has to develop a skill in aerobatics.

Nesterov's feat was recognized not only by his colleagues but by scientists. The Kiev Aeronautics Society awarded him a gold medal inscribed: "For your scientifically validated solution of the problem of controlling an airplane in a vertical bank and for your willingness to risk your life for science." In many countries this "dead" loop is also called a Nesterov loop.

Fame did not spoil the Russian ace. In the spring of 1914 he flew from Kiev to Odessa, setting three records at once: in airborne time, speed and distance. He flew the 450 kilometers (279.6 miles) in 3 hours and 9 minutes at an average speed of 142 kilometers (88 miles) per hour. Now, of course, when the Soviet flyer Alexander Fedotov broke his own world record by averaging a speed of over 2600 kilometers (1600 miles) per hour along a 100-kilometer (62.137-mile) closed circuit, the achievements of those days seem modest: A car can travel at the same speed along a good road. But this was at the dawn of aviation.

Pyotr Nesterov made a large contribution not only to aerobatics but to the tactical military use of airplanes. He also did designing. In 1910 the Central Engineering Board considered a project for a craft he suggested: a monoplane with two stabilizers located in the front and the rear and two elevators. It was voted down, and he was refused financial support. He built the plane at his own expense and flew it. Then he began building a second craft. If not for the First World War, which forced Nesterov to interrupt his work, he might have been a famous aircraft designer.

On September 8, 1914, Captain Nesterov rammed and destroyed an enemy plane, losing his own life. During the Second World War his exploit was repeated by hundreds of Soviet flyers. Alexander Pokryshkin, cited Hero of the Soviet Union three times and presently Marshal of Aviation, wrote: "There are many characteristics that to this day are shared by Captain Nesterov and the flyers of the Soviet Union. The fearlessness typical of the Russian people, their readiness to give their lives for the glory and happiness of their Motherland, their willingness to take risks, their persistence in overcoming the obstacles along their path,

Svetlana Savitskaya, 1970 world women's aerobatics champion is a Moscow Aviation Institute student and a trainee of the national flying society. It has dozens of affiliated flying, glider and parachute clubs all over the country. Instruction, planes, gas, oil and airfields are free. Annual dues are a few rubles

Merited Master of Sports Igor Yegorov, aviation engineer by profession, was the 1970 world men's champion. He did not do so well in 1972, missing out on the very difficult tail slide. He is now training for the next international match. Below: The USSR Aerobatics Team. Igor Yegorov is fifth from the left.

the daring of their thought and its revolutionary scope. . ."

There are dozens of flying, gliding and parachuting clubs all over the country with an active membership of young men and women. The clubs are open to anyone whose health is good. The annual dues range from a modest one and a half to three rubles, depending on whether the member is a student or holds a job. All the expenses for professional instruction, planes, gasoline, oil and the use of airfields are covered by the DOSAAF (Voluntary Society of Assistance for Aviation, the Army and Navy).

Merited Master of Sports Igor Yegorov from the Volga city of Kuibyshev, 1970 world aerobatics champion, had this to say about DOSAAF:

"For every Soviet sportsman-flyer the road to the sky is all his own. . . . But there is a vital junction that unites us all. That is a DOSAAF air club."

The career of many famous flyers, including Igor Yegorov himself, confirms the statement.

Igor, the son of a printer, was still in the ninth grade of secondary school when he joined a gliding club. Then, when he turned 17, he switched to a YAK-18 sports plane. During summer vacations he spent his days and nights at the airfield of a club on the bank of the Volga River.

Igor still recalls the thrill of his first independent flight, that incomparable joy of free flight.

He became a good flyer and decided to make aviation engineering his career. He enrolled at an institute, hoping that the combination of study and training at the air club would be manageable. It was. In 1963, still a student, he did such difficult aerobatic stunts as a vertical half-roll, turn at the hump at an angle of 60 degrees from back to back, and an outside spin. The team of Volga flyers to which Yegorov belonged earned the right to compete in the Tenth USSR Championship, which was held in their native city of Kuibyshev.

The senior trainer of the Soviet Union, who had watched the performances, told Yegorov,

"You put on a good show, son. Don't quit this sport."

In 1965 Yegorov classified as a Master of Sports. Not long after that he became a member of the national team.

The Sixth World Championship, held in Great Britain in 1970, was a triumph for Soviet sportsmen. The world's over-all champion was aviation engineer Igor Yegorov; the world's over-all woman's champion was Moscow Aviation Institute student and trainee of the Moscow DOSAAF Club Svetlana Savitskaya.

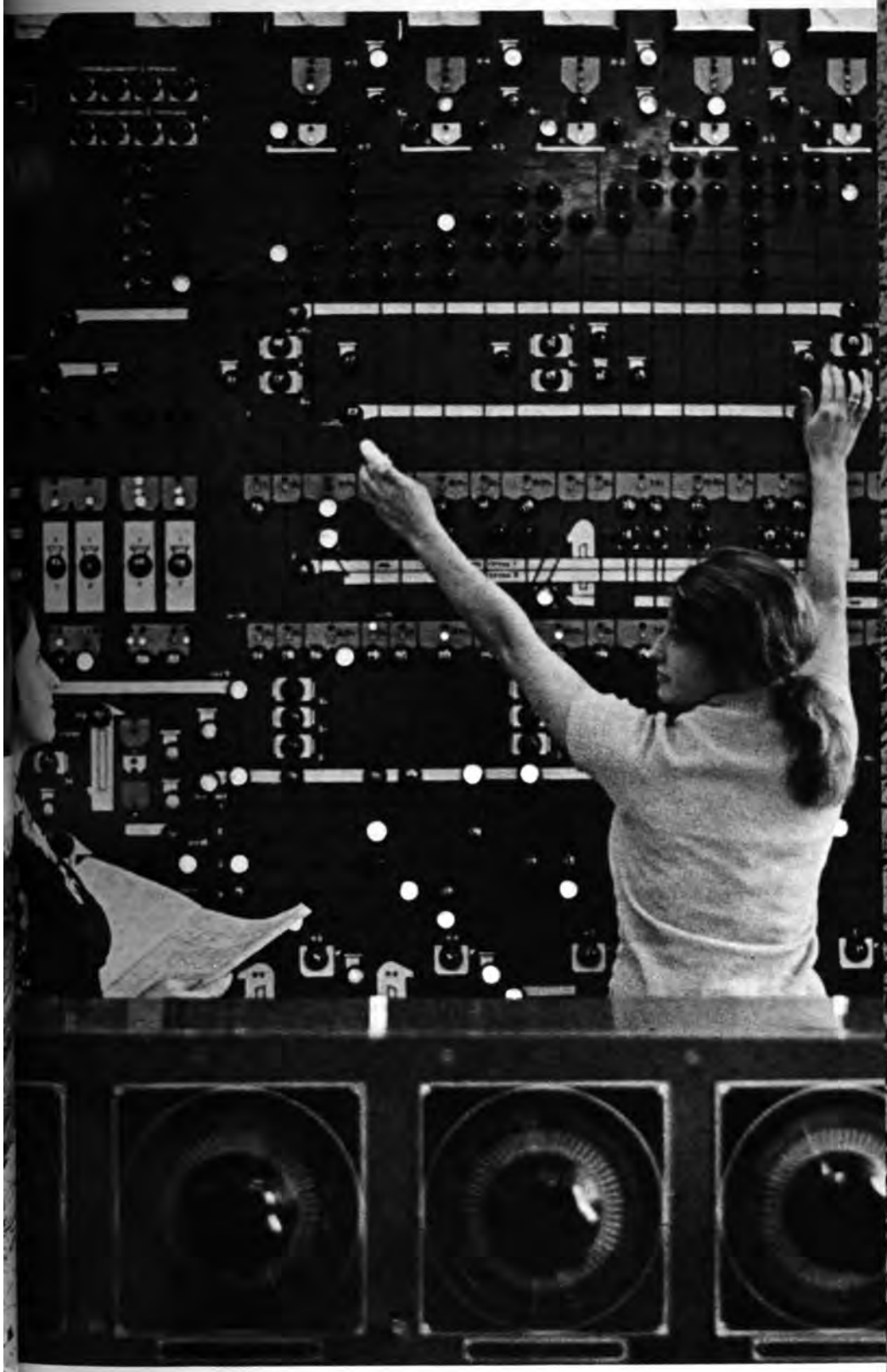
In the Seventh World Championship, in 1972, Yegorov did not do as well. He was unlucky in the tail slide, a very difficult stunt. His plane, after reaching the required height vertically, slid in the wrong direction.

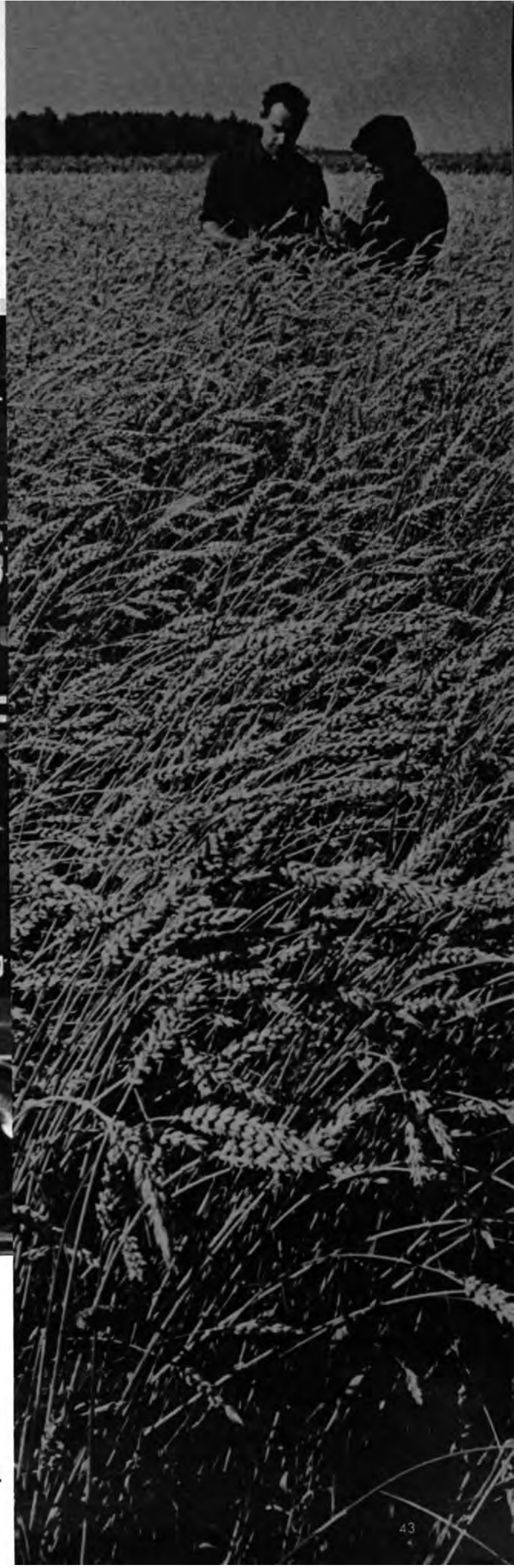
He is preparing now for new international matches, but he still finds time to devote to young sportsmen. Voluntarily, without pay, Igor is teaching them the complex skills of flying.

The descendants of Pyotr Nesterov are continuing the traditions of the knight of the fifth ocean.

THE NEW GRANARY

Grain production is the chief branch of Soviet agriculture.





"A HUNDRED POODS AND MORE"

By Lev Voskresensky

In 1973, 316 million acres were sown to grain in the USSR.

GRAIN production is one of Soviet agriculture's most important concerns. An area as large as France, the Federal Republic of Germany, Great Britain and Italy combined was sown to grain in the Soviet Union last year, 316 million acres.

Climatic conditions for the growing of this food staple, however, are not nearly as good as in those countries. Sixty per cent of the arable land in the USSR is in what we might call the risky farming zone, as compared with the USA's one per cent, for example. About three-quarters of our marketable grain is raised in regions which periodically suffer from severe drought. It is especially hard to raise and harvest grain crops in Siberia, where the growing period is very short, there is little rain, late spring frosts do not end until June and early frosts begin late in August. In a word, natural conditions are less favorable than in any of the developed agricultural countries of the West.

The Ukraine is the oldest and the traditional granary of the Soviet Union. Its contribution to the national yield is very large—one-fifth of the gross output.

The Volga area raises 15 per cent of the country's grain. The black-soil steppes that stretch along the banks of the river and the hot summer's abundance of sunny days yield hard durum varieties of wheat. The best kinds are much in demand both at home and on the world market. The flour from grain harvested in the Volga area makes first-quality bread, semolina and the best macaroni and pastries. Durum wheat is easily recognized. It has heavy, solid ears with long, shaggy awns, and its large, glassy grains are cold to the touch.

But growing this wheat in the Volga area is no simple matter. More than any other part of the country, the region is afflicted with drought. Sometimes the steppes are burned by the sun right down to the ground, the water basins dry up, and drinking water has to be brought to some villages in tanks. The climatic conditions in 1972, for instance, were very bad, but the central government took timely steps to forestall any break in the normal course of day-to-day existence. The livestock yield was not reduced, and the price of bread and other food products did not go up.

The crop return in Kazakhstan, the Urals and Western Siberia that year was good.

The virgin lands, areas of Northern Kazakhstan and Western Siberia which were reclaimed in the 1950s, added 105 million acres to the country's arable potential. Breaking so vast an area to the plow in so short a period is one of the great achievements of the socialist economic system. It took only seven years to create a new giant granary that made grain production less dependent on weather changes in the European part of the Soviet Union. Some 50 years ago all the lands east of the Urals provided nine per cent of the gross output of grain. Now Kazakhstan alone raises 12 per cent and Western Siberia eight. It is also worth noting that, together with the Volga area, the East has become an important supplier of the best varieties of hard wheat—including durum.

The Northern Caucasus, with its rich black-soil steppes along the banks of the Kuban River, raises 10 per cent of all the grain crop. This is probably the only part of the USSR where growing conditions approach those of the warm and humid European countries and the grain-producing states of the USA.

The Kuban district grows a range of soft wheats. If the wheat of the Volga area resembles diamond-shaped crystals, the grain of Kuban looks like amber. It is very rich in protein and vegetable gelatine, and bakes into tasty, light and spongy bread.

The average grain yield in this district is 3,000 pounds and more per acre. Some Kuban collective farms harvest as much as 4500 to 5300 pounds. The farms here are very large: The typical collective farm has over 50,000 acres of mostly arable land.

Though natural conditions in various parts of the country vary widely, as do grain-growing methods and the grain itself, production of this crop and others follows a common plan, whose goal is a more than abundant and completely dependable harvest every year.

Steps taken to improve the yield will go far to help reach that goal. Boris Kurdin, USSR Deputy Minister of Land Reclamation and Water Management, a leading specialist in the field, says:

"It is of course impossible to irrigate all the dry lands, and we do not set ourselves such a task. But even if one-fourth of the land under cultivation had sprinkler irrigation, the grain yield of the USSR would no longer be at the mercy of the weather."

This will take considerable funds and time, but the work has been started. Extensive irrigation systems are being constructed, as a beginning, in the arid Volga area and in the south of the Ukraine. For the first time in the history of the country vast zones of guaranteed irrigated grain production are being created.

Irrigation systems have enabled Soviet selectionists to breed varieties yielding almost 9,000 pounds of grain per acre. The winter wheat Mironosovskaya-Yubileynaya has already produced that yield in experimental conditions. Academician Vasili Remeslo, who bred the variety, thinks its potential crop capacity can be 8,000 to 9,000 pounds per acre. A very high yield indeed, considering that only some 30 years ago the almost unarguable "hundred poods" (1400 pounds per acre) was considered the ideal yield for the Russian farmer. And though folk songs still make references to that hundred-pood harvest, such a yield is no longer extraordinary even in Siberia, not to mention the Kuban and the Ukraine. Attesting to the change is a comment by Grigori Zolotukhin, USSR Minister of Farm Produce Purchases, who worked in the Kuban for many years and knows the district well.

"In 1972," the Minister said, "the Kuban suffered from serious drought, and the average yield was only 2200 pounds per acre. I am not exaggerating when I say that the farmers there were quite disappointed in the yield. A few decades ago such a harvest would have been considered entirely satisfactory."

It is clear that standards have changed, and the progress made by Soviet selectionists is one of the reasons. For example, there is a new variety of summer wheat, the Saratovskaya-29. In addition to its high yield capacity, it also has unsurpassed milling and baking properties. Or take the famous Bezostaya-1. Bred by Academician Pavel Lukyanenko, it ranks first in world agriculture for winter wheat and is the basic variety grown in Yugoslavia, Bulgaria, Hungary, Rumania, Czechoslovakia, Turkey and many other countries. In the USSR approximately 20 million acres are sown with Bezostaya-1, abroad about 7½ million.

Many selectionists believe that triticale, the first artificially bred kind of plant whose cells contain the chromosome sets of both wheat and rye, will make the bread of the future. Nikolai Turbin, president of the USSR Society of Geneticists and Selection, believes that triticale can surpass all other ear cultures in biological potential and crop capacity. Intensive and successful work in chromosome selection is going on in our research institutes.

Crop management and fertilization, as well as mechanization, are other important elements in the Soviet program for larger and more stable yields. These terms have larger meaning than the use of mineral fertilizers and machines. They comprehend soil liming, plant protection, the use of polymers and the creation of a network of agrochemical services—in a word, a whole complex of measures.

Agricultural chemistry is still a young science in the USSR. At the turn of the century, when Western farmers were using mineral fertilizers as a matter of course, Kliment Timiryazev, a Russian naturalist, was explaining to Russian peasants that you did not put saltpeter in the soil to grow salt bread. This is not a folk tale. Old Russia did not produce any mineral fertilizer. The chemical industry is a Soviet product. Our farmers today cannot imagine working without the help of chemistry.

Crops in the Soviet Union have to be harvested quickly, nature sees to that. A great fleet of harvesting machines does the job. Soviet farms employ over two million tractors, 1.3 million trucks and about 700,000 grain combine harvesters. In recent years our combine-building industry has shifted over completely to the manufacture of such new, highly productive harvesters as the Kolos, Sibiryak and Niva. In competitive tests these machines were equal and sometimes superior to such combines of Canadian, French and Belgian make as the Massey-Ferguson, Oliver and Armada.

The grain crop is an important determinant of a country's standard of living. The more grain a country harvests, the more it can allocate for fodder; the more livestock it can raise, the better its people are fed.

The USSR is one of the countries with a high standard of nutrition—3200 calories per person per day. The consumption of meat, milk and eggs is constantly increasing; of bread, going down. A larger fraction of the grain consequently can be allotted to cattle breeding, says Leonid Khitrun, first assistant to the USSR Minister of Agriculture.

During the years of the Eighth Five-Year Plan period (1966-1970) about 88 million tons of grain, half the country's average annual yield during these years, was used for fodder. During the three years of the present five-year plan period the figure has already exceeded 110 million tons.

The aim is to raise the average annual production of grain during the present five-year period to 210 million tons, to harvest 30 million tons of grain more than in the preceding five years.

GLACIER ON THE RAMPAGE
The glacier, miles long and a third of a mile wide, crawled down the mountains burying everything along the way.

This was how Lev Sokolov, leader of the team of hydrologists, got to the newly established observation post. Right: The Medvezhiy (Bear) Glacier was flinging room-sized blocks of ice in our direction. They dropped into the river with a deafening roar.

By Vladimir Surkov

Photographs by Victor Sakk

An emergency report came in from the Pamirs in May 1973: The Medvezhiy Glacier had come to life. In the mountain valley of Vanch the alarm was sounded, and Vladimir Surkov, *Izvestia* special correspondent, took off for the glacier with a glaciological expedition of the USSR Academy of Sciences.

OUR HELICOPTER was flying over a freakish and chaotic mass of rocky mountains covered with ice and eternal snow. There it was—the famous Roof of the World—with the highest mountain peaks in the USSR. Nothing but glaciers everywhere, more than 4,000 of them on the Soviet Pamirs, spreading over an area of some 4,000 square miles. And all of it ice! A mammoth storage battery nourishing all the Central Asian republics.

With blizzards sweeping their abrupt slopes and snowslides vanishing into blue abysses nearby, glaciers, glittering coldly, flow past beneath us. There isn't a living soul in sight. If someone from another planet were to see this endless expanse, he would surely conclude that our Earth is uninhabitable: It is so hard to imagine life of any kind in this land of eternal frost, in this desert of rock and ice.

But these grim Pamir areas only seem to be uninhabited. There is a great deal of life down there below, in those mountains and mountain valleys nature has lifted above the clouds. Before long we saw it. By we I mean the researchers of the USSR Academy of Sciences' permanent Pamir glaciological expedition. Its distinguished chief is Leonid Dolgushin, with a doctorate in geography, who probably knows more about glaciers and their eccentricities than anybody else in the world. An amazing man: At 62 he still does a solid day's field work.

We'll be landing soon. I hesitate to say that out loud, with Yuri Zhuravlyov, the commander of our MI-8, listening; this is a first reconnaissance flight after a long spell of bad weather. For a full month air routes over the Pamirs had been closed by a thick cloud covering, fog and heavy snowfall. There was a break in the clouds today with a

The creeping barrage of water, rock and mountain debris approaches the district center. The last forecast of the field expedition is flashed to the valley by radio transmitter from the mountain area near the glacier.

little sunshine, and we had taken off from Dushanbe, the capital of Tajikistan, and headed for the Vanch district, with its raging Medvezhiy (the Russian for bear) Glacier. No one knows what the weather will be like an hour from now.

With the threatening situation in the Vanch valley, a team of glaciologists, geologists and weathermen has to get to the walking glacier. Khrustalny settlement, which is close to the site, cannot be reached by foot or by car, the highway has been buried by snowslides and rock debris.

The situation is tense but spirits are high. The farms by the river are ready to move people and stock at a moment's notice. Right: More specialists arrive by helicopter.

There It Is—Medvezhiy!

"Look," the plane commander said suddenly. "That's Medvezhiy under us."

We could see a glacier, many miles long and 1600 feet wide, crawling down the mountains, advancing on the Vanch River valley below. This was the glacier's tongue. It had come to life and, moving into the valley, had blocked the Abdukagor River, the Vanch's right tributary, forming a big squarish lake, all set up to unleash terribly destructive mudflows.

His eye taking in all this, Leonid Dolgushin turned to me, "I'm in the grip of such mixed feelings. The fact is that what we forecasted has happened: After 10 years the Ice Bear is spurting forward again. At the same time I am full of anxiety: Medvezhiy is moving considerably larger masses of ice than last time, and it is almost inevitable that the lake will break through, with millions of cubic feet of water coming down on the valley and settlements scattered here and there. We have to prepare for the break to keep the loss to a minimum."

We landed near the mountain village of Poymazor, soon to set out for our first rendezvous with

Leonid Dolgushin (in beret), a Doctor of Science in geography, probably knows more about glaciers and their habits than any man alive. He has been studying Medvezhiy for some 10 years.

the glacier, awakened and stirring.

Alone with the Glacier

Medvezhiy is hurling in our direction multiton blocks of ice they call valises here. Each of them, the size of a big room, drops into the river's rocky bed with a deafening roar.

The glacier's menacing advance has already done some damage, it has pulled down a telephone line. Having blocked the Vanch's right tributary, it has reached the left one—the Dustiroz River. A second ice dam is building up here. The settlement of Khrustalny, where geologists and an expedition of scientists are living, is in grave danger. And though it is situated on a mountain terrace, high above the Vanch River's flood plain, the ice is nearing their cabins.

Dolgushin sets off for Medvezhiy's tongue. For 10 years now he has been keeping the glacier under constant observation. Many scientific and practical conclusions have been reached, and a number of theoretical works have been written on forecasting the catastrophic movements of these ice giants.

Medvezhiy has advanced over a mile into the valley. The mass of ice is now moving at the rate of 33 feet a day. Blocked by an ice dam, the Abdukagor River has formed into a lake containing some 320 million cubic feet of water. In 1963, 215 million cubic feet collected in the lake, and when the lake broke through, a 33-foot-high mudstream rolled through the Vanch valley. Today there are over 100 million more cubic feet of water in the lake, and it keeps coming in. What will the mudflow be like now? The Central Committee of the Tajikistan Communist Party and the republic's Council of Ministers have met and worked out measures to head it off.

Breach in the Dam

The roar of hurtling waters today joined the cannonade of Medvezhiy, the glacier continues to move downward, headed for the mountain valley. Breaking through the ice dam, the water thundered down along the Vanch's rocky bed.

A mountain stream, originating as a small, at times hardly noticeable, streamlet, gradually builds up titanic force, turning into a raging mudstream that has the capability of destroying everything in its path. That was precisely what happened this time. When the water from the lake first breached the ice dam, the hydrometeorological service registered a small drainoff—175 cubic feet per second. Only a few hours later the lake was shooting out 880 cubic feet of water, then 2500, 4300, 8400; then 25,000 cubic feet every second, then 35,000 and, finally, 53,000. The mud-and-rock mountain stream headed for the Vanch valley, its strength steadily increasing.

But people were prepared for it. This natural force could have swept away the bridges spanning the raging river. But they had been dismantled in advance and their metal trusses and girders carried up the mountain slopes.

The creeping barrage of water, rocks and mountain debris was approaching the district center. The main water intake of the Vanch Hydroelectric Power Station is located here, in the river's flood plain. It is not meant, of course, to handle such a terrific flood. But it is already protected by a reliable dam. An hour ago a directed explosion resounded over the river, breaking up a rock-filled cofferdam, and the bulk of the stream, before it even reached the head structure, was deflected along the river's old broad bed.

Many collective farms and villages are located along the Vanch's rocky banks. The people were temporarily moved to safe localities and the cattle shipped out.

The Final Outcome

And now the culmination of the two-month glacial epic. For several hours the elements raged at the district center as well as along the entire river. But none of the structures nor the hydroelectric station proper was damaged. More important, not a single person was hurt, although 530 million cubic feet of water came pouring out of the lake up in the clouds.

Some of the glaciologists, hydrologists, geologists and weathermen in this emergency expedition to the Roof of the World.

ART ON STAMPS

By Leonid Fursenko

WORKS OF ART—Russian, Soviet and foreign—are reproduced on USSR postage stamps periodically. Here are philatelic reproductions of masterpieces in Moscow's Tretyakov Art Gallery, named in honor of its founder, collector Pavel Tretyakov (1832-1898). In the hundred years since its founding the gallery has collected some 50,000 paintings, drawings, sculptures and icons by Russian artists from the eleventh century to our time. The works reproduced on these stamps date from the second half of the eighteenth to the close of the nineteenth century.

In the latter half of the eighteenth century Russia experienced a flowering of national culture that was strongly influenced by the progressive ideas of the Enlightenment. In 1757 the Academy of Fine Arts was founded, an institution that has trained a great many Russian painters, sculptors, architects and engravers. One of the distinguished painters of the period and a leading member of the academy was Anton Losenko (1731-1773), a man of peasant origin. While giving preference to the then dominant historical genre, he was also an outstanding portraitist. His studies of contemporary figures in the arts include the important *Portrait of Actor Fyodor Volkov,* father of the Russian theater, which he did in 1763. The masters of eighteenth century Russian painting, in general, deserve special credit for their studies of contemporaries, notably Fyodor Rokotov (1735/36-1808), whose sensitive renditions portrayed the convictions and inner life of his subjects. His *Portrait of Poet Valerian Maikov,* done in the 1760s, is a fine example of his work. Paintings of everyday life were the exception in those days. All the more interesting, therefore, is *A Peasant Dinner* (1774) by Mikhail Shibanov (dates of birth and death unknown). The work testifies to the broad creative scope of this portraitist, a serf of Count Grigori Potyomkin. The creations of Dmitri Levitsky (1735-1822), which influenced many painters, marked the summit of eighteenth century Russian art. His characterizations are always precise, diverse and individualized, as, for instance, his *Portrait of Nikolai Novikov*—an eminent Russian enlightener and publisher—done in the 1790s. By the close of the eighteenth century, landscape painting moved up to a place of prominence along with historical paintings and portraits. Fyodor Alexeyev (1753-1824) is considered one of the pioneers of Russian lyrical landscape painting. Traveling through Russia, the artist carefully depicted on canvas the specific features of different cities, creating their distinctive "portraits." You might call Alexeyev's paintings architectural landscapes. His *View of Voskresensky and Nikolsky Gates* (1811) gives an idea of his style, his light and free brushwork.

Russian art of the first half of the nineteenth century reflected the social contradictions of the period. A realistic portrayal of life took precedence, and much of the painting done incorporated progressive ideas. The work of Alexei Venetsianov (1780-1847) was the most considerable achievement of the period. He was probably the first of the Russian painters to devote himself entirely to genre painting, to link his artistic interests with the life of the people. A good many of Venetsianov's works depict peasant children as, for example, *There You Have Dad's Dinner,* which he painted in 1824.

Along with Venetsianov, Vasili Tropinin (1776-1857) was a major figure in the development of Russian realist art of the first half of the nineteenth century, particularly in portraiture. He painted writers and artists, nobles, merchants and common people. His interest in people led Tropinin to the creation of such type portraits as *The Lacemaker* (1823) and *The Guitarist* (1832).

The peculiarities of Russian portraiture of that period were most vividly embodied in the creations of Orest Kiprensky (1782-1836). More, Kiprensky made his own contribution to world portrait art of the age. He combined brilliant execution with humanist content, profound interpretation of image and expressiveness. These qualities characterize his *Self-Portrait* (1828).

Karl Bryullov (1799-1852) brought a major development to Russian art: Russian classicism was on the decline by then, giving way to the romanticism of such canvases as his *Italian Noon* (1831). Bryullov influenced a good many painters of subsequent generations, among them Ivan Aivazovsky (1817-1900). The sea was Aivazovsky's only subject, the theme of several thousand of his paintings. His creations, with great scope, feeling, strength and grandeur, seek to capture the sea's rich diversity, its boundless inconstancy. He caught one such moment in *The Seaside* (1840).

Mid-nineteenth century Russian art was marked by the increasing emergence of genre painting. Pavel Fedotov (1815-1852), an artist with a tragic destiny, was its most distinguished representative. Closely observing everyday events, Fedotov portrayed the life and morals of the petty nobility, merchants and civil servants, thus preparing the ground for the critical trend in painting. His *The Young Widow* (1851) is intensely dramatic.

Alexander Ivanov (1806-1858) also devoted his life to the fight for a new, socially meaningful art. He sought to give his images content and emotional and psychological expressiveness. His plein-air painting much anticipated the efforts of other artists. Italian nature in his landscape *The Lower Gallery in Albano* (mid-nineteenth century) is depicted with great philosophical depth and freshness.

Ivan Shishkin (1832-1898) was a major figure in Russian landscape painting of the latter half of the nineteenth century. His images of nature are poetic, conveying the national and even local distinctiveness of the landscape. The forest—its grandeur and mystery—is one of his favorite themes. *Pine Wood,* done in 1872, is characteristic.

Alexei Savrasov (1830-1897) is one of the classic landscape artists of that period. His modest but poetical landscapes re-create the essence of Russian nature. He saw and had the gift for conveying the poetry of an outwardly quite unattractive landscape as, for instance, in *Country Road* (1873).

New elements entered into Russian art of the second half of the nineteenth century, a critical view of real life and sympathy for the common people. The works of Vasili Perov (1833-1882), exposing everything that degraded and incapacitated man, differed markedly from the paintings of the preceding period. Portraiture also occupied an important place in his work; his *Fyodor Dostoyevsky* (1872) is a masterpiece.

The movement of Russia's foremost artists for a democratic realistic art was led by Ivan Kramskoy (1837-1887). His famous portrait of the Russian poet Nikolai Nekrasov (1877) is a sample of his insight into the psychology of his contemporaries. He was for many years the ideological leader of Russia's painters, more particularly he was the nonacademic mentor of Ilya Repin (1844-1930), the greatest artist of the period. Probably no other Russian artist painted so broad a picture of contemporary life and gave it so much diversity as Repin. His *Arrest of a Propagandist* is dated 1880-1892.

Vladimir Makovsky (1846-1920) was also an advocate of the progressive ideas of his time. His subjects were extraordinarily diverse and included civil servants, priests, old military men and pensioners. *Meeting* (1882) is one of his most famous paintings: A peasant woman comes to see her son who has been apprenticed to an artisan in the city.

Vasili Surikov (1848-1916) devoted himself completely to Russia's past. That does not, however, belittle his importance in the history of Russian art. He achieved exceptional depth and truth, and depicted with great force a number of major events in the history of Russia's people. All told, Surikov painted only seven canvases, but each is the work of a gifted artist. The subject of one—*Boyarinya Morozova* (1887)—is a seventeenth century religious movement.

Nikolai Kasatkin (1859-1930) was the first painter to portray the life and struggle of Russia's working class. His paintings shocked contemporaries with the boldness and novelty of their content. His *Woman Miner* (1894), remarkable for its emotional expressiveness, is the product of a visit to the Donets Coal Basin.

Mikhail Vrubel (1856-1910) was one of the most talented and original artists of the late nineteenth century. His work bore the imprint of the coming twentieth century. The theme that runs through all his work is the tragic conflict between society and the strong, proud individual. Vrubel drew much of his subject matter from mythology, epic songs, folk tales, legends and classical literature. His *Princess Swan* (1900), for example, is a symbolic treatment of Alexander Pushkin's *Czar Saltan.*

Art treasures of the famous Tretyakov Gallery on stamps

THEATER IN AN AUTO PLANT

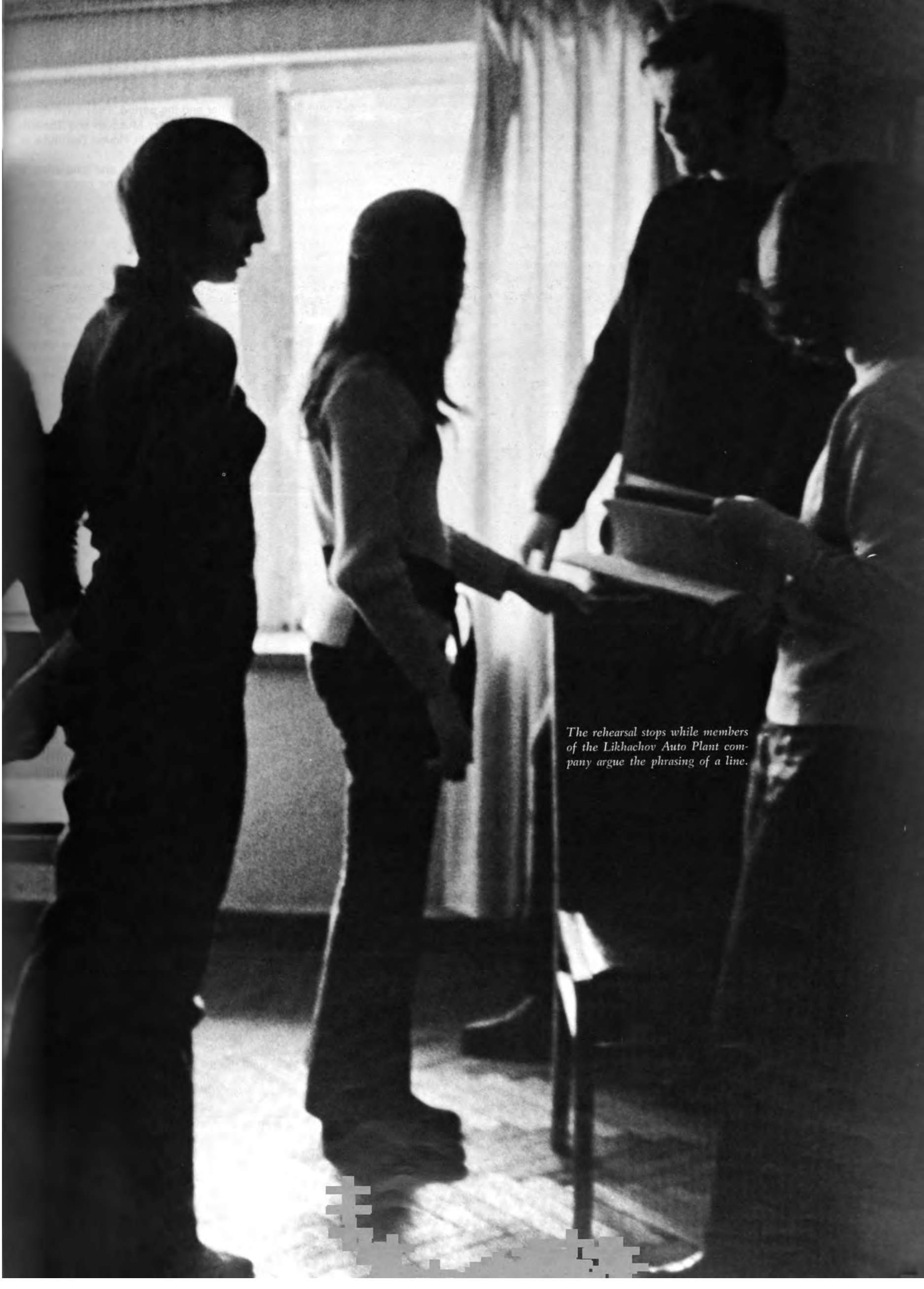
By Anna Nikolayeva

Photographs by Alexander Lobov

Over half the Soviet Union's towns and cities have an amateur theater. There are 1200 of them, twice the number of professional companies. Performances are given in almost all the languages spoken in the USSR. The directors of these amateur troupes receive their training at institutes and theater schools.

Every year the work of these theaters from all over the country is shown in Moscow at the Bolshoi Theater and the Palace of Congresses.

Some 10 years ago the title of People's Theater was established for the best of the amateur companies. More than 900 have won the title.



The rehearsal stops while members of the Likhachov Auto Plant company argue the phrasing of a line.

THE PEOPLE'S THEATER of the Likhachov Auto Plant in Moscow is one of the country's oldest amateur theaters. It opened on February 10, 1937, to mark the centenary of the death of Alexander Pushkin with a program of the poet's works. Every year since, the company has staged a Pushkin performance on this anniversary date.

As is true of all the people's theaters in industrial plants, the members of the company and most of its audience are workers. The function of these theaters is to provide the workers with an avenue for creative expression and give them an appreciation of dramatic art.

In the 30 years since it was founded, the People's Theater of the Likhachov Auto Plant has developed a style of its own and a repertoire composed, in the main, of heroic and romantic plays.

As a rule, the theater prefers not to mount productions other theaters do. Often the actors will produce original drama or adapt fiction and poetry for play or reading performance.

Russian classical playwrights are represented by Gogol, Turgenev, Ostrovsky, Leo Tolstoy and Chekhov, and Soviet literature by Gorky, Sholokhov and Paustovsky. Foreign plays and works of fiction staged by the company include Shakespeare's *Romeo and Juliet, The Gadfly* by Voynich, *The Friends from Pittsburgh,* adapted from Mark Twain's *The Adventures of Tom Sawyer* and *The Adventures of Huckleberry Finn* and a reading of American short stories.

Not too long ago the People's Theater celebrated the thirtieth birthday of *The Friends from Pittsburgh.* All seven actors who have played Tom Sawyer, beginning with Vladimir Mochalin, the first Tom, and ending with the present one, Kolya Denisov, a student at the theater studio, took part in the jubilee performance.

Some plays in the repertoire are put on every year. Each new generation of actors gives them its distinctive touch. And there is no hiatus in the development of succeeding generations: Future actors are trained at the theater's children's and youth studios. Boys and girls 11 to 14 whose parents work at the plant or live in the neighborhood are admitted to the children's studio through competitive examinations. After three years of study they move on to the youth studio, following which they become regular members of the company.

Preparing for a new production at the People's Theater, the actors try to become one with the character and the period. They have available the collections of the Bakhrushin Literary Museum and Theatrical Museum in Moscow and that of the Pushkin House (Institute of Russian Literature) in Leningrad.

Working on Turgenev's *A Month in the Country* and preparing a stage version of his *Spring Freshets,* members of the casts visited the Turgenev museum in Orel, where they studied nineteenth century photographs and documents. They also walked in the beautiful old park in Spasskoye-Lutovinovo, once the Turgenev estate, where they gave a performance of *A Month in the Country* for the local collective farmers.

In preparation for *Natasha Rostova,* adapted from *War and Peace,* they made two visits to Tolstoy's museum-estate in Yasnaya Polyana, where they also performed for the local people.

The plant's trade union covers all the theater's expenses, which include the salaries of the producer, the orchestra leader and the stage directors, who also teach at the studios, and the costs of the trips the company makes to various cities. The theater has a makeup room and wardrobe of its own, the costumes usually designed by graduates of a theater school.

Some of Likhachov's amateur actors—assembly line workers, a technician and an engineer.

The entrance to the plant's palace of culture looks much like the foyer of a professional theater.

Amateur actors never have as much time for rehearsals as they would like. It isn't always easy after a day's work at a lathe or in a design office to shrug off fatigue and get down to business, but love for the theater prevails.

Victor Zunin was 13 when he entered the studio of the People's Theater. Today at 33 he is an engineer at the plant, secretary of the party organization in his department, married and with a little girl of three. In spite of his job and his social and family responsibilities Victor rarely misses a rehearsal. "To be able to express through my characters the things that interest me in life—that's the greatest satisfaction," he says. Why didn't Victor become a professional actor? Because his life would not be complete without engineering, no more than it would be without the theater.

On Saturdays and Sundays the doors are opened to the public. The theater is always full: Not only the 200 people who make up the company and study at the studios consider it their own; everybody who works at this big automobile plant has an emotional share in their People's Theater.

Valeria Talashova is getting her acting training in the theater's youth studio. She works in the motor shop of the Likhachov plant.

The repertoire includes classical Russian, Soviet and foreign plays. Scene from Turgenev's A Month in the Country. *Left: A modern play of the sea.*

A scene from the amateur theater's production of Snow Queen. *Tanya Anisimova is Gerda and Nikolai Novoshilov is the king.*

Larisa Korovkina as Zhenia Komelkova in the play The Dawns Are So Quiet Here.

LAWYER AT A PLANT

By Nikolai Belov

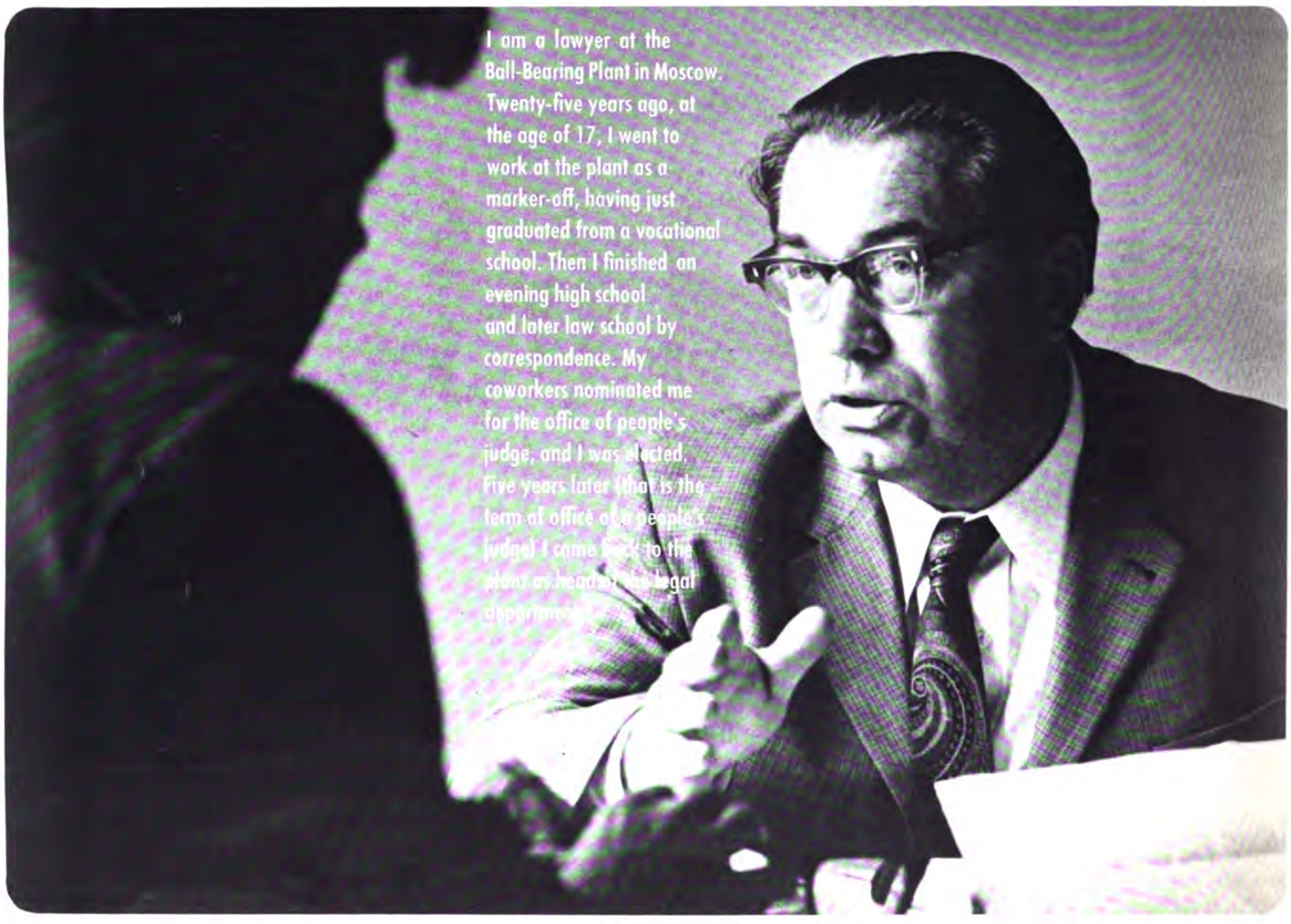
FIVE PEOPLE make up the legal department at our plant. Our main job is to familiarize the plant personnel with the law, giving particular emphasis to labor-management provisions. A ready knowledge of labor relations law is important for employees in the personnel department, for instance, who hire, fire and promote factory and office workers. For people in that department we have organized a special three-month course. Not long ago I gave a lecture for this course on transferring workers from one job to another. The personnel staff must know exactly the who and the why and the when of every such job shifting. At a Soviet plant or office a worker may not be transferred without his or her consent, nor is management permitted to put the employee in a lower paying job. There are exceptions: A worker can be demoted for a serious violation of work rules or some other action which has caused material damage. But even this penalty requires the consent of the trade union committee.

Lawyers speak regularly at meetings of active trade union members, who often suggest the topics. The graduates of vocational-technical schools are particularly interested in labor legislation because of the very substantial privileges they are entitled to under the law. We explain, for example, that the working day of teenagers is two hours shorter than that of older workers, six hours is the limit. They earn equal pay for equal work and a vacation of 24 working days, which can be taken at any time of the year.

We do not confine our work to labor-management differences. People often come to us for legal advice on other matters. One not atypical example was the situation of a woman worker with children who got a divorce and wanted to know how much of her husband's income she was entitled to. We told her that a father has to pay a quarter of his earnings for one child and a third for two children. That includes all his earnings—extras like overtime work and bonuses.

A lathe operator (a correspondence student at a technical school) came to me recently with a complaint. His shop superintendent refused to give him paid leave to take his exams. We found out that the shop was understaffed, but we insisted that the law had to be observed. The student got his paid leave.

One might ask: Doesn't this application of the law tend to slow down production? No, it would only seem to. In this case, management put narrow interests ahead of the general good. The point is that not only is the lathe operator interested in furthering his education, in becoming a more productive worker; the plant wants him to advance himself. The law giving paid leave to students



holding full-time jobs was adopted precisely because it reflected the larger interests of socialist society.

Another example of management ineptitude involved a worker who complained to us that his resignation notice was being ignored. He wanted to change jobs. Soviet law says that if an employee wants to leave the job, two weeks' notice must be given. If by the end of the two weeks the order of dismissal has not been signed, the worker may stay away from work and continue to collect the wages, but—at the expense of the executive who did not sign the order. In this case the matter was settled by explaining the situation to the shop superintendent. But if it had not been amicably resolved, we could have taken it to court.

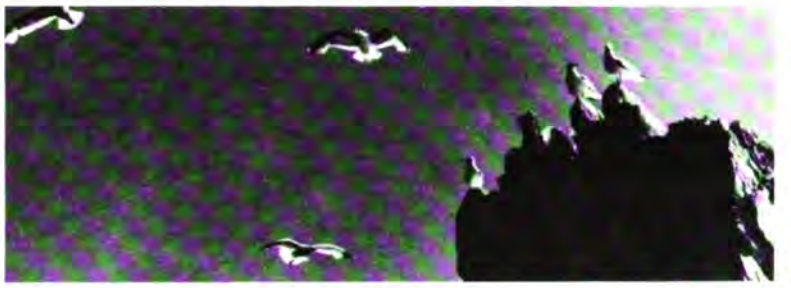
People sometimes ask if our interference does not chip away at respect for management. We think it is just the other way round. If we had not stepped in, both shop superintendents would have taken unlawful actions which would have had to be reversed anyway. And this would have really hurt their reputations as responsible administrators. The fact that in the past few years not a single employee at our plant has brought a complaint about the unlawful actions of management to court shows how strictly the labor laws are observed here.

But that is only a part of our work. Another of our jobs, no less important and time-consuming, has to do with contracts: Lawyers are involved in the plant's relations with its suppliers and with the enterprises that buy its goods. So in addition to the law we must know our economics. Such things, for example, as the quality and volume of metal to be delivered for ball-bearing manufacture are not everyday matters. Should we or our suppliers have complaints, they are looked into by an arbitration commission responsible to the executive committees of the regional Soviets of Working People's Deputies and the Councils of Ministers of the autonomous and union republics. The final arbitrator is the USSR Council of Ministers. The interests of our plant in arbitration proceedings are defended by our legal department.

A good example of our work was a recent case we won against an enterprise which did not make deliveries on time, thereby violating the terms of our contract and putting us to considerable expense. The enterprise had to cover our losses.

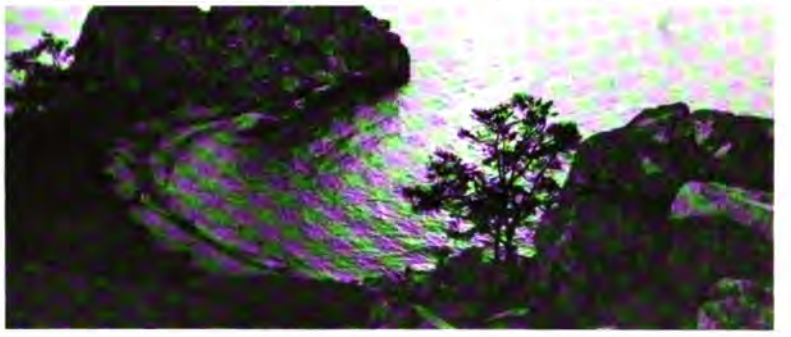
Our duties, then, are to familiarize plant personnel with the law, act as their legal counsel in case of need and advise the plant management on business contracts.

NEXT ISSUE



The theme of the May issue is environmental protection, a subject that has always had high priority in the country. Among the earliest decrees adopted by the new Soviet state were those dealing with the use of woodlands and fishing grounds and the establishment of a wildlife preserve in the lower reaches of the Volga. The government, headed by Lenin, recognized the importance of taking immediate protective measures even at a time when the country was gripped by famine and devastation. An article discusses the role of the state in protecting nature and the 200 decrees that became the basis of Soviet legislation.

Leningrad is the country's second largest city and one of its leading industrial centers. Our correspondent was curious about how a city with 2,000 factories could remain free of smog and have a river running through its center clean enough to swim in. She interviewed Vasili Kazakov, its mayor, to get some answers. Among the things he told her was that Leningrad has a general development plan drawn up in 1966 which takes into account the major sources of pollution and provides for eliminating them. It can be done. Leningrad is living proof of that.



The land shelters and nourishes the people who inhabit the planet Earth. A recent round-table discussion sponsored by the magazine *Voprosy Filosofii* dealt with, among other subjects, the wasteful and thoughtless extraction of the Earth's mineral resources that threatens to exhaust the coal supply in 100 to 150 years, the silver supply in 13 to 40 years, and lead in 20 to 60 years. The food problem is also acute and will become worse with the population growth. There are already 2.4 billion starving or semi-starving people for every 450 million who have enough to eat. Is population control the answer or are there other practical solutions? A portion of the discussion is reprinted in May.

The rising salinity of the Sea of Azov threatened its tremendous fish yield—70 pounds per acre of water. Damming the Kerch Strait will control it to within 0.05 per cent. An article about a complex and ingenious scheme—the first of its kind in the world, say the specialists.

"The forests saved our Revolution from starvation. It is the duty of each of us to plant trees to replace those cut down." So read the Komsomol appeal on Forest Day in 1923. A picture story shows how the younger generation is fulfilling this duty and many other related ecological tasks projected by nature protection organizations throughout the USSR.

An American teacher's impressions of Soviet educational methods based on his observations and experience in teaching literature to Soviet students.

The Oka River flows through the large industrial city of Ryazan in the Russian Federation. It has a population of 350,000, as well as thermal power stations, nonferrous metallurgical installations, foundries, one of the largest oil refineries in the country and a synthetic fiber plant. How is it, then, that the water at the city beach is not polluted? The answer to this question is the subject of a well-illustrated article.

COMING SOON

An issue for and about children

SCIENTIFIC AND TECHNOLOGICAL COOPERATION BETWEEN CMEA AND EEC COUNTRIES

By Dzhermen Gvishiani
Corresponding Member of the USSR Academy of Sciences,
Vice Chairman of the State Committee for Science and Technology of the USSR Council of Ministers

TWO integrated economic regions have taken shape on the European continent: the European countries of the Council for Mutual Economic Assistance and the members of the European Economic Community (Common Market). Although the two groupings embody simliar processes of internationalization and concentration of productive forces, they reflect the fundamental difference of their socioeconomic systems.But this difference does not exclude the peaceful coexistence of the two groupings, the mutual value for the countries in contemporary Europe's integrated regions of economic, scientific and technological ties.

The present international atmosphere is favorable for a basic change in the economic relations of Eastern and Western Europe. Indications of this change are the good relations, both political and economic, that have developed between the Soviet Union and France and the Federal Republic of Germany. The need for cooperation is, to a considerable degree, dictated by the scientific and technological revolution.

No country can hope to achieve economic and social progress without mastering the new technology. But this entails tremendous expenditures, the efforts of large research groups, the construction of sophisticated and expensive experimental and semicommercial equipment, and the use of the most advanced computer technology. Nations with small or medium-size potentials and reserves cannot assimilate the findings in all fields of study at once and apply them to full effect.

The organization of large-scale production, particularly of items that need intensive scientific and technological development, requires pooling the efforts and resources of several countries and adjusting to the potentials and demands of a large market. All this makes imperative the development of scientific, technological, production and commercial cooperation of the countries of Eastern and Western Europe, the CMEA and Common Market countries included.

For example, the environment has become a major world problem. The contamination of the air and water, soil deterioration and the depletion of natural resources are serious concerns in many countries, especially the USA and Western Europe. Such problems as the pollution of the environment by industry and transport, the wasteful extraction of minerals, the neglect of reclamation measures, the use of injurious fertilizers and chemicals, the interference with the ecological balance are not, of course, an inevitable consequence of economic activity. They can be avoided by using the findings of science and technology.

The solution to these problems, as well as to those of continued economic development, is well within the capabilities of the European countries. They have already accumulated a large body of experience in economic, scientific and technological cooperation both inside and outside the CMEA and the Common Market. Long-term scientific and technological ties have expanded particularly. These include intergovernmental agreements for the solution of problems through specialization and cooperation in production.

Tracing the evolution of the Soviet Union's scientific and technological ties with most European countries, we find that at first there was only an occasional exchange of individual specialists and scientists. Then followed a period when agreements on cultural and scientific exchanges were concluded. In the last five-year period there has been a tendency to move on to joint projects.

In recent years CMEA member countries have concluded several hundred agreements with West European countries, primarily with EEC countries, both on an intergovernmental and intercompany basis. Apart from the USSR, Bulgaria, Hungary, Poland and Rumania have accumulated considerable experience with such agreements in recent years. They provide for the sharing of scientific and technological information, patents and licenses, for joint research and design, and the cooperative manufacture of various items. The latter includes the exchange of parts and units and the coordinated marketing of the finished product in the cooperating countries and on the world market. The mechanism of this type of cooperation is being improved, and new areas are being developed.

In their scientific and technological exchanges with the West, the CMEA member countries are equal partners, making a substantial and ever growing contribution. The CMEA members have a good experimental and production base and wide-ranging commercial contacts on the world market. This is particularly true of the Soviet Union, whose scientific and technological potential, experience in large-scale research and achievements in advanced fields of science and engineering are generally known. All this taken together creates favorable conditions for large-scale joint projects and for the marketing of new products throughout Europe and the world. CMEA undertakings are open to nonmembers in Europe and on the other continents.

The Soviet Union and other CMEA members welcome cooperation with Western Europe. The ties between the USSR and many West European countries testify to this fact. Soviet-Italian scientific and technological cooperation is one example. The Soviet Union is working with more than 30 Italian industrial and financial agencies and companies. FIAT is helping to build the Volga Auto Plant in Togliatti. Agreements have been concluded with IRI for ferrous metallurgy, shipbuilding, machine building, transport and telephone communication; with ENI for oil and gas, as well as with textile and knit goods firms and other branches of light industry.

The Soviet-Italian projects for the extraction and transport of natural gas are also mutually profitable. Agreements in this field cover a period of 20 years and more.

Cooperation between the USSR Academy of Sciences and three major Italian scientific institutions—the National Council for Scientific Research, the del Lincei National Academy and the National Institute of Nuclear Physics—is also developing rapidly.

Soviet and French scientists and specialists have been working together in such fields as physics, oceanography, hydrology, biology, public health and the use of computer technology in planning and production management. Soviet-French cooperation in industry includes such undertakings as the joint development of a continuous metallurgical process, oil well drilling, and the manufacture of chemical products, as well as the construction of a number of large industrial complexes in the USSR.

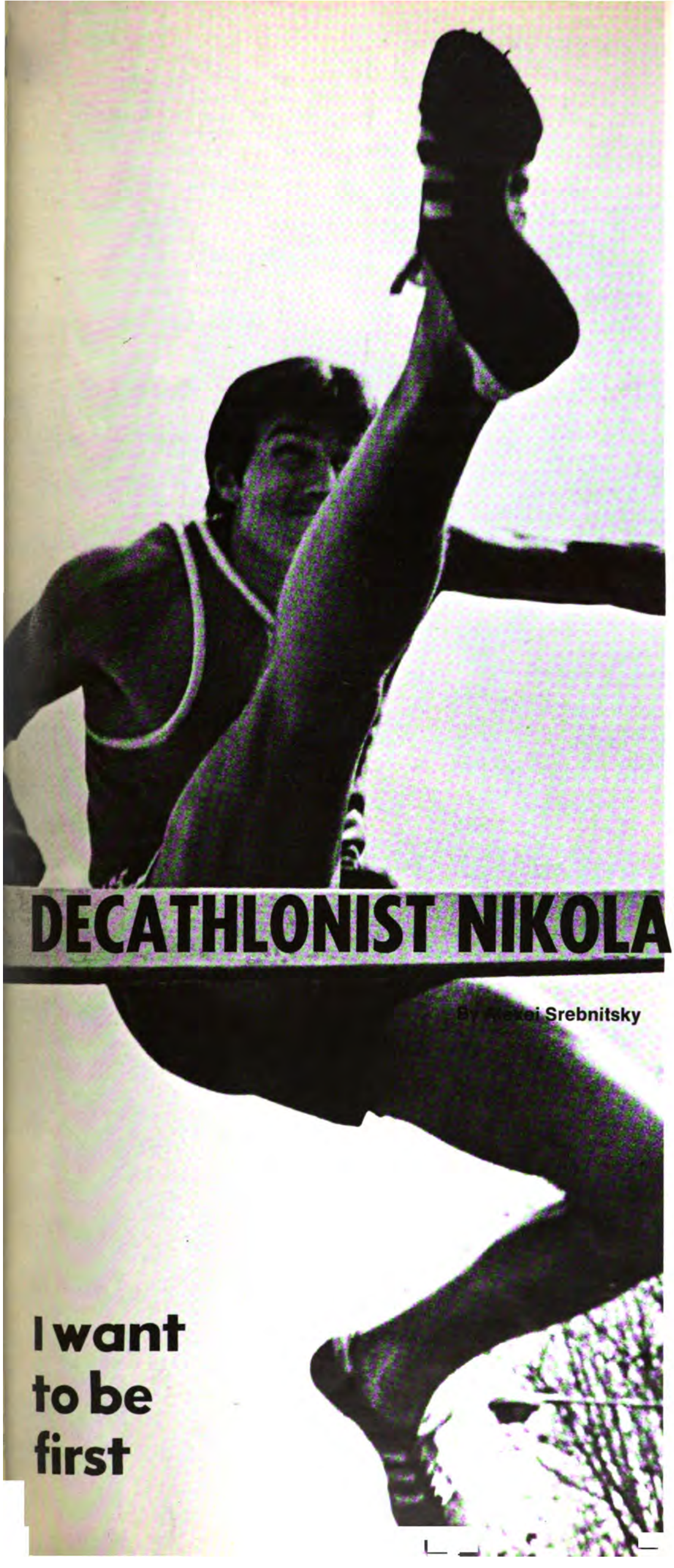
The Soviet Union's scientific and technical ties with Austria, Belgium, Denmark, Finland and Sweden have expanded in recent years. Cooperation with leading Dutch and Swiss firms is growing. Some 30 projects have been negotiated for scientific and technical cooperation with companies in the Federal Republic of Germany, and a joint commission will soon be created for scientific, technological and economic cooperation between the two countries.

The creation of unified power and transport systems, the organization of transcontinental transportation and other joint efforts of several European countries can establish a solid basis for cooperation. Similarly, the combined efforts of European scientists could be of great significance in combating cancer, cardiovascular and virus diseases and other health problems.

These, to our mind, are the main areas for European cooperation, including among the CMEA and EEC countries. They could serve as organizational structures for the evolution of joint scientific research and coordinated projects.

It is in the interest of the European continent to extend this cooperation to such highly developed countries as the USA and Canada, which have traditionally been linked with Europe.

Scientific and technological cooperation will make it possible to increase the scientific potential of each European country and of the continent as a whole, to bridge the scientific and technological gap between the various states and strengthen the mutual ties of the European peoples.



I want to be first

DECATHLONIST NIKOLAI AVILOV

By Alexei Srebnitsky

"Avilov is great! What he has done is an inspiration to Europe!" exclaimed the famous West German decathlonist Willi Holdorf. That was after the tall Soviet athlete in the red jersey ran the 1500 meters, the last event in the decathlon, at the Olympic Stadium in Munich. Until that finish, that is to say, until August 1972, Holdorf was the only European who had ever won the Olympic gold medal in the decathlon (Tokyo, 1964). The second man to beat the Americans was 24-year-old Nikolai Avilov (height 6 feet 3 inches, weight 185 pounds). In his 10 years in sports, Avilov had competed in the decathlon 20 times. This last time, in Munich, he broke a world record, which added a special glow to his Olympic gold medal. The victory in the decathlon is deservedly considered the most important in athletics. What accounts for Avilov's achievement? "In all the years he has trained, he hasn't missed a single workout," the champion's coach, Vladimir Katsman, said.

NIKOLAI AVILOV went in for athletics with no thought of the decathlon. In 1961 his model was the famed high jumper Valeri Brumel.

He enrolled at a children's sports school in Odessa (a big Ukrainian port on the Black Sea) for the high jump. But he soon decided that going through the same motions day after day was a bore. Tall, springy and fast, he was easily persuaded to join a basketball team.

An instructor at the school who happened to meet Vladimir Katsman, one of the best coaches in Odessa, told him about the very capable but fickle adolescent. Katsman was not overly impressed but decided to check on Avilov anyway. They had a talk and got down to business.

At 16 Avilov cleared the bar at 6 feet 6 inches. There was no competition for him in Odessa, and he was bored. Reproaching him for irresponsibility, the coach got Nikolai started on the shot, the discus and the pole vault. Anything to keep this capricious youngster, for whom he had high decathlon hopes even then, from running off to the basketball court, or anywhere else, again.

When Nikolai said he was aiming to pass the eight-foot mark in the long jump (a new event), Katsman threw another idea at him:

"How about a different eight—8,000 points in the decathlon?"

In 1965 Avilov captured the USSR scholastic championship in the decathlon. Three years later he went to the Olympic Games in Mexico, where he placed fourth. This too was something of a surprise; the Olympics decathlon is a sport for full-grown men, and at the high altitude of Mexico City many of them were breathless and depressed from lack of oxygen. Avilov was just past his twentieth birthday, and he hadn't yet lost his adolescent gawkiness.

"In all the years he has trained," said coach Vladimir Katsman after Avilov broke the decathlon record in Munich, "he hasn't missed a single workout."

Avilov is a graduate of the law school of Odessa University. He had to give up sports for nearly half a year to work on a thesis for his degree.

Avilov met his wife Valya, a high jumper and bronze medal winner, at the Olympics. His plans for six-month-old Seryozha: soccer playing.

Coach Katsman searched him out at a children's sports school in Odessa and got him started on the shot-put, discus and pole vault.

Mexico convinced the specialists that Avi was psychologically stable and, as Katsm claimed, a potential Olympic champion.

As for Avilov himself, his first Olympics pressed him for reasons other than the decathl

"In Mexico I met Valya."

Competing for Two

Avilov's wife, the former Valentina Kozyr, is self a well-known athlete. At the Mexico Olym she won the bronze medal in the high jump.

They are a tall, attractive couple. After his tory in Munich Avilov said:

"I couldn't possibly have made a poor show —I was competing for the two of us."

Valentina, then six months pregnant, stayed home in Odessa. Avilov promised her he'd bring home a gold medal, and he did. that she had any doubt about it.

Neither did Nikolai's father Victor. Before s ing his son off to Munich, he bought a sheep: son will be coming back a champion, and need the sheep for a celebration feast. All Ode is invited."

Odessa celebrated.

An All-Round Contender

Actually, only those very close to Avilov unquestioning faith in an Olympic victory prior Munich. After the very promising showing in M ico, he failed twice in the four-year interval, hopelessly lost the European title to Joachim K of the German Democratic Republic. While Av did reach the 8,000 mark, he won the natio title only once and did not approach the natio record set shortly before by Boris Ivanov. In list of the world's leading decathlonists for pre-Olympic year 1971 Avilov was fifth—after K Bendlin (Federal Republic of Germany), Ivan Kirst and Hans-Joachim Walde of the FRG. Mo over, he made only two starts the whole seas

Even his participation in the Olympic Gam was in question at one time. Some of the lead experts thought Katsman had given his pupil small a training load in the pre-Olympic seas Only the energetic intervention of Ivan Stepanch nok, head coach of the USSR team, and country's outstanding decathlon specialist Fr Kudu outweighed the adverse judgments.

Katsman knew what he was doing. At the ti Avilov was suffering from a serious stomach ment. Valentina hurriedly made herself a speci ist in dietetic food, and the coach, just as quick revised the training program for the Olympi particularly cutting down on the number of p formances in official meets. The coach knew f failure is bad for morale; what Avilov needed w a psyching up that would make him put eve thing he had into his Olympic effort.

And that's how it worked out. In Munich Avil bettered his personal records in seven decathl events: long jump 25 feet 2¼ inches, shot-put feet 2¼ inches, 400 meters 48.5 seconds, 11 meter hurdles 14.31 seconds, discus 154 feet 1 inches, pole vault 14 feet 11 inches and javel 202 feet 3½ inches.

In the high jump he repeated his best achiev ment of 6 feet 11½ inches.

He did his usual 11 seconds flat in the 1 meters and covered the 1500 meters in 4:31 setting a world record of 8,454 points for th decathlon as a whole.

The dramatic accident of Kirst, who upset th hurdle, fell and dropped out of the running, hap pened when the gold medal was already in th bag. Avilov was disappointed with this turn events.

"I was really sorry that Kirst dropped out," he said. "He's a great athlete. If he had continued to the end, my result would have been higher and the contest on the second day would have been more interesting."

A closer look at the meters and seconds shown by Avilov demonstrates that the Olympic champion is a typical product of our decathlon school. It is the same school that produced Vladimir Volkov, the first European champion from the USSR; the hard working Vasili Kuznetsov, who lacked the athletic qualities of a decathlonist but broke world records by sheer will; and Rhein Aun, silver medalist of the Tokyo Olympics. It is the school that believes in the harmonious development of decathlonists. The Americans, for instance, put their hopes on the track events, and Taiwan's C. K. Yang set world records exclusively through his high results in the pole vault. Our decathlonists work for a confident and even performance in all the events.

Nikolai Avilov is not a phenomenon but simply the best of many excellent Soviet decathlonists.

Hard to Be First

Avilov was dubbed the Smiling Man by Italian journalists who saw him in action at the World University Games in Turin. With his smile goes the lively wit of the Odessan.

But he can, when necessary, grit his teeth. Olympic fans still remember the last event, the 1500 meters, which brought Avilov the gold medal and with which I started this story. Actually the result was not all that important—Avilov simply had to reach the finish, and the title was his. But for his teammate Leonid Litvinenko it was the last chance to make the trio of medal winners.

Litvinenko made a desperate spurt ahead. Avilov ran with him for several meters but then fell back, all of a sudden grabbing his side and staggering. Katsman, sitting in the grandstand, closed his eyes in horror: Would Avilov really drop out? But, face distorted with pain, he went on, dragging after Litvinenko. Then came the home stretch. Avilov crossed the finish line second and dropped to his knees. The whole stadium was in an uproar chanting his name, but he heard nothing. Later he and Litvinenko stood with arms around each other, looking at the figures on the scoreboard which showed that Avilov had won the championship and Litvinenko the silver medal.

"The gold medal is mine all right. But the record is Leonid's. Dragging after him was a matter of principle: I've never lost to him by more than a hundred meters in this event," Avilov said later.

Then there was the 1500-meter run at the World University Games in Moscow, a year after the Munich Olympics. Again Avilov stayed in despite terrific pain. This time it was a strained tendon, and it was clear from the previous results that he could not win the championship title. Nevertheless, he went on to finish second in the race. Afterward Avilov congratulated the decathlon winner, Ryszard Skowronek of Poland, and immediately left the stadium.

"I took up the sport to be champion," he said, "but it's hard and getting harder." Indeed, when it comes to athletics, the fates have been springing unpleasant surprises on Avilov lately. In other areas everything is going fine. Avilov is the father of a son and a graduate of the Odessa University law school. Actually, he had very little time to prepare for the post-Munich starts, including the University Games.

But Avilov is now training hard. Still young, he has plenty of time ahead. His present target is Montreal. That can mean new trials and tribulations, but also the chance for new wins.

THE YOUNG WORKER

Interview with Anatoli Arkatov, Member of the YCL Central Committee

The Seventeenth Congress of the Young Communist League of the Soviet Union, opening in Moscow at the end of April, will give special attention to the young worker. In this interview, Anatoli Arkatov, a member of the YCL (Komsomol) Central Committee, shares his thoughts on the younger generation of the working class and its tasks. Arkatov, 29, is a worker's son and a factory worker himself. He has held a job at Moscow's Likhachov Auto Plant (Russian abbreviation, ZIL) since he was 16. He started as a fitter and learned the trade of adjuster. Arkatov is also studying at an evening institute attached to the plant. He is deputy secretary of the plant YCL Committee.

Q: Speaking at one of the plenary meetings of the YCL Central Committee, you said, among other things, that the Komsomol wants especially to ensure a worthy replacement for our present generation of workers. What do you mean by worthy replacement?
A: That's a pretty complex notion. Let me see how I can explain it. Our working class has a long tradition of political consciousness, responsibility for the general interest, political activity, unity and collectivism: These are the spiritual and moral characteristics of the people in our new socialist society. Naturally, they're combined with enthusiasm about the job and high professional standards.

As I see it, the worthy replacement isn't merely someone who follows these traditions, excellent though they are. We expect our young workers of today and tomorrow to reach a still higher level. The response to this standard is especially evident in their vocational qualifications—the scientific and technical revolution requires a steady increase in knowledge, and our young workers are meeting that requirement.

Each generation of the Soviet working class contributes something new, something of its own. This is especially true of the young men and women of today, if only because they have a better education and, compared with their parents, more opportunities for all-round development.

As you see, the criteria for "worthy replacements" are pretty high.
Q: Judging by Komsomol activities, today's young workers take a very responsible view of their obligation to society. What do you think?
A: Definitely so. Our country owes much of its economic progress, for instance, to the younger generation. Young people constitute half the country's work force. This proportion does not indicate anything special, because it's the same in many other countries. The difference here is that our youth is active and shows a creative approach. In industry, as a rule, the young workers have more education than the older ones, and they make up the bulk of the innovators and other activists.

Take our plant, for example. A while ago we Komsomols organized several experimental youth brigades whose job was technical innovation and production streamlining. The members of these brigades, in addition to fulfilling and exceeding their shift•quotas, worked up plans for improving production technically and put them into practice. Our idea soon caught on, and the movement, now called technical initiative of the youth, has spread to industrial plants generally.

This initiative, apart from the money it saves (one invention reduced production costs by an average of 7200 rubles on a countrywide scale, and one suggestion saved 700 rubles), is also an impetus to the professional development of young workers. They not only get the chance to express themselves, but earn public recognition.

Equally striking is youth initiative on what are known as key construction projects. The country is building factories, power stations and towns, sometimes in remote areas. Most of these projects are the work of young volunteers. In 1972 they completed 60 key projects, last year the number increased to 135. And there are plenty of young workers involved. The Komsomol committee of such projects in the most remote parts of the country gets piles of letters from young people applying for jobs there.

These key projects bring out such characteristics of our youth as the desire for new experiences and for mobility. But I don't think this is their real motivation. What is? Let me go back to tradition again. The key-project concept originated in the late twenties and early thirties, at the beginning of the country's socialist industrialization. The projects were, of course, different, smaller in scope and on a simpler technical level, but the heightened emotion and revolutionary spirit they generated has lived on to our day.
Q: You mentioned young people earning recognition. How does that happen? When they begin work at the plant, what are their prospects—vocationally and in terms of general growth?
A: Let's begin with the fact that they have every opportunity to improve their qualifications through training courses, or in the shop with the help of experienced coworkers and foreman-instructors. They learn the trade of their choice, raise their qualifications and earn higher wages.

In addition, young workers can study without quitting their jobs—either at an evening high school, if they do not have a complete secondary education, or at a technical school or institute. Large plants run their own technical schools to train engineers. There is one at ZIL with a student body of more than 1500. The labor law gives a number of privileges to young people who combine work with study, including additional paid vacations to take exams and prepare diploma projects.

As you see, beginners at our plant have a good many opportunities. What they become depends on them. The fact is that a great many executives and leading engineers have worked their way up from the shop.
Q: What is the role of the Komsomol here? How does it help the young worker?
A: I'd say that the young workers are looked after by the Komsomol even before they come to the plant. I'm talking about vocational guidance in the schools. This year some 200,000 secondary school graduates will take jobs in industry. The Komsomol organizations, together with teachers and representatives of different plants, have made a considerable contribution to helping them choose work that they like.

But this is only half the problem. When a newcomer shows up at the plant, it is essential to make him feel part of the collective right away. I was lucky. My father, mother and elder brother all worked at ZIL, so it was like a homecoming for me. But it doesn't always happen that way. Most of the additions to our personnel now come from other towns and villages. Some young people take a long time to adjust, and the Komsomol has to look after every one of them. We help them choose an interesting job and enroll in evening or correspondence courses, involve them in community activity, see to their recreation and leisure interests —especially those who live in a hostel.
Q: The practical help of a Komsomol organization is very important, of course, but how about character development? What does the YCL do about that?
A: That's a complicated question. You can't have rules for that. Komsomol branches work in such a way that young people acquire civic-mindedness and the communist world outlook naturally, in the process of constructive labor. A considerable role here is played by the participation of our young men and women in socialist emulation and production management. That enriches the young people's minds, shapes their character and strengthens their will.
Q: What have you personally gotten from the Komsomol?
A: A lot. The incentive to study, interest in community activity, motivation to develop and grow—they all came from the Komsomol.
Q: Aren't you an exception? After all, you're a member of the YCL Central Committee.
A: Actually my being on the YCL Central Committee didn't have much to do with it. We're all equal members of the organization. It encourages productive ideas from everyone and offers unlimited opportunities for civic activity and personal growth. As for the YCL Central Committee, all its decisions are made on the basis of proposals from the primary organizations, that is, from rank-and-file Komsomol members. The Central Committee considers the interests of the broadest masses of young people. Community activity in the Komsomol gives each member a chance to show his or her talents and abilities in public service.

AMERICAN NUMISMATISTS IN THE SOVIET UNION

By Vladimir Belyakov
Novosti Press Agency

A LARGE GROUP of coin collectors from various cities in the United States made a three-week tour of the Soviet Union. They visited Moscow, Leningrad, Odessa and cities in Uzbekistan, Central Asia.

"Every Soviet city we visited has its own local color," said Irving Berlin, Vice President of Numismatic International, from Dallas. "In Leningrad we saw unique numismatic collections in the Hermitage. In Tashkent, the capital of Uzbekistan, we went to the famous bazaars in the old city searching for rare coins, and we admired the splendid historical monuments of Bukhara and Samarkand."

"I have never before met such hospitality as in your country," added Robert Barrett, a professor from New York. "All doors were open to us. This is a good sign for similar exchanges in the future."

On the last day of their stay in the Soviet Union the American collectors were received at the Moscow Friendship House. The hosts were members of the USSR-USA Society, the staffs of museums and Soviet collectors. The visitors were welcomed by Anatoli Shaten, one of the leaders of the USSR Collectors Society.

The Soviet collectors presented their American guests with souvenir silver medals coined in commemoration of the fortieth anniversary of the establishment of diplomatic relations between the Soviet Union and the United States and the first visit of American numismatists to the Soviet Union.

MUSIC BREAKS THE BARRIER

American Pianist on Concert Tour

SUSAN STARR has made four tours of the Soviet Union since 1962, the year the American pianist won second prize in the Moscow Tchaikovsky International Competition.

The young pianist finds her Soviet tours very exciting: "I feel, in a way, every tour is a challenging thing for my career. Professionally, it is extremely demanding because the Soviet audience is so knowledgeable, and there's a special feeling when I play in the Conservatory Hall in Moscow because this was the scene of the 1962 Tchaikovsky Competition. I always feel there is a certain level of excellence, a level of perfection that I must achieve when I play here. It's quite like the feeling I have when I play in Carnegie Hall in New York or in Chicago, where the critics are so very tough. And, of course, one becomes terribly nervous. But the audience is so warm, they put me at my ease and I'm inspired to play my very best.

"It's never a satisfactory performance if I cannot feel the audience response directly, and I don't mean just from applause. I mean to talk with them, to see what they have to say to me. Maybe not just about my playing. You can read so much in people's faces and, especially, if you have achieved something by the playing. A barrier has been broken. Some sort of international communication has come into play. Then I feel I've served a worthwhile purpose, and if it's because I played well, then I hope all of our good pianists and violinists and cello players will come here and all of yours will come to our country so that we can really make the ties of friendship stronger."

Starr has traveled widely in the Soviet Union. Her most memorable visit was to Volgograd, where she saw the monument commemorating those who fell at the Battle of Stalingrad.

"It was the most moving experience of my life," she said. "I think any American can imagine the pain and suffering of war, but we've never really gone through these experiences in our own land. That's why it hits home so—the enormity of it and the graves and the people walking up those steps to place the roses. And the statue of the mother with the fallen son—everybody's son, everybody's brother, he belongs to everybody, and it's everybody's grief and sorrow."

Cosmic Problem Solved

From theoretical investigations by 32-year-old Alexei Friedman, Doctor of Science (Physics and Mathematics), Siberian scientists have developed a unique plasma installation. It permits the modeling of a number of processes occurring in the galaxies.

Doctor Friedman heads the cosmic plasma dynamics laboratory in Irkutsk. He has proved mathematically that many processes in the galaxies can be described by equations similar to those used to determine the behavior of plasma.

"Until recently we believed that spirals in the galaxies resulted from the strong gravitational forces generated by the tremendous mass of these formations," he says. "But it turns out that spirals are a universal property of a revolving continuum, whether it is water, air or plasma."

For 200 years scientists in various countries have been investigating the problem Doctor Friedman has solved. He proved that each galaxy has a unique path of development determined by the conditions of its origin.

Soviet-American Trade Relations Expanding

The third session of the Soviet-American mission on trade completed its work in Moscow last autumn. The delegations were headed by Nikolai Patolichev, USSR Minister of Foreign Trade, and George Shultz, U.S. Secretary of the Treasury.

Among the topics discussed was long-term cooperation on industrial projects, including the transfer of Siberian natural gas to the United States.

The joint communiqué noted that in the first seven months of 1973 the total exchanges between the USSR and the USA came to about 900 million dollars, more than in 1971 and 1972 combined.

The heads of the delegations exchanged documents confirming the official opening of the trade missions projected during the Washington summit talks in June 1973.

The U.S. business office began operation in Moscow on October 3, 1973. In their comments at the opening ceremony, U.S. Chargé d'Affaires Adolph Dubs and U.S. Secretary of Commerce Frederick Dent, who had both participated in the work of the session, stressed the unusually rapid growth of relations between the two countries.

Atomic Icebreaker Under Construction

In Leningrad, the city where the world's first atomic icebreaker, the *Lenin,* was built, a second one, called the *Arktika,* has just been floated at the Baltic Shipyard in the mouth of the Neva.

Its central section can easily hold a 10-story building. This is where the heart of the ship, the nuclear power plant, will be located. The new icebreaker, much more powerful than its predecessor, will prolong winter navigation on the northern routes and will lead ships through the heavy ice at a higher speed. A modern passenger liner uses about 5500 tons of liquid fuel on its way from Europe to America. To cover the same route, the *Arktika* will need about five pounds of fuel.

The new ship is a very sophisticated structure. Its hull, 460 feet long and 100 feet wide, has room for 1,280 shops and other facilities connected by some 60 miles of tubes and 370 miles of cable. A reliable radiation safety system is being installed.

Special attention has been paid to living and recreation areas for the crew: air-conditioned cabins, dining rooms, a canteen, a club, a library, a music room, a movie auditorium, a gym, and a winter swimming pool.

The atomic icebreaker is being built in Leningrad, but other cities are involved in the project. Moscow, Gorky, Riga, Tashkent, Kaliningrad and Vladivostok are supplying machines, equipment and instruments.

"THE MOST INSPIRING TO WE EVER HAD

THE LATE JOSÉ LIMÓN'S dan gave the Soviet Union its first e of American modern dance in Febr March of last year. The 16 dancers idea how Soviet audiences would them and admitted to some appr The nation was accustomed to the of classical ballet and the folk d might not respond to an unfamil Their style and principles of move virtually unknown to the Soviet publ

Moreover, the program was unu *Moor's Pavane, Orfeo, There Is a T Unsung, Dances for Isadora.* A Lewis, the acting artistic director, his major works Limón is saying to the audience: he didn't believe th was only entertainment. He wanted people by showing them the dram human condition, to make some im their lives and to bring people to closer relationship with one anothe to tell stories that speak to peopl the world as testament to the huma

This is how the dancers felt audience.

Laura Glenn: "I'm so very gla here. The enthusiasm is tremendou place we've been to has been sold

Daniel Lewis: "People came back throw their arms around us—the what we did—but on opening nig waited for two numbers before me know how they felt. The Soviet audi intelligent and ready for anything n on and off stage."

Edward De Soto: "The most inspir we've ever had! The Soviets rece magnificently. They reach out for especially for dance, and are close to arts."

Nina Watt: "We had fantastic re performers. I would love to have longer."

Ann Vachon: "We've been living o ences' affection—it was such a warm tion. I also liked the custom here of on the houselights so that we could the audience and applaud back—w that."

Among the memorable events month-long tour which took them Soviet cities, Moscow-Leningrad-Ri were the opportunities the troupe visit dancing schools. There was each city. But the most exciting vis Leningrad, at the Kirov Choreo School.

"We didn't realize it was going to great experience it was," said Jenn lon. "The Kirov people had provided recital, and the school was just rig ghosts of Nijinsky and Pavlova w a sudden, I began to see all the heard about—here they were—in the We were to demonstrate a class b

The José Limón Dance Company applauding an enthusiastic Moscow audience and vice versa.

Members of the visiting American troupe sit in on a Moscow ballet school class.

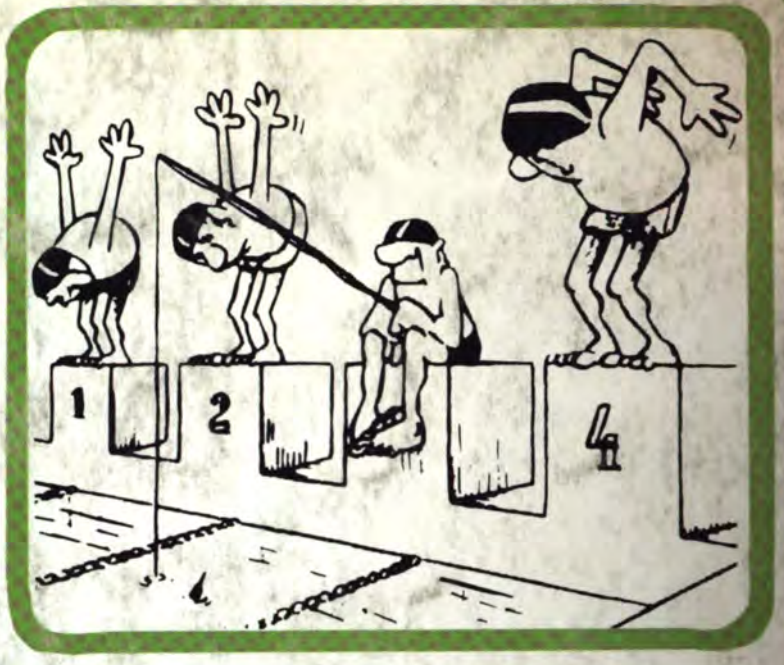
brought any dances with us. We did the class but we wanted to do more because they had given us so much."

High points of the tour were the talks and exchanges with Soviet artists; Lewis said that for him those contacts were the main reasons for the visit because "we can learn what the Soviets have to offer in dance, and the Soviet Union has some of the finest dancers in the world and one of the best dance companies I've ever seen in my life. I want to learn from them. Konstantin Sergeyev, the Kirov Ballet's artistic director, has done so much for us. He saw to it that a demonstration was set up for us to watch all the classes, from the little children to the senior class, and we reciprocated and showed them some of the Limón techniques. And when it was over, we just looked at each other and shook hands and realized that we had communicated. I took what I could from the classes and I will bring it all home with me."

Peter Sparling: "The Bolshoi school was also quite amazing—the way young people specialize and are trained at such an early age. This was so impressive! And seeing the men's ballet senior classes was very interesting—there was lots of personality there."

Risa Steinberg: "Watching classes being taught, I've learned a lot for my own teaching. Seeing eight- and nine-year-olds studying has helped me understand what I need to do in training the dancer."

Robyn Cutler: "We have grasped the importance of discipline and technique just by watching Soviet performers."



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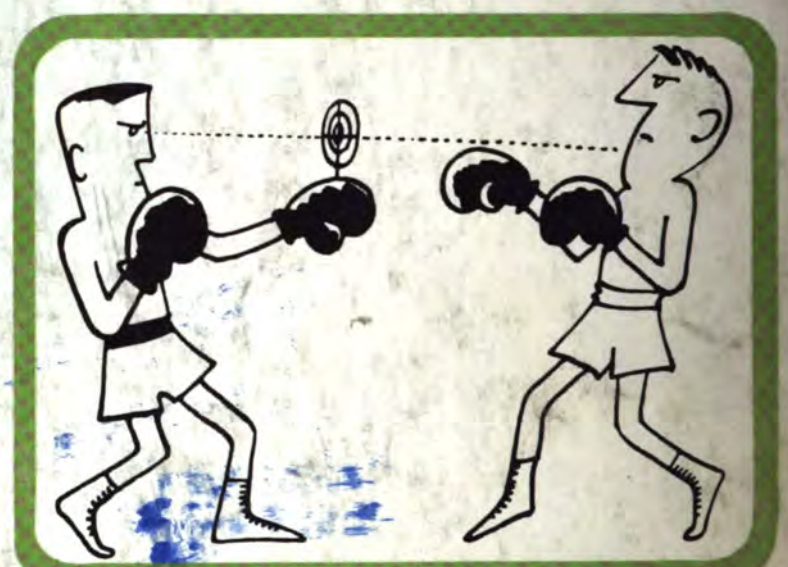

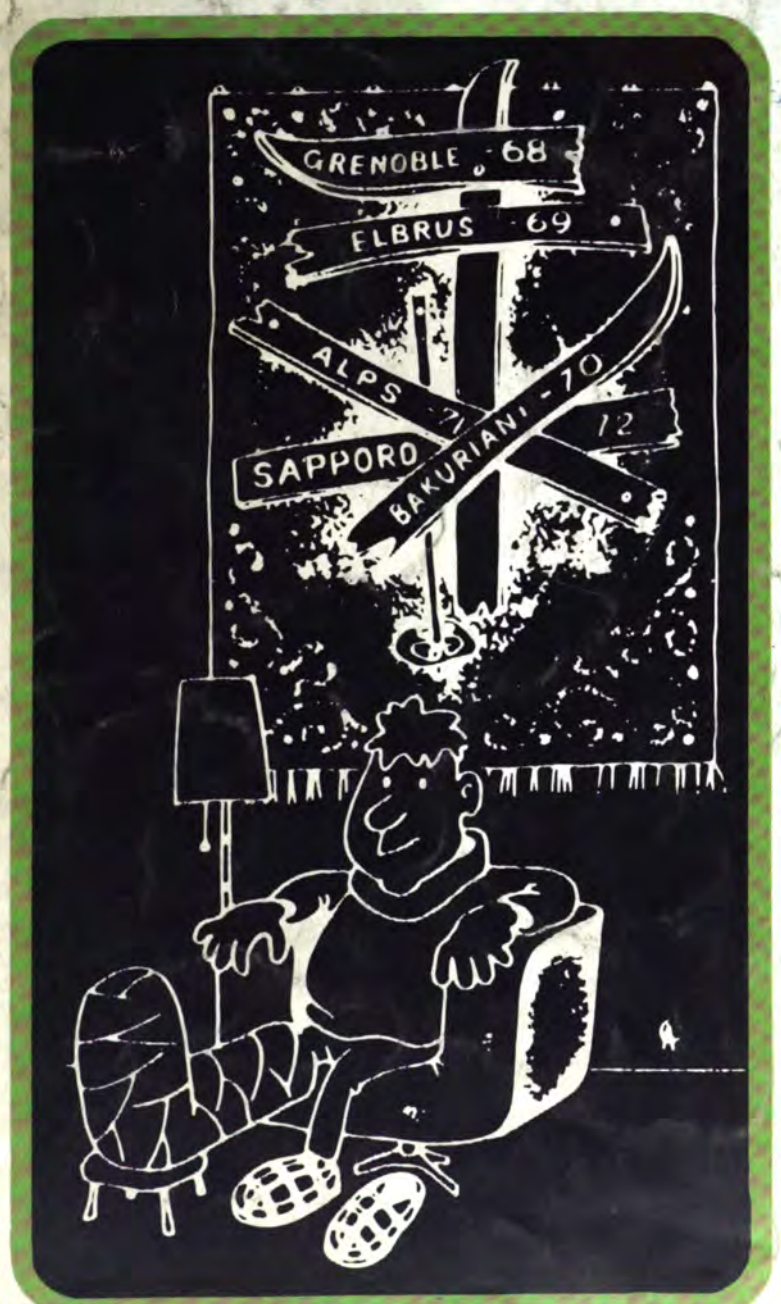

Cartoons by Sergei Tyunin

SOVIET LIFE

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SOCIETY AND NATURE

ECONOMIC REFORM REVIEWED

USA-USSR ECOLOGY STUDIES

ELK FARM

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AIR

Man and nature . . . Are they friends or foes? This question, rhetorical only yesterday, has taken on very real meaning. The entire human race is facing a common danger. Diminished energy and raw material resources; pollution of air, water and soil with industrial wastes, especially with radioactive and carcinogenic substances; destruction of forests and wildlife—that is the reverse side of technical—or, better put, irrationally technical—progress which is destroying the sole source of all living things on Earth—its biosphere. To prevent our "blue" planet, an oasis of life in the solar system, from becoming a dead desert, like Mars or the Moon, man must prove his intelligence, he must meet the impending

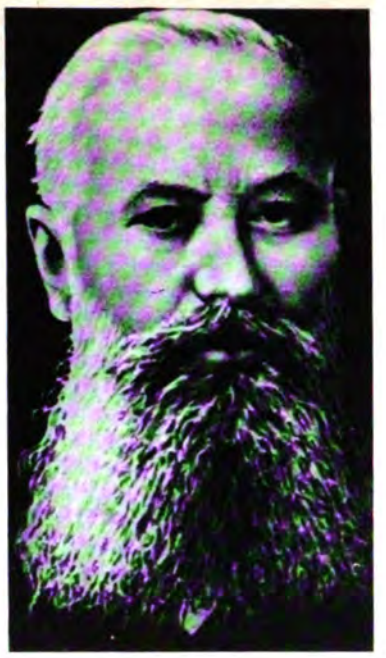
WATER

threat of asphyxiation, self-poisoning and hunger. The only answer to the ecological crisis is the scientific regulation of the man-nature relationship. But this requires a social structure that will guide a country's development, not on behalf of certain groups of the population but on behalf of society as a whole. Only a society equipped with a purpose and a plan can remake the environment and still preserve the vital balance between the needs of nature and man.

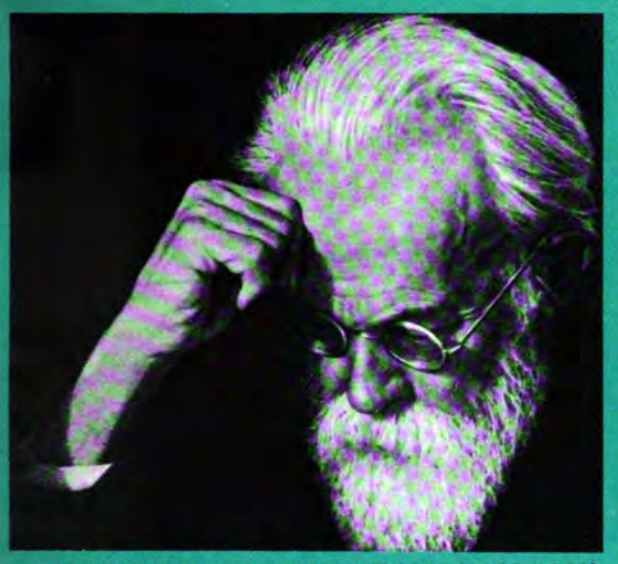
This issue of our magazine describes how that balance between nature and man is being maintained in the Soviet Union.

LAND

RUSSIAN SCIENTISTS ON THE INTERACTION OF SOCIETY AND NATURE

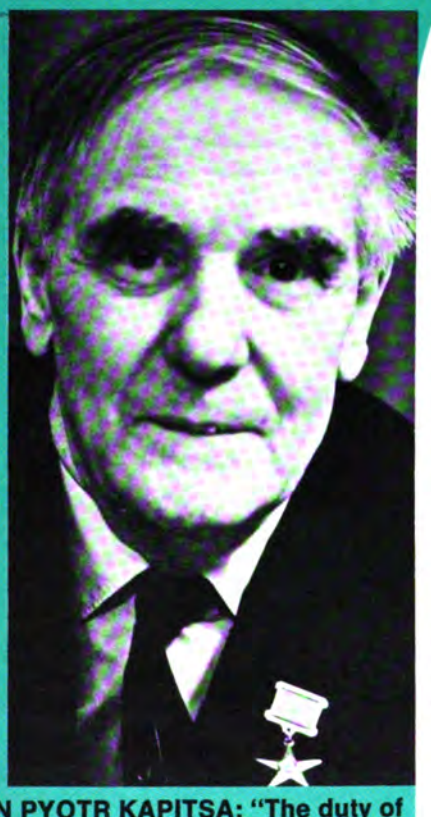


VASILI DOKUCHAYEV (1846-1903): "All the enemies of agriculture—winds, storms, drought, dry winds—terrify us only because we do not know how to combat them. They are not evils: We simply have to study them and learn how to control them. They will then begin to benefit us."



ACADEMICIAN VLADIMIR VERNADSKY (1863-1945): "A tremendous future is unfolding before man in the geological history of the biosphere if he realizes this and does not use his brain and labor for self-destruction."

ALEXANDER VINOGRADOV: "Mankind has entered a period when it must accommodate its activities to the requirements of nature."



ACADEMICIAN PYOTR KAPITSA: "The duty of scientists in all areas of both the natural sciences and the humanities is to mold the social consciousness of people so that they will work together in solving ecological problems throughout our entire globe, the dimensions of which, as we now realize, are finite."

ACADEMICIAN YEVGENI FYODOROV: "We cannot turn our whole world into a sanctuary: Nature keeps changing. On the other hand, the way in which we change the natural environment matters very much. Are we capable of doing it in such a way as to combine the natural processes with those we introduce so that the changes are not harmful to human beings? I believe that this is achievable in socialist society."

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Front Cover: The elk, almost extinct at the turn of the century, is being domesticated in Kostroma. Story on p. 52. *Photograph by Edward Ettinger.*

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LETTERS TO THE EDITOR

Having visited the Soviet Union and Siberia on two recent trips, we find SOVIET LIFE most educational and also informative. Considering the history and background of many peoples, the progress and development is truly amazing. We hope to visit that country again.

A. L. Knudstad
Saint Louis, Missouri

I have just subscribed to your very interesting and informative magazine. I have always been interested in the Soviet Union. But now I am more interested than ever. I work at Children's Hospital of Pittsburgh, in Pittsburgh, Pennsylvania. I am a cardiovascular lab technician at the hospital. This summer I would like to go to Moscow and visit hospitals there. This past fall we had 11 Russian doctors at our hospital. I would prefer to confer with a technician or doctor who works strictly in cardiology. I enjoy your magazine and hope that you might be able to help me start a lasting friendship with the people of the Soviet Union.

Robert J. Stephenson
Pittsburgh, Pennsylvania

I have been an interested reader of SOVIET LIFE for several years and have found your articles helpful in my work as a community college government instructor. Certainly, if we are to maintain peace between our two countries, knowledge about one another's culture is imperative.

In 1966 my wife and I spent eight days in the USSR on a guided tour. That experience was worthwhile but too short in time and limited to Moscow, Kiev and Leningrad. I would like to see more of the small towns and collective farms, especially in the Caucasus or Siberia.

W. Lawrence Reynolds
Daytona Beach, Florida

We are enjoying SOVIET LIFE and hope we can visit the USSR some day. The magazine is certainly a helpful step toward better understanding.

John G. Martin
Orange, Connecticut

I am a fairly new subscriber and would like to congratulate you on your fine magazine. Both my students and I enjoy the pictures as well as the articles.

James C. Lovelace
New Milford, Connecticut

Just a short note to let you know that SOVIET LIFE magazine is very pleasant reading to me. It truly is a very delightful magazine and receives the same treatment as the *National Geographic*, which I also receive. They never see the trash can. I can see that your Soviet citizens really love their country. They have earned my highest respect. Your Soviet civilization is a good life.

Roy J. Hanke
Cheektowaga, New York

THE LAW PROTECTS NATURE

Interview with Alexander Georgiyev

Standing committees for nature protection have been established in both chambers of the USSR Supreme Soviet: the Soviet of the Union and the Soviet of Nationalities.

IZVESTIA correspondent Herman Ustinov asked Alexander Georgiyev, chairman of the Standing Committee for Nature Protection in the Soviet of the Union, to describe the problems tackled by deputies and the results of their work over the past few years.

Q: What are the tasks of the standing committees for nature protection?
A: The Soviet Union has a number of laws to protect our country's priceless natural resources, and our committees see to it that these laws are complied with. Deputies perfect legislation and monitor environmental protection laws.

Q: What problems did you first tackle?
A: Our first problem was to combat water and air pollution. To focus the work and make it more effective, the committees concentrated on only three industries: chemicals, pulp and paper and nonferrous metals. This selection is obvious since these industries process high-pollutant raw materials and employ technological processes that discharge much smoke and waste water.

Existing legislation obliges enterprises to develop technologies ensuring the fullest possible utilization of crude products and fuel. Optimally, an industry should not discharge any noxious substances. If the technology to do this is lacking, effective purification facilities should be developed. The Soviet Union is one of the few countries that prohibits new industrial enterprises from operating until purification facilities have been built.

Q: How did the committees evaluate the activities of the three ministries in charge of the chemical, pulp-and-paper and nonferrous metals industries?
A: We're convinced that they were doing a lot to effectively control water and air pollution. Annual spending for these purposes more than doubled in the past five-year plan period, and it has increased even more under the current five-year plan. Many enterprises have built purification and decontamination facilities. And there's great concern for Lake Baikal. The country is effecting a number of large-scale purification schemes, including those for cleaning the Volga and the Ural rivers. Water recirculation facilities are being increasingly used. As a result of new technologies and the utilization of waste products water and air pollution has decreased. In some cases waste utilization even helps to speed up returns from investments in purification facilities.

Deputies concentrate on shortcomings in nature protection projects since purification structures are sometimes handled inefficiently. The committees recommended a uniform technical policy for the construction and operation of purification facilities and sent it to the respective ministries and departments.

Q: What were the ministries' reactions to your recommendation?
A. Their reaction was positive and businesslike. The ministry of the pulp-and-paper industry discussed our proposals at a board meeting and determined which enterprises would build water and gas purification facilities during the current five-year plan period. Large sums are being invested in purification structures. To coordinate research on the rational utilization of water in the pulp-and-paper industry, which consumes great amounts of water, the USSR Paper Research Institute has set up a water utilization laboratory.

After considering the committees' recommendations, the ministries of the nonferrous metallurgy and chemical industries also produced extensive programs for effective water and air pollution control. These programs are currently being carried out.

Q: What other problems attracted the committees' attention?
A: They also discussed the utilization and protection of mineral resources. The committees issued recommendations for improving environmental protection and natural resources utilization to planning and economic agencies. Our work was brought to the attention of the Presidium of the USSR Supreme Soviet. Deputies' recommendations were carefully considered by the government and forwarded with relevant instructions to appropriate ministries and departments.

The committees considered another very important question, too—the protection and reproduction of fish stocks in inland water bodies. The proposals we sent to many central organizations were given due attention there. The committees' proposals were discussed by national ministries and departments and the ministries of the union republics. The USSR Ministry of Fisheries and the USSR Ministry of Agriculture informed the committees of various measures to more effectively protect and reproduce fish stocks in inland water bodies. The building ministries responsible for constructing fish-breeding and water purification facilities took a number of important steps to ensure fish protection.

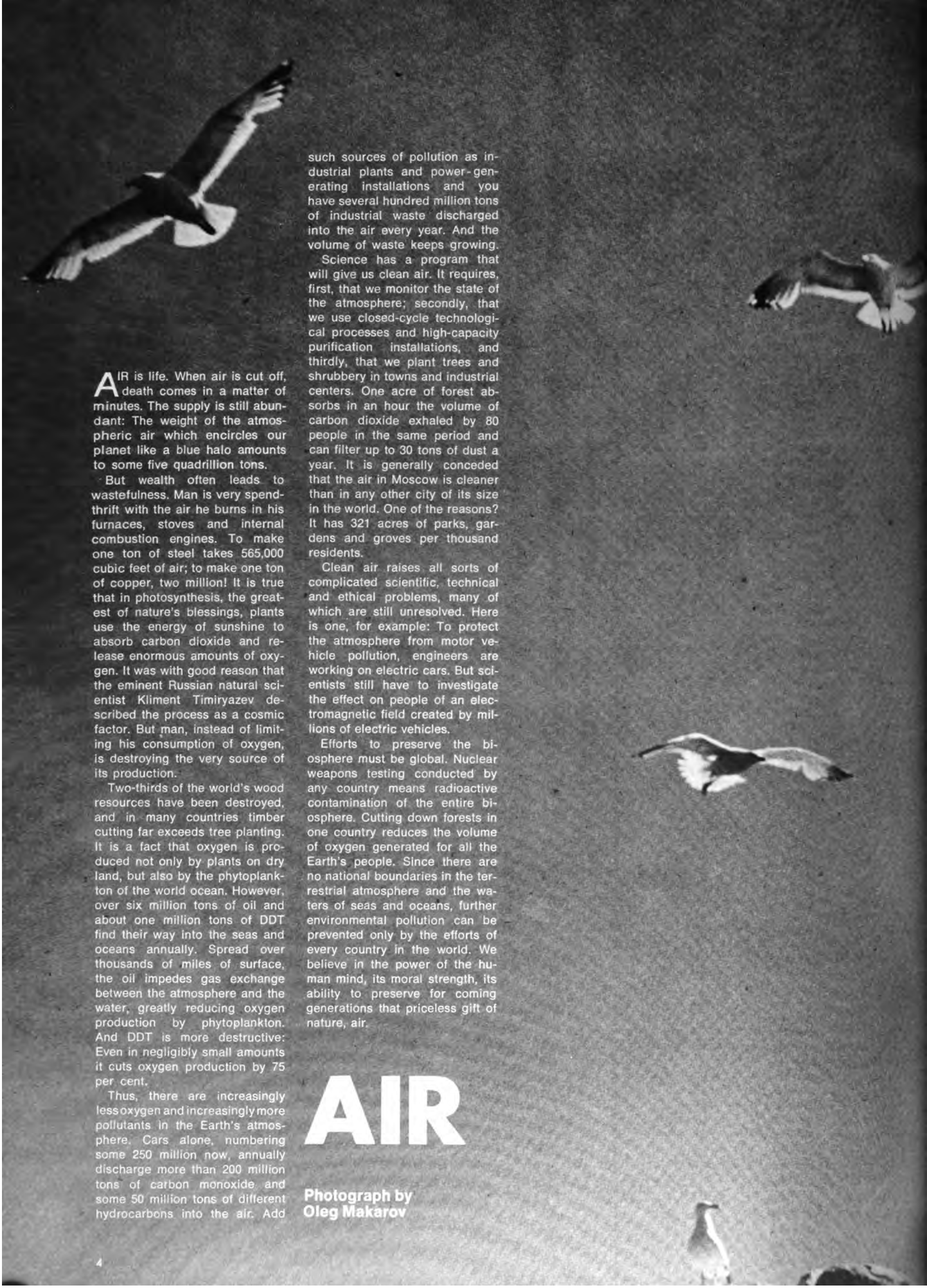
Q: In September 1972 the Fourth Session of the USSR Supreme Soviet discussed the improvement of environmental protection and the rational utilization of natural resources. Did the committees actively participate in this session?
A: Yes, of course. And in supporting the government's measures for improving nature protection and the rational utilization of natural resources, we drew the deputies' attention to some important aspects of the problem, first of all to the necessity of more effectively planning environmental protection projects.

Today the economy and the environment are interwoven with so many complex and varied ties that uncoordinated programs can hardly bring success. It is necessary to have a reliable system for forecasting, planning and financing. Providing materials, controlling the fulfillment of projects and enterprises' accountability to the state, and setting up research and development centers must all be considered if environmental protection problems are to be comprehensively tackled with the latest scientific and technological achievements in the interests of the national economy. It should be recalled that this extensive and comprehensive work in nature protection and natural resources utilization was emphasized by Leonid Ilyich Brezhnev in his report to the Twenty-fourth CPSU Congress.

As I noted earlier, one of our committees' tasks is the further perfection of environmental protection legislation. The standing committees are currently completing the drafts of forest and minerals protection bills. A proposal for establishing bills for plant and air protection has also been introduced.

The deputies supported the committees' proposals. Many of our ideas were reflected in the resolution of the USSR Supreme Soviet and in the CPSU Central Committee's and the USSR Council of Ministers' decision to improve environmental protection and the utilization of natural resources. The decision particularly states that the country will produce annual and long-term plans for environmental protection and the rational utilization of natural resources as part and parcel of annual and long-term national economic plans. This proposal was originally submitted to the session by the standing committees.

The resolution of the USSR Supreme Soviet and the decision of the CPSU Central Committee and the USSR Council of Ministers represent a long-term program that will take years to complete, but this program is already being successfully implemented today.



AIR

AIR is life. When air is cut off, death comes in a matter of minutes. The supply is still abundant: The weight of the atmospheric air which encircles our planet like a blue halo amounts to some five quadrillion tons.

But wealth often leads to wastefulness. Man is very spendthrift with the air he burns in his furnaces, stoves and internal combustion engines. To make one ton of steel takes 565,000 cubic feet of air; to make one ton of copper, two million! It is true that in photosynthesis, the greatest of nature's blessings, plants use the energy of sunshine to absorb carbon dioxide and release enormous amounts of oxygen. It was with good reason that the eminent Russian natural scientist Kliment Timiryazev described the process as a cosmic factor. But man, instead of limiting his consumption of oxygen, is destroying the very source of its production.

Two-thirds of the world's wood resources have been destroyed, and in many countries timber cutting far exceeds tree planting. It is a fact that oxygen is produced not only by plants on dry land, but also by the phytoplankton of the world ocean. However, over six million tons of oil and about one million tons of DDT find their way into the seas and oceans annually. Spread over thousands of miles of surface, the oil impedes gas exchange between the atmosphere and the water, greatly reducing oxygen production by phytoplankton. And DDT is more destructive: Even in negligibly small amounts it cuts oxygen production by 75 per cent.

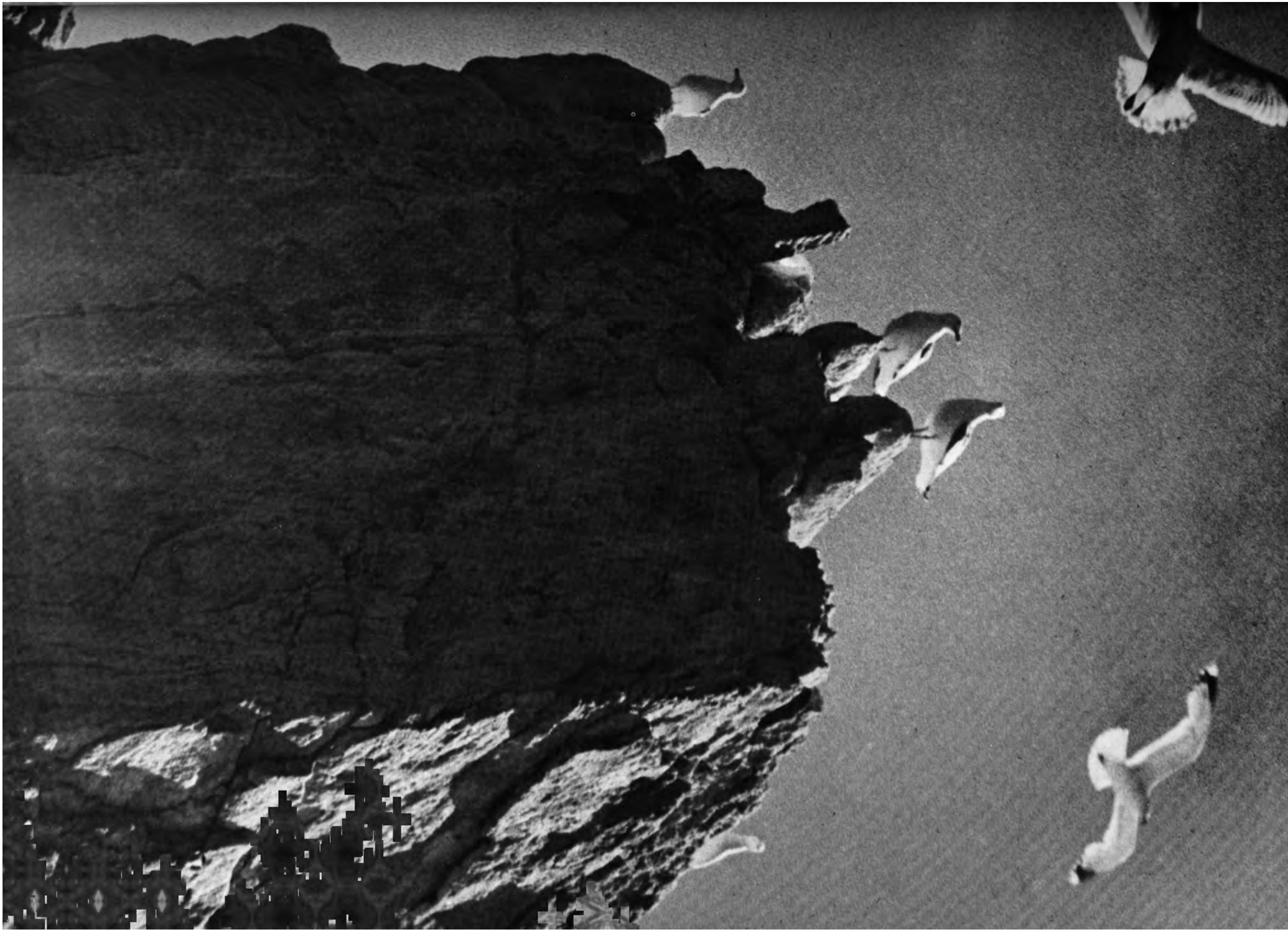
Thus, there are increasingly less oxygen and increasingly more pollutants in the Earth's atmosphere. Cars alone, numbering some 250 million now, annually discharge more than 200 million tons of carbon monoxide and some 50 million tons of different hydrocarbons into the air. Add such sources of pollution as industrial plants and power-generating installations and you have several hundred million tons of industrial waste discharged into the air every year. And the volume of waste keeps growing.

Science has a program that will give us clean air. It requires, first, that we monitor the state of the atmosphere; secondly, that we use closed-cycle technological processes and high-capacity purification installations, and thirdly, that we plant trees and shrubbery in towns and industrial centers. One acre of forest absorbs in an hour the volume of carbon dioxide exhaled by 80 people in the same period and can filter up to 30 tons of dust a year. It is generally conceded that the air in Moscow is cleaner than in any other city of its size in the world. One of the reasons? It has 321 acres of parks, gardens and groves per thousand residents.

Clean air raises all sorts of complicated scientific, technical and ethical problems, many of which are still unresolved. Here is one, for example: To protect the atmosphere from motor vehicle pollution, engineers are working on electric cars. But scientists still have to investigate the effect on people of an electromagnetic field created by millions of electric vehicles.

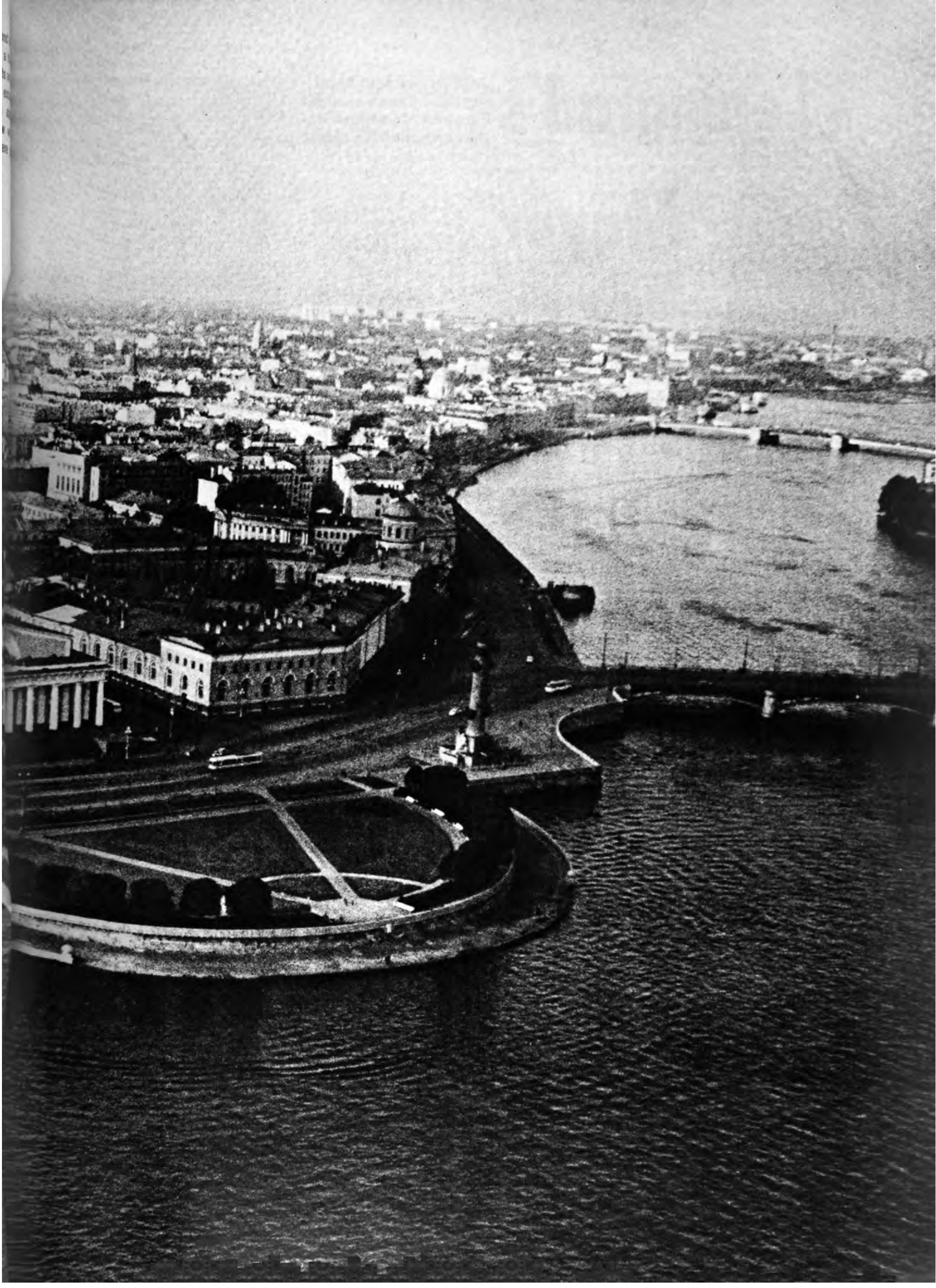
Efforts to preserve the biosphere must be global. Nuclear weapons testing conducted by any country means radioactive contamination of the entire biosphere. Cutting down forests in one country reduces the volume of oxygen generated for all the Earth's people. Since there are no national boundaries in the terrestrial atmosphere and the waters of seas and oceans, further environmental pollution can be prevented only by the efforts of every country in the world. We believe in the power of the human mind, its moral strength, its ability to preserve for coming generations that priceless gift of nature, air.

Photograph by Oleg Makarov



SMOGLESS LENINGRAD

Leningrad is a big industrial center, the second largest i country, with some 2,000 big factories and a humid cl that is ready-made for smog. But its residents are spare usual smoking chimneys and motor-vehicle exhaust an attendant hazards to health. Leningrad's atmosphe clean, and its waters are unpolluted. How was it d Our reporter Lyudmila Yenyutina went there to find



Leningrad's Mayor on Protecting the Environment

An interview with Vasili Kazakov, Chairman of the Executive Committee of the Leningrad City Soviet

Vasili Kazakov, 47, who comes from a peasant family, graduated from technical school and worked for 10 years at the Leningrad Machine-Tool Plant. He started as a turner and rose to designer after completing the course of study of the Correspondence Engineering Institute. In 1954 he was appointed to the Leningrad City Party Committee and in 1961 to the Regional Party Committee. He was elected Chairman of the Executive Committee of the Leningrad Soviet in January 1973.

Air pollution in big cities has been getting considerable attention in the world press. How much is Leningrad preoccupied with the problem?

Pollution is a problem for every big city, ours included. Leningrad is the second largest industrial center in the country. What aggravates the problem here is our damp climate.

The Leningrad general development plan, covering a period of 20 to 25 years, was drawn up in 1966 and subsequently approved by the government. It gives close consideration to environmental hazards, including the major sources of air pollution: factory smoke, exhaust gases and other atmospheric discharges. The Leningrad City Soviet, assisted by a large number of specialists—doctors, sanitation officials, meteorologists, engineers and architects—worked out a comprehensive system of measures to protect the air. It was incorporated in the general development plan.

What is actually being done to prevent pollution?

One of our key objectives is to use district heat-and-power plants throughout. The city had none at all before the October 1917 Revolution: Every building was heated by its own stoves, or by a boiler room at best. You can imagine what thousands of smoking chimneys did to the city air. So the first thing was to get rid of the heating stoves in apartment houses, hospitals, schools. That problem has been disposed of; it could have been solved much earlier if not for the war and the terrible blockade.

Experience tells us that a hundred small chimneys pollute the air more than one with an equivalent capacity. We have therefore been dismantling small boiler rooms and either connecting the building to a district heat-and-power plant, or setting up big boiler room clusters to serve whole neighborhoods.

Approximately 600 small and medium-sized boiler rooms have been closed down in the last four years (1970-1973). Today most of the city's housing is heated by district heat-and-power plants.

Our second important goal is to switch the city's industrial enterprises, heat-and-power plants and big boilerhouses from coal and residual oil to gas. Half our fuel needs in 1973 were met by gas. As a result, we were able to reduce the coal burned by 8.2 million tons a year, thus preventing the atmospheric discharge of 132,000 tons of ash and 154,000 tons of sulfurous gas. But it is still too early to relax our efforts. Not till 1980, when the gas share of the city's fuel balance has reached 80 per cent, will we be able to say that we have virtually done away with smoke discharge.

Another job is the construction of gas purifiers and dust collectors at industrial plants. This is a costly operation, but we are investing more in it each year. Thus, our outlay in the four years from 1966 to 1969 was 3.5 million rubles, while in 1972-1973—only two years—it was 3.6 million rubles. This last sum paid for 344 gas-purifying or dust-collecting installations, including 92 built by factories themselves. The effect is there to be measured. From 1965 to 1971, for instance, the air pollution around Kondratiev Avenue, the site of many factories, was cut to one-seventh of its original proportions; that of a big residential district along the Seventeenth Line of Vasilyevsky Island to one-third; and that of the Central Recreation Park to one-ninth.

A more drastic measure is to close down a production unit if it threatens the environment. The general development plan prohibits the siting of new industrial facilities within the city limits; exceptions are made only for small-scale repair shops and other community services. Existing plants whose discharge cannot be purified are often restructured: our coke-and-gas plant is a case in point. It used anthracite as a raw material, discharging dust, dirt and sulfurous gases into the air. Anthracite processing at that plant was discontinued a year ago. Its line now is an innocuous one: powder metallurgy and metal ceramics.

What about automobiles? The number is increasing steadily.

It certainly is, and Leningrad is no exception. We have to reckon with it. A national standard, introduced in our country in 1970, set a limit to the carbon monoxide content of exhaust discharge. Our concern is to see, along with the city's traffic inspection and sanitary-epidemiological services, that every motor vehicle on the streets is in good repair. In the meantime, the city road network is being restructured. The idea is to reduce the standing time of automobiles with engines going: A moving vehicle pollutes the air far less than a stationary one. The first step toward cleaning the air, then, is to get traffic running smoothly by eliminating bottlenecks. We are planning clover-

leaves and "green wave" avenues for non-stop traffic at a specified speed. The city's arterial highways are being reinforced by parallel streets that channel off much of the traffic.

Two circular thoroughfares are being built for trucks and diesel-engined vehicles. One route will pass through the industrial zone away from residential districts, the other will skirt the city. All these adjustments to our dense traffic network are an integral part of the city's general development plan.

Here is another factor. Big-city experience indicates that a private car is not necessary for short rides—under 10 or 12 miles. Home-to-work travel via a well-developed public transit system beats the private automobile for comfort, speed and economy. Think of this: For five kopecks—the price of a subway or bus ride—you can go from one end of the city to another fast, with no traffic jams.

Our public transit system serves eight million passengers a day. We have 3,000 buses, about 4500 taxicabs, more than 600 trolley buses, over a thousand streetcars. Add to this a 25-station Metro with 300 subway cars. Our rolling stock is being continually modernized and augmented as the city grows. At the same time, the type of mass transportation we are developing most pollutes the air least. About 20 miles of streetcar track and 40 miles of trolley bus lines have been built in Leningrad in the last two years alone. The streetcar and trolley bus services carry about half our passenger traffic. But the subway, without question, is the most promising. For Leningrad, it's the major transportation of the future: By the turn of the century our subway lines will reach a total of 150 miles.

Not only highways and public transit lines are on the drawing boards. Leningrad's research facilities are working out methods of decreasing poisonous exhaust gases and improving automobile design. Research is under way on the use of liquefied gas for fuel. This possibility is quite promising and not too costly. All it requires is a slight engine modification. The first gas-driven vehicles have had successful road tests.

Small-scale car-servicing units are being closed down in Leningrad by decision of the City Soviet. At the same time, automobile parking and service centers are being built on the outskirts, away from residential districts, with powerful exhaust systems and up-to-date facilities. These complexes effectively replace countless small service stations.

The general plan provides for expansion of the city's area from 115 to 200 square miles. Its transportation arteries will be extended accordingly. Despite that, we do not foresee any of the horrors of automobile traffic pileups.

You can't talk about pure air without considering the city's water, especially since Leningrad has 85 rivers, canals and other waterways.

Our work would be wasted if we didn't keep that important fact in mind. Before 1917 Leningrad did not even have a centralized sewer system: Every landlord, to save money, had his sewage pouring into the nearest waterway. This vestige of the old days was rather difficult to get rid of. Today, improving the city's water is a vital part of the general plan. The outlay for the purpose is 600 million rubles.

What we have to do is finish the construction of a centralized sewer system. A ramified network of sewers covering the entire city area has already been built. Sewage now flows into conduits deep underground. This is a very costly procedure: The pipes are laid at a depth of 60 to 70 feet, and each half-mile costs an average of about one million rubles. Sixty miles of such conduits have already been laid; their total length will reach 110 miles. More than 300 of the city's industrial plants have built their own waste treatment units in compliance with the City Soviet ruling.

All sewage will eventually be conveyed to the treatment plants now under construction on the city outskirts. The first section of these plants with mechanical and biological purification equipment will be completed in 1976. But you can already see that the water in Leningrad's rivers and canals is pure. People go fishing in the center of the city.

Tree and shrub planting is a necessary element in purifying the air. What is Leningrad doing about that?

The area planted with trees and shrubs in the city has multiplied by nearly 24 times during the years of Soviet rule. It is now 169 square feet per capita. This is a higher figure than in many of the world's cities, but, to meet the targets of the general plan, we intend to raise it to 225 square feet.

About 180,000 trees and 1.2 million shrubs are planted in Leningrad every year—this often means whole new gardens and boulevards.

We must also keep the outskirts in mind; the City Soviet has an area 30 to 40 miles in diameter under its jurisdiction. We are creating an afforestation belt six to nine miles wide. Within this belt, and in the suburban area as a whole, the law prohibits construction of industrial plants without approval by city authorities. Recreation centers, children's camps and sports facilities are mushrooming there. The present forest areas are being carefully protected and reclaimed.

Here is another indication of the purity of our air: Conifers, which cannot survive in a polluted atmosphere, are flourishing in Leningrad. Look at our blue spruces, larches and Siberian cedars.

Since Leningrad is architecturally unique, you must be paying particular attention to the environmental conditions around historical monuments.

We certainly are. All the buildings or architectural ensembles of historical value are under state protection. They are surrounded by special protection zones which we try to keep free of factories and traffic, especially trucks. We're going to ban freight traffic altogether from the city's historical center. An immense amount of work is being done by the Leningrad Branch of the All-Russia Society for the Protection of Historical and Cultural Monuments.

What about the districts you're building now? Do you consider environmental factors in laying them out?

Of course. This is why it's so much easier to keep the air clean in the new districts. We follow the principle of restricting urban growth because, in the experience of many countries, overgrown cities have a multitude of problems. Our City Soviet will not approve the construction of new factories and office buildings in Leningrad unless they are indispensable to the city's development. But the population is growing, a perfectly natural process, and as a result we're building at least 50,000 new apartment units every year. We do so in a compact way, using vacant sites and keeping the demolition of old houses to a minimum.

The city planners have charted municipal development to the year 2000: Leningrad will be extended eastward. Antipollution measures are planned at the time the new residential districts are laid out. Firstly, new districts are built inside the forest belt but beyond the industrial zone. Secondly, they are connected to centralized district heat-and-power systems. Thirdly, apartment houses are sited in wooded areas. And, finally, the system of building new districts skirted by roads cuts pollution from automobile exhaust to a minimum.

You said that Leningrad's climate does not help the city air. Is that because of the swamps which were such a problem for builders in the days of Peter the Great?

The swamps have long since disappeared. In a few remaining low-lying areas—on the northern and southern shores of the Gulf of Finland—special suction dredges are being used to raise the ground level by three to five feet. These districts are then built up or turned into public gardens. An example is the South Coast Park, which was planted on filled land four years ago. It will eventually occupy an area of 250 acres.

Do you see the environmental problems facing Leningrad as similar to those of big cities elsewhere in the world?

Last fall I visited the United States for a congress of the Town Affiliation Association. I am president of the Soviet branch of the association. Our delegation visited 13 big American cities, including New York, Washington, Atlanta, San Francisco and Los Angeles. I found that American municipalities are having to grapple with much the same threats to the environment—automobile exhaust fumes, smoke and other problems generated by urbanization itself. Their ways of resolving those problems, by the way, are very similar to ours.

In some respects, however, the situation in our country is different. Since the land and the means of production here are publicly owned—all the city's land and all of its factories and offices belong to the state—it is easier for us to solve a number of problems. There is, for example, nothing to prevent us from dismantling or moving any big enterprise, no matter how profitable it might be on its current site. We can raze whole buildings and plant parks and gardens in their place if the city sanitation service finds it necessary for people's health and comfort.

You said "for people's health." Does the City Soviet take into account the needs and desires of the population itself apart from those of the city services?

Of course. Our constituents let us know their desires every two years, before City Soviet elections. Many of the requests are, naturally, related to such improvements as neighborhood cleanups and tree and shrub planting. They are all carefully studied. Then the Executive Committee of the City Soviet draws up a plan to implement them and brings it to the City Soviet. Once approved by the session, these proposals become binding on us.

Do the citizens themselves help you?

We have a City Improvement Headquarters, a voluntary organization whose members work for it in their spare time and without pay. The headquarters is an assembly of government officials and representatives of the party, trade union and Young Communist League organizations of the city. In fact, all citizens share in its activity. The help they give us is priceless. But since I couldn't possibly list all the phases of the headquarters operation in so limited a time, I suggest that you come see for yourself—take a look at what they do.

Deputy Chairman Yuri Lukyanov of the City Improvement Headquarters

A MORE BEAUTIFUL LENINGRAD

By Lyudmila Yenyutina

IF YOU WANT to see for yourself that the environment is everyone's business, drop in at the City Improvement Headquarters," Leningrad Mayor Vasili Kazakov advised me. The headquarters is located in the City Soviet building in famous St. Isaac's Square. There Yuri Lukyanov, deputy chairman, proudly described the achievements of his voluntary organization.

Lukyanov was born in Leningrad, grew up here, joined the army in 1941 and came back after the war in 1945. A history teacher by training, he has been a party official all his life.

As a war veteran, Lukyanov was eligible to retire in 1967 at the age of 53. However, his retirement lasted just one week. With his boundless energy, he couldn't face the prospect of just sitting around. When Lukyanov was asked to work with the City Improvement Headquarters, he gladly accepted and has been there ever since.

The headquarters is not a state agency but a voluntary public body. It was set up in 1964 by the City Soviet, the city party committee and the regional trade union council. Lately the city Young Communist League committee has been taking on a good deal of the responsibility. "We welcome that, of course," says Lukyanov. "The young people have more energy, and they're more inclined to look ahead."

The headquarters has two main functions. The first is to draw Leningraders into city improvement work and direct their activities. The second is to take prompt action against any violation of the city's antipollution regulations, any threat to the water or air.

Headed by Deputy Mayor Kazimir Labetsky, the headquarters has a staff of 38 representing the city's various municipal agencies and public organizations. Each city district has its own headquarters, which directs the activities of local groups in every factory, store, institution and school. All told, there are some 4,000 such groups in Leningrad.

Nobody in the organization is paid for his or her services. Further, the group has no administrative power. It simply discusses city improvement problems and makes recommendations.

Despite that, its records list only three instances when its proposals were not acted on.

Typically, if a factory is behind schedule in installing purification units or is neglecting its grounds, or a construction agency has not done the necessary landscaping, the case is turned over to the municipal agency concerned and the director penalized by the city, as well as by the party (if he or she is a party member) and trade union bodies.

To see for myself, I attended a headquarters meeting. One of the matters discussed was how to improve Krasnoputilovskaya Street. A major avenue, it links the Moskovsky and Kirovsky districts and leads into Petrodvorets, the fountain-studded former palace of Peter the Great. People who took the floor said that the street was not green enough and had occasional "blank spaces." What are these "blank spaces"? A plot of land has been allocated for construction, but the plan does not call for building to begin for two or three years. In the meantime the patch of ground remains an eyesore, dusty in the summer and muddy in the spring and fall. The improvement headquarters recommended that district groups plant lawns in such areas and use them temporarily as children's playgrounds.

What has the headquarters achieved in the past two years? A few examples. In that period, at the organization's urging, Leningrad has installed 92 air purification units, converted 122 boilerhouses to gas and built 500 fountains. Some 16 million square feet of lawns and public gardens, 200,000 trees and 1.2 million decorative shrubs have been planted. Besides this, a number of other projects are scheduled in the city's development plan.

The motivation for this tremendous job is the feeling Leningraders have for their city, their readiness to serve the common cause.

Each resident contributes eight to

Photograph by Ivan Denisenko

ten hours a year to city improvement. Every April the whole country goes on a traditional **subbotnik:** People in cities and villages spruce up their streets, courtyards and parks, lay out flower beds and lawns, plant trees and shrubs. On April 21, 1973, one million of the four million Leningrad residents turned out for the **subbotnik.**

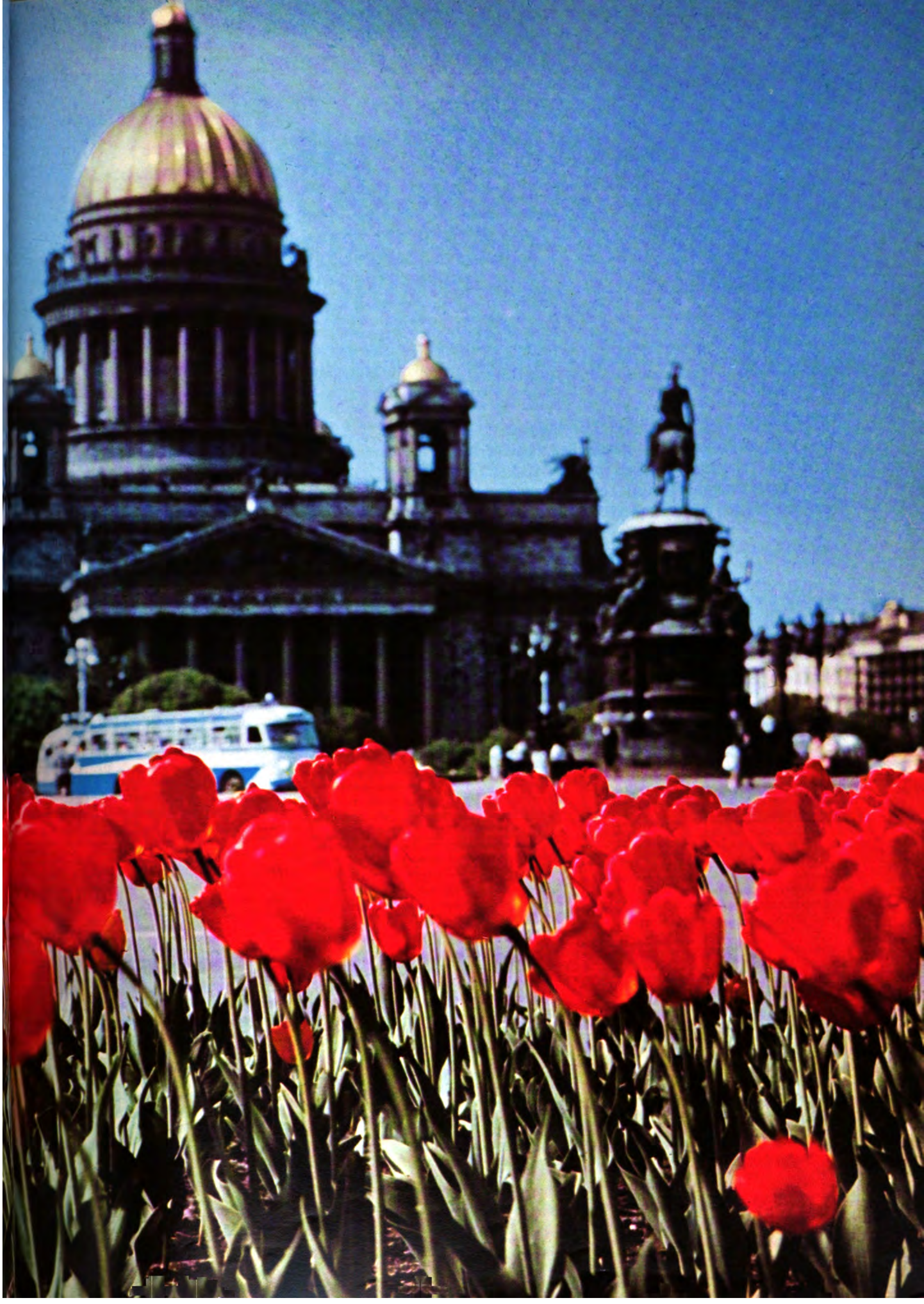
Every three months the headquarters sums up results, and the district with the best showing is awarded, to the strains of an orchestra, a bronze plaque. This is placed on the façade of the District Soviet building.

The headquarters also awards badges to those who make the greatest contribution to beautifying Leningrad. About 800 people have been presented with such emblems over the past 10 years.

"People usually leave their badges home, but they wear this one. Doesn't that tell you something?" Lukyanov asked me. "It does," I agreed.

Peter the Great. The sculptor was Carlo Rastrelli. The statue was erected in 1743 in front of the entrance to the Engineers Castle.

The Pushkin Monument, erected in 1957. The sculptor was Mikhail Anikushin. In the background: the Russian Museum (former Mikhailovsky Palace), 1825, designed by architect Carlo Rossi. Below: the Palace Bridge on a white night. Right: St. Isaac's Square and St. Isaac's Cathedral.



The fountains at Petrodvorets, a complex of palaces built by Peter the Great on the shore of the Gulf of Finland.

THE LENINGRAD CLEAN-AIR SERVICE

By Nikolai Matyukhin

Nikolai Matyukhin was born in Leningrad in 1941. After graduation from the Sanitation and Hygiene Department of the Leningrad Medical Institute, he took a job with the Institute of Industrial Hygiene and Occupational Diseases. For some years Matyukhin headed a sanitary-epidemiological laboratory. In 1971, at the age of 30, he was appointed Deputy Chief Sanitary Inspector of Leningrad.

THE TERM "the city's health" is probably a vague one to most people, but for me it has a very precise definition. A city is healthy when all its residents have good

One of the Rostral Columns. The two 100-foot pillars were erected in 1810 in front of the Stock Exchange, now the Central Naval Museum.

A Factory Changes Its Address

By Yuri Kirillov

In the last five years more than 30 Leningrad industrial enterprises that were polluting the air have either closed down or moved from the city. They included the chemical division of the Fotopribor Plant, the artificial silk department at the synthetic fiber factory and several small foundries. Also on the list was the Leningrad Alabaster Plant. Three years ago, by decision of the City Soviet, it was moved outside the city limits. This account is by our Leningrad correspondent Yuri Kirillov.

THE INFORMATION OFFICE gave me the new address: Kolpino, Zagorodnaya Street, 9. Kolpino is a Leningrad suburb not too far from the Moscow highway. The Leningrad Alabaster Plant was moved here and incorporated into the big Pobeda (Victory) production association, which makes building materials and components. The alabaster plant lost its former independence, but whether that was good or bad I could find out only on the spot. So I went to Kolpino.

In the former factory shops on the Obvodny (Bypass) Canal there were thick dust clouds around the gypsum-heating

conditions for work, recreation and all-round physical and intellectual development. These conditions have many facets, some not easily discerned. But certainly one of the essentials for the health of any city is cleanliness—clean streets and buildings, clear water in the rivers, good drinking water, clean air for people to breathe.

The cleanliness of the city, its hygienic standards, its health are kept under close observation by the Leningrad Sanitary-Epidemiological Service. It employs about 1,000 sanitary inspectors, epidemiologists and chemical engineers. Every district has a sanitary-epidemiological station, a branch of the city station. On the staffs of these facilities are sanitary inspectors responsible for controlling all possible sources of air pollution. We have 45 checkpoints that collect air samples every second day. Tests are also made inside the factories—the average frequency is once a month. Moreover, we have made the laboratories of 53 big Leningrad factories responsible for testing the air nearby to check the chemical composition of their discharge. The air is analyzed for the presence of such pollutants as carbon monoxide, carbon dioxide, sulfurous gases and soot.

This test is even more effective when it is made by automatic instruments, which register the smallest deviation from the standards. One Leningrad factory switched off its air purification system for an hour, and the change was indicated immediately by the automatic instruments.

What powers does the sanitary service have? We can take one or more of several kinds of actions against offenders. We can insist that the source of pollution be limited immediately and fine those responsible. We can order the factory or any of its shops to suspend operation. If that fails, we can ask the District or City Soviet to close the factory down altogether.

We attach great importance to the creation of sanitary protection zones around factories. Incidentally, the Soviet Union is the only country where such zones are required by law. The green belt may vary from 165 feet to a few miles, depending on the size of the factory and what it makes. No housing, medical or children's institutions or sports facilities can be built near the factory.

Pollution from automobile exhaust is much more difficult to control. Car engines, particularly if they are badly adjusted, can become a major source of air pollution. The sanitary inspectors are responsible for ensuring that motor pools do not run vehicles with faulty engines. All automobile repair and service stations have gas analyzers. There are also special flaw-detection beds to check engine characteristics.

From time to time sanitary inspectors use measuring instruments to check cars right on the city streets. They do that with officials of the State Motor Vehicle Inspection Service. If a car does not measure up, it is ordered off the streets.

Laboratory research done by the Leningrad Sanitary Service provides a mass of data for architects in planning new housing developments or renovating old ones. Guided by figures on air pollution levels, we advise landscaping agencies which trees and shrubs to plant.

Leningraders, very proud of their beautiful city, are glad to cooperate with the sanitary service. Volunteer sanitary inspectors, some 20,000 of them, keep an eye on air purification installations and report immediately if the gas and dust in the air exceeds permissible levels. They also see to it that the city streets and courtyards stay clean.

Just as it is easier for doctors to prevent a disease than to treat one, so it is easier for us sanitary inspectors to prevent air pollution than to clean up afterward. We therefore emphasize preventive inspection. Sanitary inspectors are actively involved in designing industrial and residential buildings and approving them after they are built.

boilers all the time. The city sanitary-epidemiological service made repeated complaints to the factory management, but not much could be done—small plant, obsolete equipment. . . . And the factory was in the middle of a densely populated area. So the only solution was to move it, and this the City Soviet did on the recommendation of the physicians from the sanitary-epidemiological service.

Today, the factory has switched to a new technology. Automation devices have taken over the two production lines. High-capacity boilers process 120,000 tons of gypsum a year, twice the previous output. The floor and walls of the shops are tiled, and grass grows in wooden boxes alongside the production lines. The new factory buildings are the latest thing in design, and their air purification level is 98 per cent.

The site is part of the Pobeda complex. Pobeda's expansion was planned in advance: The alabaster factory and the synthetic fiber plant were added to other units to form a specialized building association. This type of association has many advantages: centralized management, the pooling of resources so that each unit can afford the latest equipment, a production base large enough to handle apartment and dormitory construction projects. Small enterprises cannot undertake anything that big.

All the workers knew well in advance that the factory was to become part of the Pobeda complex. The trade union committee and the management assumed responsibility for placing everyone. People had a choice of going along to the Pobeda association or taking a job at a different enterprise closer to home. Many of them did just that. The Leningrad City Soviet's building materials agency had a wide choice of jobs for the engineers and technicians as well.

What do the workers have to say about the transfer?

Valeri Savelyev, 37, chief power engineer:

"I was power chief at the old factory too, but there's no comparison between the two jobs. The setup here is much more elaborate and interesting—there are so many new instruments.

"I live on Moscow Avenue, about 25 to 30 minutes by bus to Kolpino, so my travel time is about the same as before."

Lida Timofeyeva, 24, gas plant operator:

"Before starting my new job, I went to Moscow for retraining at the Gipsobeton (alabaster-cement) complex. Some 10 people in my shop had taken this same course to get acquainted with the new equipment and borrow from the Muscovites' experience. Alabaster production there is similar to ours, but the complex started operating a few years earlier."

Maria Leonova, 52, storekeeper:

"I worked at the Obvodny Canal location for nearly 20 years. My husband and I had a one-room apartment not far from the factory. But Leningrad old-timers aren't fazed by housing difficulties—we know the city is still feeling the consequences of the war. Every third building was destroyed. . . .

"I moved to Kolpino along with the factory in 1971, and in a few months we got a large apartment. The Pobeda association built three blocks of apartment houses for its workers."

New factory buildings. New equipment, not only more productive but meeting the most stringent health requirements. New housing for its workers. . . . Truly, the alabaster plant has been rejuvenated.

On the site of the old factory, a public garden has been planted. The few remaining structures house a design bureau.

GARBAGE DISPOSAL COMPLEX

By Igor Matveyev

Refuse collection and disposal is a problem for every one of the world's big cities. Leningrad has worked out a method of moving refuse with pneumatic equipment and transporting it to treatment plants outside the city. Igor Matveyev, director of one such plant, describes its operation.

OUR REFUSE TREATMENT PLANT was built on the outskirts of Leningrad four years ago. Each year we handle 14 million cubic feet of refuse—one-fourth of the city's total.

Sanitary complexes like ours have done more than drastically cut the cost of waste collection. Each year we extract about 3,300 tons of metal and produce 88,000 tons of organic fertilizer.

The process is simple and inexpensive. The refuse first goes to the separation station, where strong electric magnets pick up the metal. The remainder goes to the crusher. Then the screened, sorted and chopped mass is carried to three huge drums and treated with water and air. The rest of the job is done by microorganisms. They raise the temperature in the drum to 160 degrees, and when the compost is ready the temperature falls sharply by itself. This is the end of the biochemical process.

We have a ready market for our products, including the park administration and suburban state farms. We also supply heat and fertilizer to the greenhouses in the neighborhood.

Our plant has 13 conveyor lines staffed by 42 operators in white overalls.

Petrodvorets, the summer home of the Russian czars. It was built by Peter the Great early in the eighteenth century.

Taking periodic air samples is no longer sufficient. Leningrad now uses gas analyzers, automatic recording devices, to check on whether car exhausts meet the antipollution standards.

Photographs by Yuri Rybchinsky and Rudolph Kucherov

THE US-USSR Joint Working Group on Air Pollution Modeling, Instrumentation and Measurement Methodology met in Leningrad from October 17 to 23, 1973. The group was set up in accordance with the Agreement on Cooperation in Environmental Protection signed in Moscow by President Richard Nixon and Nikolai Podgorny, President of the Presidium of the USSR Supreme Soviet.

The memorandum to implement this agreement signed in September 1972 provided that two cities be chosen for joint study and comparison. Leningrad and St. Louis were selected; they have good experimental facilities and are considered typical.

The U.S. delegation at the conference was headed by Dr. Herbert L. Wiser, Acting Deputy Assistant Administrator for Environmental Sciences, Environmental Protection Agency. The head of the Soviet delegation was Professor Mark Berlyand, section chief of the Voyeikov Main Geophysical Observatory, USSR Hydrometeorological Service.

Both during the conference and the trip that followed, the U.S. experts were shown through a number of industrial plants and research institutions engaged in large-scale efforts to control air pollution in Moscow, Tbilisi, Yerevan and Leningrad.

The Americans were extremely interested in the methods used by their Soviet counterparts for calculating the dispersion of industrial emission in the atmosphere and in investigating a wide variety of meteorological conditions affecting air pollution.

The Soviet Union has done considerable work in studying the harmful effects of pollutants and determining critical concentrations. It was the first country to set norms of critical concentrations for 420 chemical compounds found in water reservoirs and for 138 chemical substances and their 25 combinations found in the atmosphere. These norms have been adopted by several of the other socialist countries.

The conference ended on October 23, 1973, with the signing of a protocol containing a detailed list of joint measures for pollution control. Contemplated are the exchange of information, specialists and instruments and apparatus, as well as joint investigations and special programs.

Top: Dr. Herbert Wiser (right) of the U.S. Environmental Protection Agency and Professor Mark Berlyand of the USSR Hydrometeorological Service. They head a joint working group on environmental protection. Above: Signing conference documents. Leningrad and St. Louis were chosen for study and comparison. Below: Members of the American delegation visiting one of the Leningrad University laboratories.

Our reporter Lyudmila Yenyutina asked the Americans for their impressions of the conference.

Dr. Herbert L. Wiser

Acting Deputy Assistant Administrator for Environmental Sciences, Environmental Protection Agency

I am very much impressed with the quality of the research work done in this country. I believe that jointly we will produce

results superior to anything that has been done before. I would class the results of this meeting as extremely successful, and not only regarding the information that we were able to collect. Most important is the fact that it will help us work at a faster pace and resolve problems in a better manner.

We are extremely optimistic regarding the joint Leningrad-St. Louis cooperative program. We are now very confident that our program will succeed in cleaning the atmosphere, not only of St. Louis and of Leningrad, but of all big cities of the world.

Dr. James R. Mahoney

Associate Professor of Meteorology, Harvard University

I believe we are just coming to the point of reaching the first practical results from the cooperation of this particular working group. We now have had an opportunity to examine in reasonable detail the general field of technical work in the two countries. And we have agreed on specific plans for the development of what we might call the best practical methodology of the methodologies available in the two countries for improved planning. It is also my strong conviction that if our work is able to continue successfully—and in view of the very fine cooperation we've had up until now I have good reasons to believe that it will—we may be able to help produce some documents to standardize recommendations for technical procedures in this area that will be useful for many other nations of the world as well as for our own two nations.

We feel that in the area of air pollution control it is most important to have good design of communities, good separation between residential areas and areas of industrialization. And the Soviet Union has some of the best examples in the world of this type of planning. I, for instance, have been extremely impressed by the new apartment blocks which I've seen in the Leningrad area. The heating and hot water supply to these new apartment groups is provided by centralized thermal stations. This system is much superior to individual or on-site heating which is common in many parts of the world, including in the United States, because it permits the efficient use of fuels for energy. And directly from the air pollution point of view, centralizing the combustion in a single facility provides one of the best means of controlling the exposure of the population to air pollutants. It is done by discharging the effluents through a tall stack at a location well designed and well placed relative to nearby residential areas.

We have for a long time been impressed specifically by the good theoretical basis for the atmospheric modeling which is being carried out in the Soviet Union. We have been even more impressed coming here and experiencing technical discussions of this work directly. We are now carrying home several documents that describe this work in detail.

David Strother

Office of International Activities Environmental Protection Agency

The project should enable planners on both sides to make more rational decisions

Continued on page 46

The Anichkov Bridge, which spans the Fontanka River, is decorated with four sculptured groups of horses done by Peter Klodt.

The Whole Country Will Learn From Leningrad

By Professor Mark Berlyand

Head of the Atmosphere Protection Section of the Leningrad City Soviet, Chairman of the Soviet Side of the US-USSR Joint Working Group on Cooperation in the Field of Air Pollution Modeling, Instrumentation and Measurement Methodology

ATMOSPHERIC POLLUTION is turning out to be one of the world's most complicated problems. Despite the achievements of modern science, solutions are still a long way off. A hopeful step toward remedying this is the recent agreement between the Soviet Union and the United States to work together to protect the environment. Under one of the joint Soviet-American projects, Leningrad and St. Louis have been chosen as basic cities for research. Specialists in the two countries are to work out recommendations for air purification. The accumulated experience will be applied in both countries.

A special decree of the Soviet Government passed in December 1972 outlined measures for better city planning and factory design, and set up a countrywide control service to check the level of pollution.

The range of steps being taken to ensure pure air in Soviet cities is very wide. It involves changes in production processes, development of gas purification equipment and the substitution of gaseous fuel for solid and liquid.

We also place our hopes on research in the properties of the atmosphere itself, studies now being done by meteorologists in the field of atmospheric physics and chemistry. The center of this investigation is the Main Geophysical Observatory in Leningrad. The results are first tested in Leningrad, and recommendations are then worked out for other cities.

We are making wide use of mathematical models to give us an accurate picture of the various discharges, to make a computer study of their dispersal and to account for the diversified effect of such factors as weather and terrain, and characteristics of discharges.

Our research has provided us with data for setting building standards for the design and operation of industrial and power engineering plants throughout the country. These standards are worked up with specialists in meteorology, hygiene, technology and construction.

A new trend in our research is the elaboration of techniques for forecasting adverse weather conditions that are likely to cause the level of air pollution to rise sharply. The point is that in a number of production units discharges into the atmosphere are irregular; they have what we call a volleylike character. Obviously, when this happens in bad weather, the atmosphere in the city will deteriorate. If we reduce the discharge into the atmosphere for at least short periods and avoid large concentrations of impurities in residential districts, the air will be more healthful.

A most important factor in keeping the air clean is, of course, rigorous control. The many and scattered potential pollution sources in the city—industrial plants, transport and the like—demand a continuously operating and widely ramified network of facilities for observing the chemical composition of the air. This problem is being given close attention. Systematic tests are made to determine the amount and type of pollution. But taking periodic air samples is no longer enough. We have developed and are now producing an automatic recording device that identifies the polluting elements. These gas analyzers can single out and measure any one of the most common pollutants, such as sulfur dioxide or carbon monoxide, or determine the concentration of several pollutants simultaneously—sulfur dioxide, hydrogen sulfide, chlorine. In Leningrad the instruments were first tested in road vehicles and helicopters, thus permitting the three-dimensional distribution of impurities within the city area to be identified.

Our city is setting up a centralized system for automatic control and collection of information. Pollution levels are registered simultaneously in different parts of the city and the data processed at a central point.

Until recently practically no attention was paid to the key of control for atmospheric purity: an "inventory" of discharges. While air pollution sources have been under observation for a long time, the capacity and the characteristics of the sources were not analyzed. The heads of industrial plants themselves often did not know the composition of the discharges emanating from their factories. Our recommendations for this kind of survey have now been adopted by many cities in the country.

For some years the Atmosphere Protection Section has been an active part of the Leningrad City Soviet's Executive Committee, coordinating the work of various city organizations. On its recommendation the sources of noxious discharge into the atmosphere are being identified and listed. The section periodically examines the adequacy of measures for atmospheric protection, analyzes the damage caused by pollution and suggests ways to eliminate it.

Observations indicate that, compared with other cities throughout the world, Leningrad's air is much purer. But we won't stop here. We attach great importance to Soviet-American cooperation in this field. Environmental protection experts of both countries have already met twice. We are certain that the exchange of ideas, specialists and research data will be extremely useful.

MAN AND NATURE: FRIENDS OR FOES?

By Igor Kravchenko
Candidate of Science (Philosophy)
By Ivan Lyseyev
Candidate of Science (Philosophy)

Man and nature . . . society and the environment—these are combinations that the Earth's inhabitants are beginning to think about more and more often. Are they friends or foes? The question raises a multitude of others, more specifically: Are pollution and upset of the natural balance the unavoidable results of economic activities? Will we exhaust the globe's mineral resources, "starve" for power and raw materials? What has to be done to reorder the present situation and to prevent an even more threatening future?

The questions illustrate the urgency and complexity of the problem.

In 1972 the Central Committee of the CPSU and the Council of Ministers of the USSR passed the resolution on the Intensification of Nature Preservation and the Better Utilization of Natural Resources. This resolution contains measures to prevent further pollution of the country's soil, atmosphere and water basins. The Supreme Soviet has worked out the fundamentals of legislation for the whole country on the use of water, land and mineral resources. Special resolutions have been passed for the preservation of huge areas: the Caspian Sea, Lake Baikal, the Volga and the Ural rivers. All these governmental and legislative resolutions not only establish pollution levels for industry, but also formulate principles for the conservation education of the citizen.

The magazine *Voprosy Filosofii (Philosophical Questions)* held a round table on the interaction between society and nature. Its participants were well-known physicists, doctors, biologists, geographers, economists; heads of meterorological, sanitation and geophysical services; members of conservation societies, hunting clubs and planning and economic agencies, as well as philosophers and sociologists. This is a report of the proceedings.

Toward Global Ecology

Karl Marx warned that a culture which develops spontaneously, without conscious direction, may leave nothingness in its wake. That idea would seem to be paradoxical since culture is the embodiment of reason. Today the need for those of us in the highly developed countries to take account of this warning is even more evident.

It is no accident that the ecological crisis began in the culturally and economically developed capitalist countries. The very nature of capitalist society, with its spontaneously regulated private business undertakings, its private ownership of the means of production and of land and other habitation resources, favored uncontrolled and mounting environmental destruction. The developed socialist countries are able to detect the characteristic signs of a similar crisis at home if the scientific substantiation and philosophical interpretation of the relations between nature and society fall behind the rates of cultural and economic development.

Those taking part in the meeting were agreed that the degree to which we alter our natural habitation must be planned rationally. We must create an optimal biosphere, which means we have to study the relations between the biological, geophysical and technical systems. Regulating those interrelations is an extremely complicated business and requires the coordinated efforts of both natural and social scientists and the creation of a new discipline, global ecology.

Are our economic activities really fatal for developed civilizations? Academician Yevgeni Fyodorov suggests that neither technological progress nor the increasing demand per head of population makes continuing pollution inevitable. In the opinion of the academician, it can be avoided by closed cycles in industrial production, by the use of better methods of fighting pests and better fertilizers in farming, by reprocessing garbage, and other such measures. All this can reduce pollution to tenths of a fraction, even hundredths of a fraction of its present level.

Practical Experience

Academician Pyotr Kapitsa called attention to the partial protection provided by natural purifying mechanisms. For example, he cited Lake Baikal, which is a colossally powerful biofilter producing clear water. This purification is conditioned by the biological processes that go on in the lake. If Baikal were to be filled with completely pure water, life in the lake would cease and Baikal would no longer reprocess the polluted water coming into it. Thus, in using Lake Baikal, chemists and engineers must work out technological processes whose waste can be treated by the lake.

Certainly a most effective way of protecting nature is by the intensive construction of purification systems. But they are still very expensive and not effective enough. When industrial plants are enlarged and modernized, these installations have difficulty handling the added load. And converting them again is expensive. Finally, there are varieties of production wastes for which methods of purification have not been worked out. According to Yevgeni Ignatyev, department head at the Council for the Study of the Productive Forces, it is useless to put your trust solely in methods of purification. A comprehensive program is required to fight pollution of the air and water basins, one of whose basic ingredients is the more rational distribution of the productive forces. A planned socialist economy can do that. Regional, industrial and cultural centers are to be set up in all areas of the country. This will make it possible to limit population growth and industrial expansion in the biggest towns, where protection of the environment is particularly pressing.

Here is another example of the practical value of a comprehensive program. Sergei Chickin, Deputy Minister of Health of the RSFSR, said at the meeting that in Moscow alone over the past three or four years some 200 enterprises have been moved outside the city limits, 1200 boilers have changed over from coal to gas, 4,000 dust and gas filters have been installed at industrial plants. This has cut the dust in the atmospheric air by five or six times and the sulfur gases by three to four times.

In 15 towns on the Volga and Ural rivers alone, purifying installations are to be built at a cost of more than 300 million rubles. By early 1980, throughout that whole great stretch of territory, there will be no untreated sewage pumped into these rivers.

Resources and People

The conference participants paid a great deal of attention to wasteful and thoughtless extraction of the Earth's mineral resources. Academician Kapitsa reminded us that if the requirements in power per head of population continued growing at the present rate, the supply of coal would be exhausted in 100 to 150 years. For other kinds of raw materials the crisis seems even more imminent. Thus, the world's silver will be exhausted in 13 to 40 years, its lead in 20 to 60 years. The food problem is no less acute. According to UN data, to double the harvest, using present methods of working the soil, 6.5 times more fertilizers are needed, six times more pesticides, and three times more electric power. A subsequent

growth in yield will unquestionably require an even greater outlay.

But there are ways of meeting the threatening crisis. There are untapped resources and still untouched deposits of minerals. There are also, in principle, new solutions to be considered—changing the consumption pattern, for example. At one time we wore only wool and linen, now we wear the by-products of oil, and it is anyone's guess what we will be wearing a few years from now.

We have ways of replacing such biological resources as forests, the soil, fish, water, atmospheric oxygen. Presently, for example, we catch 70 per cent of the population growth of the basic industrial fish in the ocean—dangerously close to the point of exhaustion. But it is possible to breed fish artificially and increase their rate of growth many times over. And there will be immeasurably more such possibilities with scientific and technological progress.

Among the variety of explosions shaking our planet—informational, scientific, technical—we are faced with a demographic explosion. The population of the Earth is now 3.7 billion. If growth continues at the present rate (by approximately 2 per cent per year), then, according to Academician Kapitsa, in 700 years there will be a person on every 10 square feet of the Earth's surface.

Should we be regulating population growth right now? Are those countries that are trying to do it justified? Is self-regulation, the influence of social and political factors, sufficient?

In this connection Academician Fyodorov made the point that the need for regulating population growth could be left open, since the real need to regulate the composition of the population from the point of view of quality was already evident. In the socialist countries regulation of this type is an inevitable result of the system of training personnel and developing people based on a long-term plan for the development of society. The younger generations have a place in the scheme of production and their needs and interests do not conflict with those of the rest of society.

Here social problems enter the picture. And without solving these, it is impossible to deal seriously with the natural science, technological and economic aspects of ecology.

Not Only Technical Solutions

If burning extracted fuel (97 per cent of the sources of energy) in the course of a year releases 20 billion tons of carbon dioxide (CO_2) into the atmosphere, if 90 million internal combustion engines in the United States annually give off 66 million tons of that poisonous gas (plus nitrogen and sulfur compounds), then our first and foremost job in technology is to make the changes that will put an end to poisoning the atmosphere.

But there is the question of the social conditions in which technology itself is developing and how its findings are used. Another and no less important problem is whether the technical solution to various kinds of ecological problems can hold off the threatening crisis. Today scientists in various countries, including America, insist that it cannot. By way of example, American ecologists Paul and Ann Ehrlich write that there is no technical panacea for solving the chain reactions of problems that will lead to a crisis in the system "population-food-environment." Technology used properly can help only in such areas as pollution control!

The belief in technology as the final solution to all problems can lead us up a blind alley.

Indeed, when the modern researchers establish that today for every 450 million people who have plenty to eat there are 2.4 billion semistarving or starving people, then first and foremost they are dealing with a tremendous *social* problem.

The discussion participants noted that it is precisely in the social sphere that the conflict between nature and society arises, the confrontation of people, the subject—and nature, the object of their influence. The division of capitalist society into opposing classes and groups is reflected in the attitude toward natural surroundings. The conflicts of class, group and individual interests lead to a chaotic, uncontrollable and even destructive attitude toward the environment. In these historically formed conditions the only basis for fundamental changes in the relations of people to nature and the regulation of these relations is a society free of antagonistic class contradictions. None of the participants in the discussion had any doubt, therefore, that the ecological crisis could, in principle, be solved in a socialist society.

That belief of Soviet scientists does not derive from irresponsible "technological" optimism. It comes from the conviction that there is a realizable possibility of integrating the social, technological and economic transformation of socialist society. In this connection some speakers suggested that the ecological problem be regarded as a process of organic intertwining of economic, cultural and socially transforming beginnings, as the eradication of the opposed nature of the elements in the system "individual-society-habitation." This process permits changing the aggressive consumer attitude toward nature that has formed over the centuries.

International Cooperation

The speakers rejected as two extremes both the aggressively transforming attitude toward nature, and the demand not to interfere with nature at all. The latter extreme is completely unreal in our present-day world. New relations with nature require its rational alteration on a scientific basis. The prototype for such a base, as we have already mentioned, is global ecology, an integral science of nature and a change in people's behavior with regard to nature.

Academicians Pyotr Kapitsa, Yevgeni Fyodorov and Innokenti Gerasimov stressed the planetary nature of the most important ecological problems and the impossibility of solving them in individual countries, no matter how effective isolated conservation measures may be. Combined activity, without which no really effective solution to ecological questions is possible, depends on the peaceful coexistence of states with differing social systems. Only peaceful coexistence, economic and cultural development, the general exchange of scientific and technical experience and coordinated international action will permit purposeful environmental transformation in the interests of all of humanity, stressed director of the Institute of Geography Academician Innokenti Gerasimov.

The philosopher Anatoli Medunin regarded the ecological crisis as a new area of creativity in the peaceful competition between states and systems, competition for a clean planet and the rational utilization of its natural resources. He said that the prime responsibility in this competition and in the solution of the urgent ecological contradictions rests on the developed countries. They are largely responsible for the destruction of nature, and they have at their disposal the scientific and technical potential for the protection of the environment.

The speech of historian Sergei Khozin of the Institute of U.S. Studies was devoted to international ecological cooperation. He pointed out that the most important ways of achieving such cooperation are exchange of information, coordination of national programs, joint international action, the creation and observation of international standards regulating the activity of industrial enterprises, mutual technical and scientific assistance. He thought the international scientific research centers could become the generators of ideas in ecology.

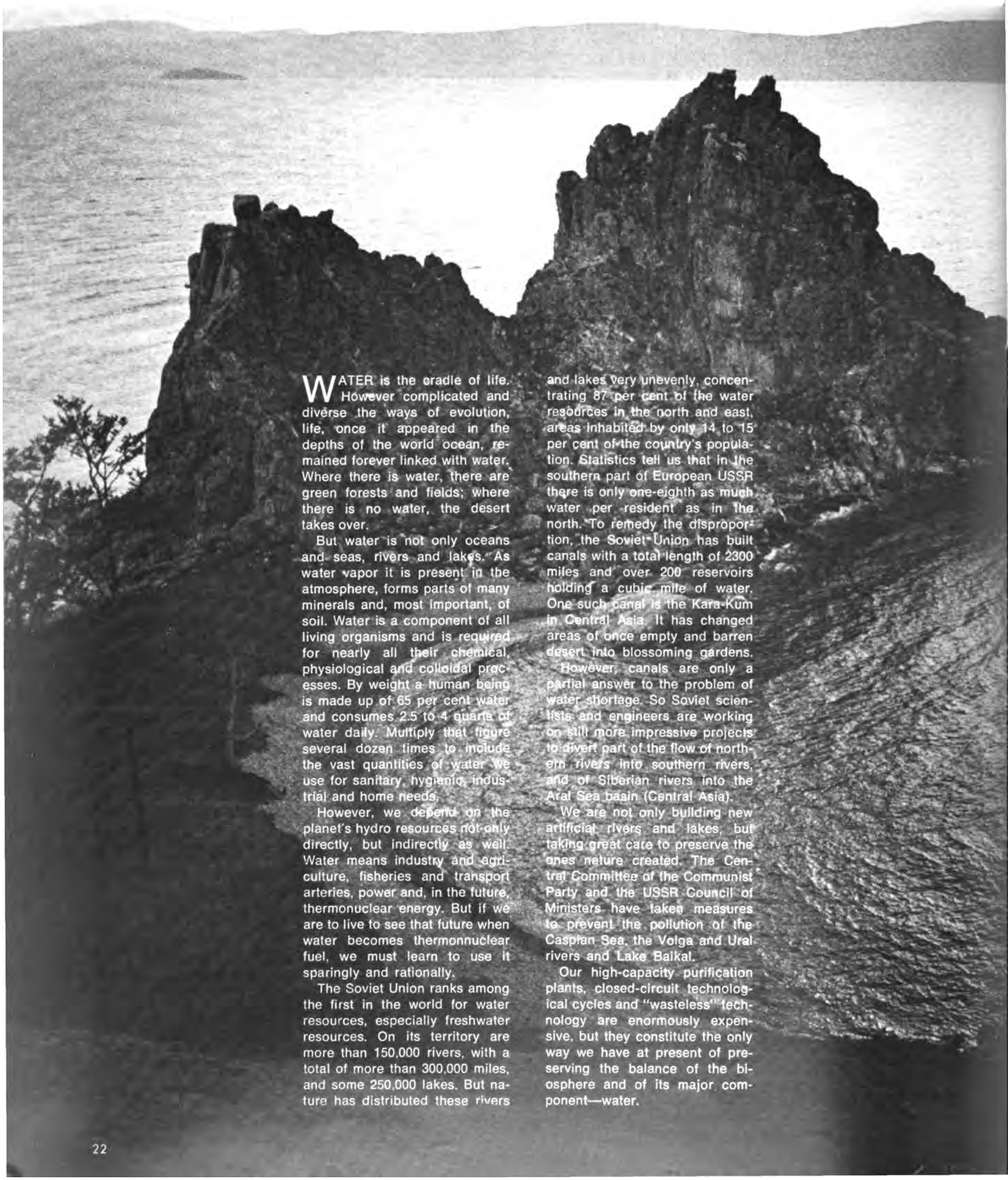
Academician Kapitsa noted that there was no way at present to put pressure on countries that did not wish to be involved in efforts to protect the environment. They are causing serious damage. He cited as an example those countries that continue in their own narrow national interests to conduct nuclear tests in the atmosphere.

Ecological measures are not an end in themselves, nor are they abstractions groping for the ideal. The round table emphasized the human idea behind ecology. Professor Tsaregorodtsev proposed this formulation of the aims of ecological transformations: to create a natural environment that answers not only the biological requirements of harmoniously developed people, but their psychological, esthetic and other needs as well. That phrasing of an ecological goal is based on a recognition of the permanent value of human life implicit in socialist thinking.

The speakers expressed the conviction that people can really become the friends of nature. We can become its skillful transformers and helpers, purposefully building our relations with nature and consequently with each other.

WATER

Photograph by
Alexander Makletsov



WATER is the cradle of life. However complicated and diverse the ways of evolution, life, once it appeared in the depths of the world ocean, remained forever linked with water. Where there is water, there are green forests and fields; where there is no water, the desert takes over.

But water is not only oceans and seas, rivers and lakes. As water vapor it is present in the atmosphere, forms parts of many minerals and, most important, of soil. Water is a component of all living organisms and is required for nearly all their chemical, physiological and colloidal processes. By weight a human being is made up of 65 per cent water and consumes 2.5 to 4 quarts of water daily. Multiply that figure several dozen times to include the vast quantities of water we use for sanitary, hygienic, industrial and home needs.

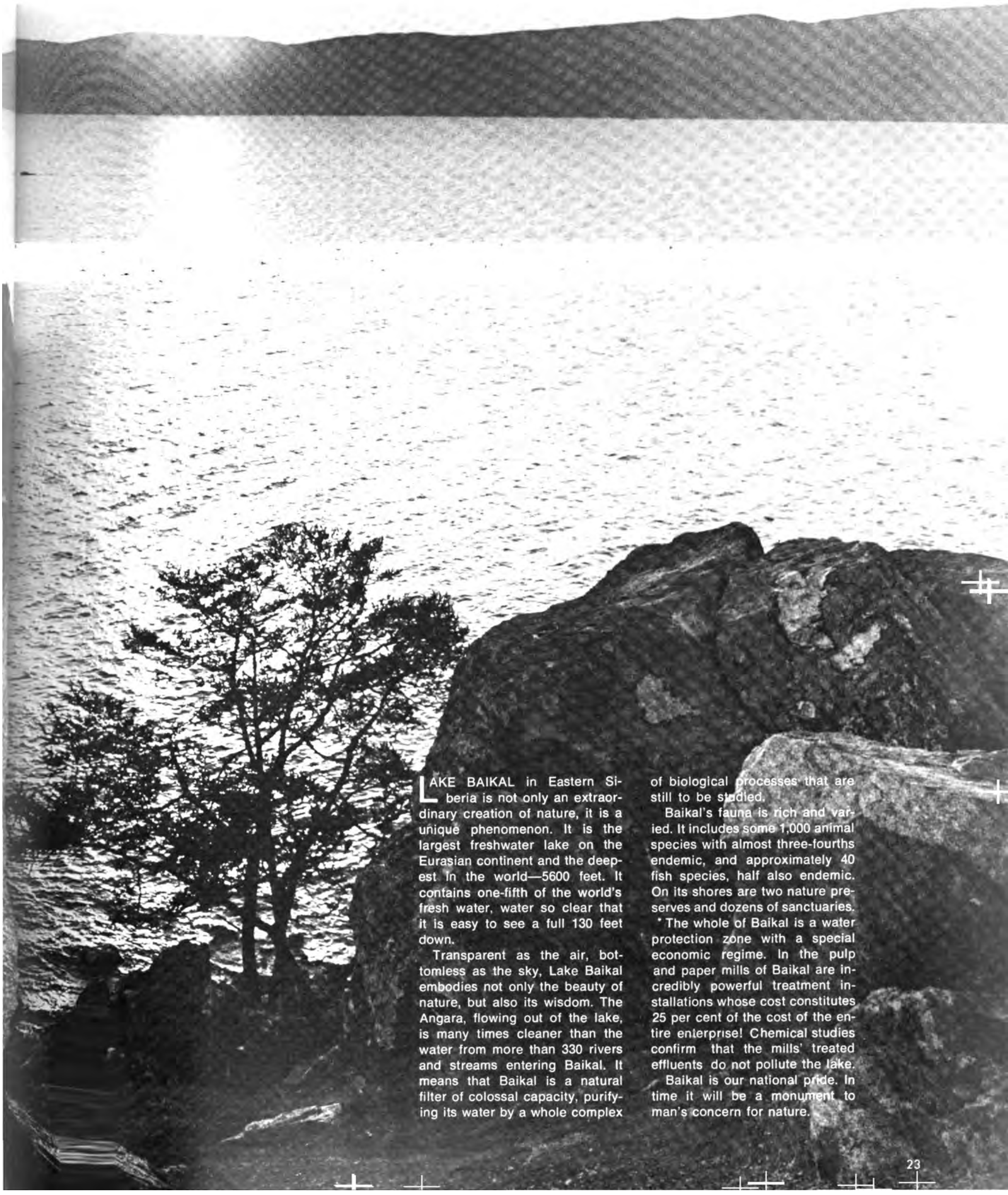
However, we depend on the planet's hydro resources not only directly, but indirectly as well. Water means industry and agriculture, fisheries and transport arteries, power and, in the future, thermonuclear energy. But if we are to live to see that future when water becomes thermonnuclear fuel, we must learn to use it sparingly and rationally.

The Soviet Union ranks among the first in the world for water resources, especially freshwater resources. On its territory are more than 150,000 rivers, with a total of more than 300,000 miles, and some 250,000 lakes. But nature has distributed these rivers and lakes very unevenly, concentrating 87 per cent of the water resources in the north and east, areas inhabited by only 14 to 15 per cent of the country's population. Statistics tell us that in the southern part of European USSR there is only one-eighth as much water per resident as in the north. To remedy the disproportion, the Soviet Union has built canals with a total length of 2300 miles and over 200 reservoirs holding a cubic mile of water. One such canal is the Kara-Kum in Central Asia. It has changed areas of once empty and barren desert into blossoming gardens.

However, canals are only a partial answer to the problem of water shortage. So Soviet scientists and engineers are working on still more impressive projects to divert part of the flow of northern rivers into southern rivers, and of Siberian rivers into the Aral Sea basin (Central Asia).

We are not only building new artificial rivers and lakes, but taking great care to preserve the ones nature created. The Central Committee of the Communist Party and the USSR Council of Ministers have taken measures to prevent the pollution of the Caspian Sea, the Volga and Ural rivers and Lake Baikal.

Our high-capacity purification plants, closed-circuit technological cycles and "wasteless" technology are enormously expensive, but they constitute the only way we have at present of preserving the balance of the biosphere and of its major component—water.



LAKE BAIKAL in Eastern Siberia is not only an extraordinary creation of nature, it is a unique phenomenon. It is the largest freshwater lake on the Eurasian continent and the deepest in the world—5600 feet. It contains one-fifth of the world's fresh water, water so clear that it is easy to see a full 130 feet down.

Transparent as the air, bottomless as the sky, Lake Baikal embodies not only the beauty of nature, but also its wisdom. The Angara, flowing out of the lake, is many times cleaner than the water from more than 330 rivers and streams entering Baikal. It means that Baikal is a natural filter of colossal capacity, purifying its water by a whole complex of biological processes that are still to be studied.

Baikal's fauna is rich and varied. It includes some 1,000 animal species with almost three-fourths endemic, and approximately 40 fish species, half also endemic. On its shores are two nature preserves and dozens of sanctuaries.

The whole of Baikal is a water protection zone with a special economic regime. In the pulp and paper mills of Baikal are incredibly powerful treatment installations whose cost constitutes 25 per cent of the cost of the entire enterprise! Chemical studies confirm that the mills' treated effluents do not pollute the lake.

Baikal is our national pride. In time it will be a monument to man's concern for nature.

CLEAN RIVER IN AN INDUSTRIAL CITY

By Mikhail Krivich
Photographs by Igor Zotin

I ARRIVED in Ryazan, an old Russian city on the Oka River, on a hot morning in June, when even my light summer jacket felt too heavy. This "thoughtful and tender" land, as the Russian poet Sergei Yesenin called it, has been praised in poetry and lyrical prose for the beauty of its unruffled lakes and rivers, its expanses of forest and field.

In my official capacity I had to visit the beach and take a dip in the river, since the purpose of my trip was to look over the city's water purification system.

But in spite of the heat I had no inclination to bathe. In the first place, I had seen the industrial and domestic sewage of the city; in the second, I had already found out that the beach in Ryazan was further downstream than the city itself.

Downstream

There are no miracles nowadays. A big city inevitably produces a stream of sewage. The factories create tributaries to this stream that carry acids, alkalis and other industrial wastes. At present the Oka River flows not through the patriarchal town that Ryazan used to be decades ago, but through a large industrial city with a population of 350,000. There are thermal power stations in Ryazan, nonferrous metallurgy installations, foundries, a synthetic fiber plant and one of the largest oil refineries in the country. Why, then, is the water of the city beach still unpolluted?

The same purification plants handle Ryazan's domestic sewage and its industrial wastes. Not far from the oil refinery, a high-capacity biological treatment plant has been built.

I walked along the intricate, half-mile-long routes past powerful pumps, reservoirs of seething water, and giant basins with an unruffled, glasslike surface. I climbed endless ladders and crossed concrete channels on whose bottom a gray foamy substance bubbled like lava. Odors began to change, and toward the end of my expedition I could feel a fresh river breeze. In the last reser-

The Oka River in Ryazan, an industrial city, couldn't be purer.

Ryazan's oil refineries, foundries and artificial fiber plants all use the Oka's water, but the river is clean enough for fishing.

Waste water is treated biologically at the city purification plant.

voirs I could see the green threads of al
As I passed the discharge point, I fil
small glass flask with the transparent w

The Ryazan water treatment plant ha
strict rule: If the results of a single eff
test are unfavorable, the whole staff los
bonus.

"Does that happen often?" I asked.

"Not once so far," replied Nadezhda P
shova, manager of the plant.

Water Means Money

As the city grows, the number of indus
plants increases, and so does the num
of water purification units. This is the
in practice; it says, in effect, that the
is not a sewer.

The building of purification plants
already cost Ryazan nine million rubl

The city fathers, that is, the Exec
Committee of the City Soviet, and the in
trial plants could not have done the
separately, which is why the treatment
ities are built by joint effort. Each ente
is assessed an amount depending o
volume of waste water it empties into
sewer system. Thus, for instance, the Ry
Branch of Moscow's Likhachov Auto Pl
responsible for two million rubles, th
refinery for 200,000, the acid-resistant
terials plant for 100,000.

Nobody questions the rightness of
arrangement, not even the auto plant
the refinery, which discharge the la
amount of waste water.

Pavel Deineko, director of the oil re
says:

"From a technological point of view
operation in the biological purification
dustrial and domestic sewage is highly
pedient. And from an economic poi
view, too, the building and operation
few large treatment plants instead of do
of small ones is undoubtedly more efficie

The city executive committee fixes
amounts of the assessments and con
water use.

An industrial plant pays about one-se
teenth of a kopeck for each cubic foo
water taken from the river. To purify
cubic foot and return it to the river c
another one-fourth of a kopeck. Since
dustrial plants use hundreds of thous
of cubic feet of water a day, the expe
involved is enough so that engineers
around for possible economies. Some p
use the same water over and over a
without discharging it into the river. To
that, the water is cooled, then purifie
necessary. This requires cooling tow
(heat exchangers), pumps and other spe
equipment. Re-using water is an impor
way of keeping the Oka River clean.
city executive committee works out pre
plans of how much water each enterp
may use, and at what times.

If the regulations are violated, those
sponsible are fined or, in some cases
whole plant is closed down.

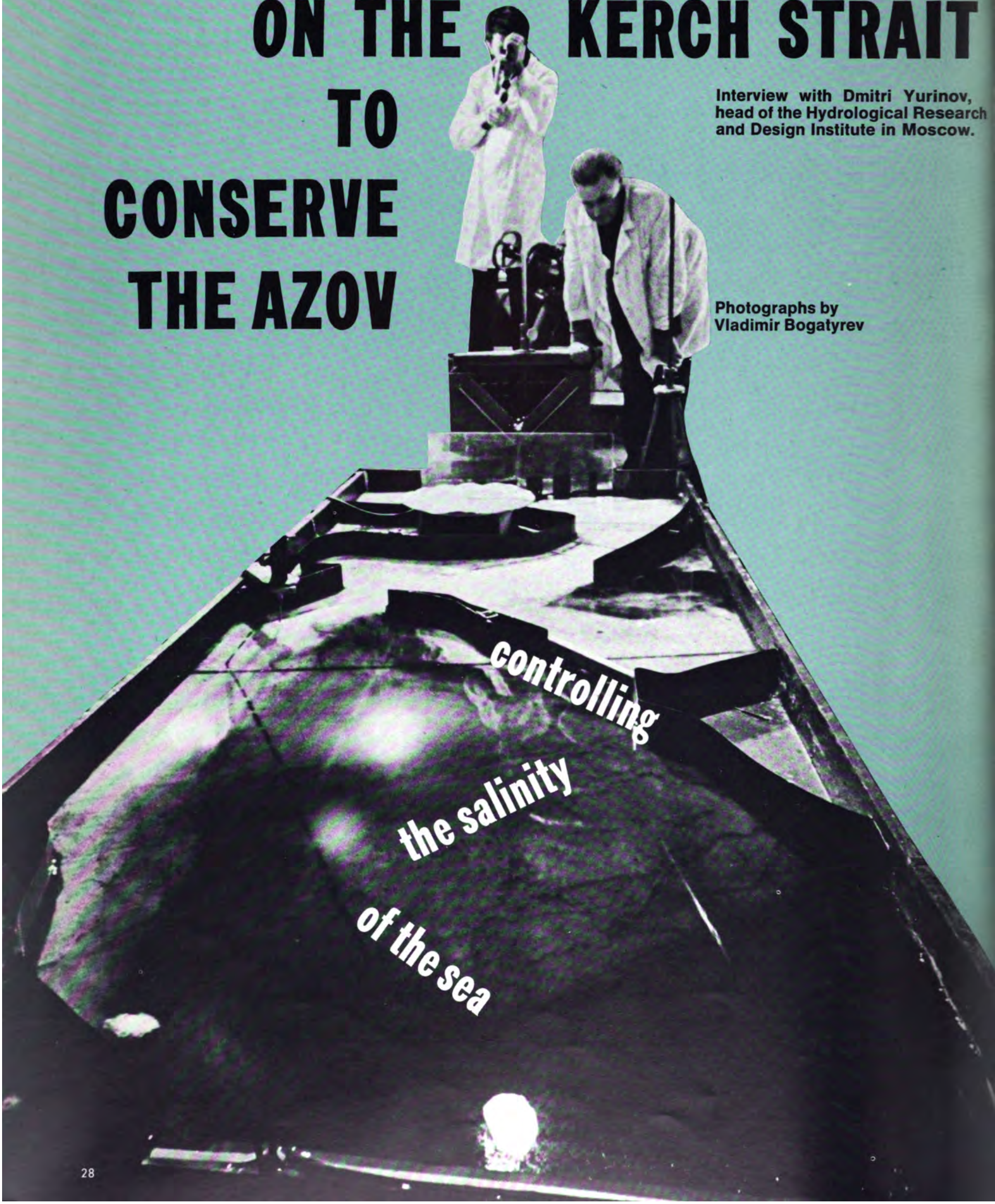
The experience of Ryazan proves that
industrial city and a river with fish, a
and beaches of yellow sand and tall g
can coexist perfectly if its people agree
conservation.

It was a pleasure breathing the city's
thanks to the surrounding greenery and
pure water of the Oka.

A DAM ON THE KERCH STRAIT TO CONSERVE THE AZOV

Interview with Dmitri Yurinov, head of the Hydrological Research and Design Institute in Moscow.

Photographs by Vladimir Bogatyrev



THE SALINITY of the Sea of Azov will be controlled to within .05 of a per cent a few years after the Kerch Strait and the Don River are dammed. The plan for the use and conservation of the water resources of the Azov basin was developed by the Hydrological Institute and approved by the USSR State Planning Committee. The complexity of the project and the scale of the territory covered make it the first attempt of its kind anywhere in the world, according to the experts.

But why the Azov basin? That is the question that started off the interview with Dmitri Yurinov, the institute's chief.

"The Sea of Azov is one of the most productive on Earth," he replied. "Each acre yielded about 70 pounds of fish."

"Yielded? Why the past tense?"

"Because unfortunately that is no longer the situation. Each year the sea receives a diminishing volume of fresh water, and its salinity keeps rising. To use the language of ichthyologists, the area available for fattening the fish, especially the young, is gradually shrinking.

"The fish in the Azov area include the pike perch, bream and taran—a variety of roach that grows to a length of 20 inches and a weight of 5 pounds. Not so long ago they had extensive spawning grounds in the Don flood plain. Fish that had no commercial value also emerged in the plain, where the abundance of food kept them from gobbling the sturgeon eggs in the river beds."

"But can't sturgeons spawn in commercial ponds?"

"Yes, that's been tried, and it's not too bad, but it can't equal the natural method. And we haven't yet been successful with brood ponds for the pike perch, bream and taran—another reason why we need the Don flood plain. For two months in the spring, it should be covered by a layer of water from two to six feet deep. The new hydrosystems on the river will do that.

"Now about the composition of the water. At one time the Azov had a normal environment for fish due to its water exchange with the Black Sea. During floods the river's fresh water flowed into the Sea of Azov, through it, and via the Kerch Strait to the Black Sea. In turn the Black Sea supplied the Azov with sea water in the autumn. Those being the conditions, salinity was maintained on the average at 1.0 to 1.1 per cent, highly suitable for rearing and fattening the fish. Of course, in dry years, when the river discharge fell sharply, the salinity increased, but within a year or two things were back to normal. Nature's own control mechanism was enough. But it can no longer cope with the task—the river discharge is dropping as water consumption rises."

"Evidently agriculture and industry will be using more and more water?"

"They certainly will. Their share is now 2.6 cubic miles of water a year out of a total flow of 10 cubic miles, but according to forecasts the figure will climb to 3.5 by 1985. To become the country's most plentiful source of fish again, the Azov would need all 10 cubic miles of river water. If it is getting more and more saline now, what can we expect in the future?"

" If the cook oversalts the soup, she adds water to it. "

"That's the point. One possible way of

Nikolai Alexashin is all for the project. He heads the area fish protection agency.

Yevgeni Stonogin is working on the dam across the Kerch Strait. It will regulate the flow and facilitate spawning. Right: Fisherman Mikhail Sokolov is with the Krasny Desant state fishing farm.

Fishery researcher Svetlana Lasukova estimates that the dam will quintuple the fish catch in the basin by 1980. Below: The fish farm also raises livestock and fruit.

decreasing the salinity was to sharply increase the river discharge, diverting the waters of the northern rivers via the Volga, the Tsimlyansk Reservoir and the Volga-Don Canal to the Azov. Hopes were placed on this method, but the estimated cost was prohibitive: two billion rubles!

"So we tackled the problem from the other end. After all, the salt content of the Azov could be reduced not only by adding fresh water but also by reducing the delivery of salt water from the Black Sea. This could be accomplished by partially damming the Kerch Strait, leaving a channel about 800 feet wide. But preliminary estimates showed that this variant too was unsuitable: First, it would not be fully effective, and second, the cost would be almost as high as for complete damming. So the choice fell on the third variant, which has now been adopted: to put up a full barrier, a concrete dam, on the Kerch Strait, leaving holes in it for regulating the water exchange between the two seas. This type of control is necessary because reducing the salinity too much could also be harmful: Oxygen-consuming blue-green algae would appear, and the fish would die. So you can see that precision is highly important."

"How much would complete damming cost?"

"We haven't arrived at a precise figure yet, but it would be somewhere between 300 and 400 million rubles as compared with 2 billion for diverting the northern rivers. And out of that amount, 100 million rubles would go toward building the Crimea-Caucasus dam bridge to replace the present ferry service.

"Of course, a whole complex of problems are involved once we change the water economy of the huge Azov basin, which covers an area of 208,000 square miles. What we have already established is that today's water deficit can be met by local resources. In fact, the resources of the Don, the Kuban and other, smaller, rivers will keep pace with economic development in these areas until 1985. After that, we will need to shift 1.1 to 1.4 cubic miles of water annually from the Volga through the Volga-Don Canal, which will demand some reconstruction of the canal.

"Our plan includes the solution of some other interesting problems. Take this one, for instance: The famed Black Sea anchovy, which has been caught commercially for many years, spends the winter in the Black Sea because the Azov is too cold. But the food resources there are sparse, so the fish thins down, loses strength. In the spring it migrates to the Azov, puts on weight, spawns and again returns to the Black Sea. We expect to catch it right there at the Kerch Dam, in quantities appropriate for maintaining its population at the required level, by closing off the foundation drain holes with nets. That will eliminate the need for seagoing fishing vessels.

"In surface area the Azov is one-tenth as large as the Caspian. As for volume, there is no comparison: The Azov has an average depth of 30 feet as against half a mile for the south Caspian Sea. But after the hydrotechnical systems I have described are built, the 'small' Azov Sea should produce up to 330,000 tons of fish—not much less than the giant Caspian, and half of it commercially valuable varieties."

The field is too big to be covered in a brief interview. We touched on only one aspect of the problem—fish resources. However, the project also envisages large-scale land improvement, the reason the USSR Ministry of Land Reclamation and Water Management is in charge. Half the river flow will be used for irrigation, after all the hydrotechnical systems go into operation, so that the area of irrigated land will increase from 1 million to 4.5 million acres! For comparison, we might note that last year the total area of the country's new irrigated lands amounted to about two million acres.

In addition, the hydrosystems on the Don will increase the river flow, thus improving the single transport route from the Baltic to the Black Sea; hydroelectric power plants will provide cities and villages with additional electricity; and more water will be made available to industry.

This young sturgeon does not meet the government's strict size regulations, and it goes right back into the water.

SHEVCHENKO: CITY IN THE DESERT

By Robert Tsfasman
Photographs by Vladimir Granovsky

SHEVCHENKO, the regional center of Mangyshlak, Western Kazakhstan, is only 10 years old. Like any of the country's big new construction projects, it attracts young men and women from more settled areas, people who look for broader horizons and challenges, who prefer to build their lives with their own hands rather than take the ready-made. Visitors are surprised that this city in the middle of a desert greets new arrivals with more than a "Welcome!" and the bare necessities. It has all the modern comforts.

"People come here not only to work, they spend their holidays here," Rufina Ostapenko, deputy mayor of Shevchenko, told me.

"No reason it can't be a health and holiday resort. We have the sea, greenery and good air," say the boys from the workers' rooming house.

Leningrad Aids Kazakhstan

Shevchenko does have the look of a seaside resort, particularly seen from the Caspian Sea. Light apartment houses loom in the distance on the craggy shore. The city is separated from the sea by an English elm park and a long and practically deserted beach. It is crowded only in the evenings and on weekends because Shevchenko is not a resort, but an important mining, metallurgical, petroleum and chemical center. Despite that, you see no industrial landscape in the city proper; the factories are three miles away from the residential areas.

Many of the world's cities might well envy such planning, including those built since talk about the threat of ecological disaster began to take a serious turn. You cannot even begin to expect that kind of planning in old cities. No new factories are constructed in Moscow, and some of the old ones have even moved to the suburbs. But Moscow was not built in one piece, while Shevchenko was. It was built to a single plan, and a multitude of problems were worked out at the same time.

The city was designed by Leningrad planners, a well-known team of architects who specialize in "cities of the future." They designed Navoi, a city in Uzbekistan about the same age as Shevchenko.

Some of the Leningrad architects are still around. They take turns working with the local architects and engineers. Mikhail Levin, one of the Leningrad group, has actually based himself in Shevchenko and is serving as chief city architect. Levin's approval is needed for any significant change in the master plan.

Shevchenko is a city planned for growth. The principle is a series of self-contained neighborhoods, each with a kindergarten, school, stores, restaurants, community service facilities. To sum up, cities within a city. Growth boils down to the addition of new neighborhoods. Incidentally, the state commission will not pass on new residential districts unless everything is completely finished, right up to the interior décor of the kindergarten. Otherwise no apartment house occupancy permits are issued.

The population of the city is expected to double and reach 200,000 in the near future. The housing area is growing at a somewhat higher space ratio than originally expected because apartments are being built larger. But the basic principle remains unchanged.

Shevchenko is considered one of the country's most beautiful new cities. Although standard housing is the rule (the city could not have grown as fast otherwise), the architects have combined individual elements to achieve a fascinating variety. The basic building material—ornamental shell rock—is close at hand, fortunately; getting material to this distant and isolated site would be far too difficult and expensive.

Fresh Water from the Caspian

This is all flat steppe—desert would be a more accurate description. In summer the grass turns brown. There are no bushes or trees around. Precipitation is minimal—often less than an inch. The mercury goes up to 104 degrees Fahrenheit from a winter low of minus 22. The wind is no great help either. But the worst thing is that there is no fresh water. Although the Caspian Sea is called a lake in some textbooks (it has no link with the world ocean), its water is salty, nature's joke on man.

Nature did not welcome man to the Mangyshlak Peninsula. Kazakh nomads came here from time to time with their flocks of sheep. They pitched tents, and there were a few all but deserted settlements. In the nineteenth century the czarist government exiled the great Ukrainian poet Taras Shevchenko here; the capital of modern Mangyshlak was named after him. In one of his letters the poet described the local landscape: "It is a real desert. Sand and stone. You look and look until you feel so sick at heart you want to hang yourself, but then, there is nothing to hang yourself with."

Mangyshlak, however, is as rich under the soil as its surface is poor. At the end of the fifties and the beginning of the sixties geologists found tremendous reserves of petroleum and gas, rare metals, the raw materials for mineral fertilizers and building rock, thereby opening Kazakhstan's "Wild West." Settlements of geologists and oilmen sprang up, and subsequently Shevchenko was built.

Apparently the earth of Mangyshlak contained everything but fresh water, that "most important mineral in the world," as Academician Alexander Fersman used to say. Water was brought from artesian wells a long way off, at a cost of five rubles a ton. The state paid the bill. But the artesian wells could not supply enough water for a city the size of Shevchenko. Incidentally, it gives its residents 120 gallons of water a day. For comparison: Moscow's quota is only 13 gallons more. All that notwithstanding, Shevchenko is one great mass of greenery. Its shady housing developments stand in gardens and parks. The greenery covers 1360 acres, half the city's area.

Obviously, this could not have been done with the water brought here; local water distilled from the sea did the job. Formerly the distillation plants burned fuel oil, but in the summer of 1973 the world's first industrial fast neutron reactor went into service here. The nuclear station provides Shevchenko with electricity and fresh water.

There is a great deal of talk these days that conventional energy resources will be exhausted eventually and that nuclear fuel will be the only hope left. But we must bear in mind that uranium reserves are not inexhaustible either. The fast neutron reactor is the promising alternative. A breeder reactor, it converts ballast uranium-238 into plutonium. For each pound of expended nuclear fuel, it can yield roughly half as much new fuel again.

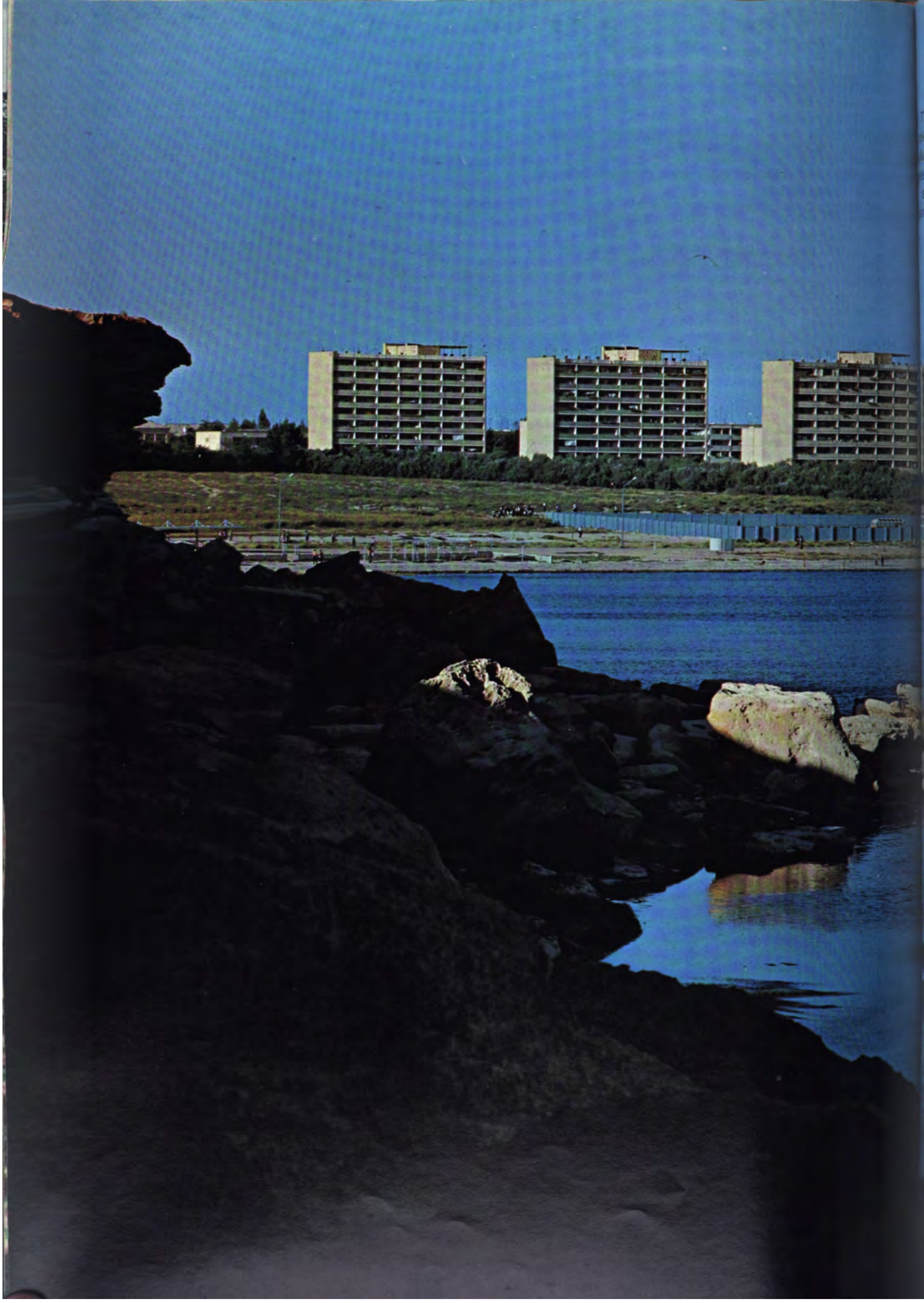
If the conservation of nuclear raw material is a problem for tomorrow, water conservation has long been today's problem for both scientists and the public. Although water produced by distillation units is low-cost, people in Shevchenko use it sparingly. You find no dripping taps. The apartments get three kinds of water: drinking, industrial and hot water. Drinking water is made of a mixture of distilled water and mineralized artesian water. A small quantity of seawater is added to the hot and industrial water.

The Caspian gives the city its lease on life, and Shevchenko is making what return it can by keeping the sea unpolluted. Special party and government resolutions see to that. All waste water, both industrial effluents and sewage, is dumped in a salt depression seven and a half miles from the city. There are no oil patches on the surface of the Caspian—even near the berths of the oil tanker port. To receive ballast tankers, shore purification plants were built in Shevchenko in 1968. Later, at the initiative of port superintendent Ismail Allakhverdiev, local specialists worked out procedures and devices that prevent all spillage when tankers are loaded.

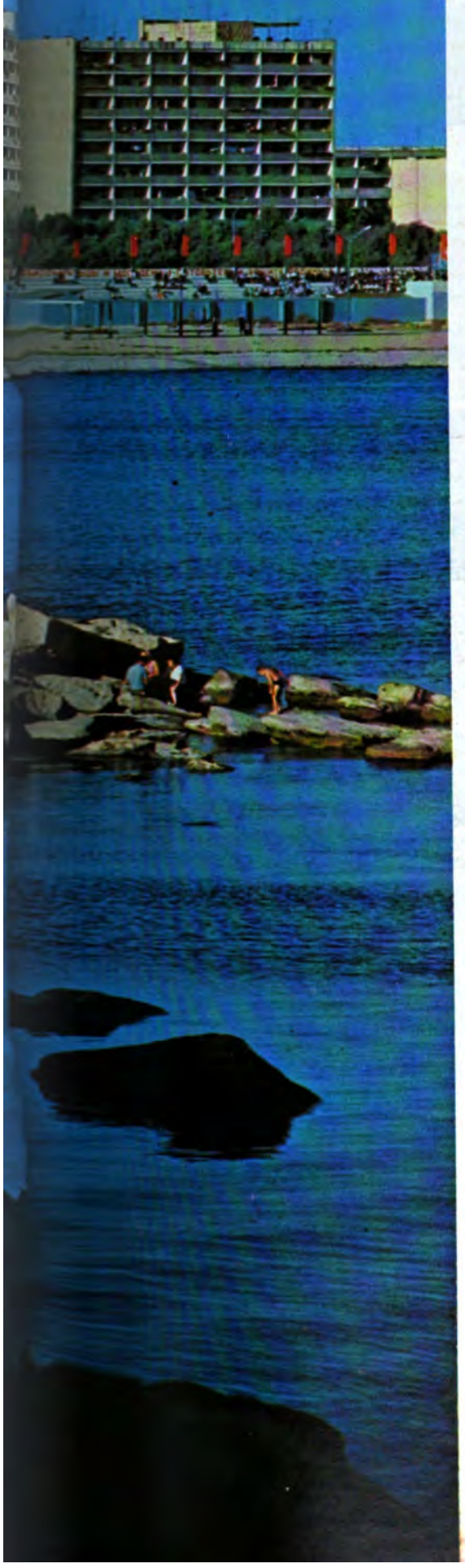
Gardening

This peaceful collaboration of people and nature is one of the many distinctive features of Shevchenko. The construction of the city was a national effort, but neither that nor experimental design and unconventional approaches account for the final product. In the last analysis, the decisive role was played by its citizens, yesterday's new settlers. The population of Shevchenko is a patchwork of some 50 nationalities, people from all over the Soviet Union. Yet in many ways it is rather homogeneous. They are mostly young (the average age is 30), and like young people anywhere, they are energetic, adventurous, enthusiastic, ready to attack any problem that comes their way.

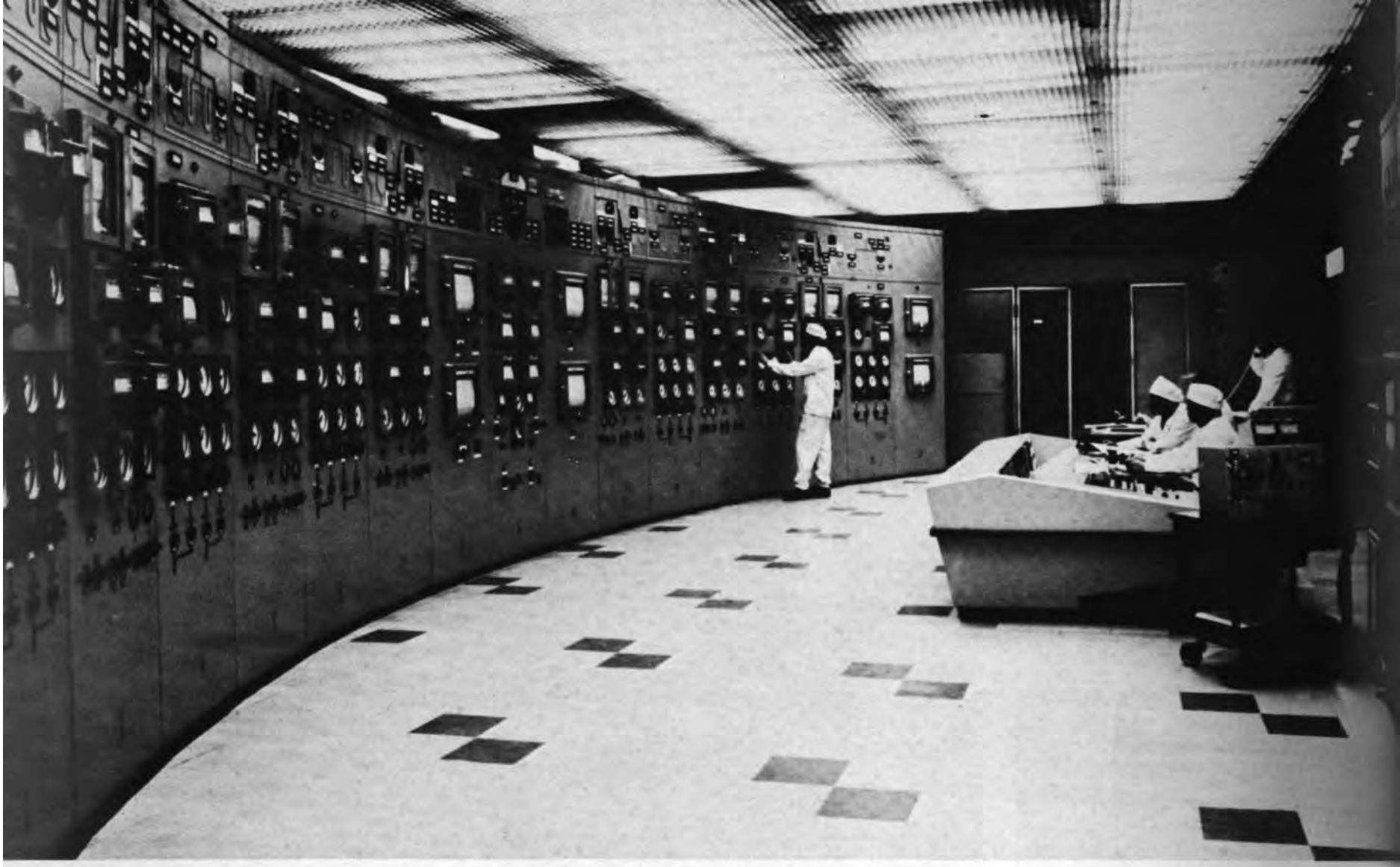
Another detail. New construc-



This mining, metallurgical, petroleum and chemical center ›ks like a resort town—fresh air d greenery everywhere, and the sea right at its door. It was planned with ecology in mind.



Shevchenko is in desert country. There is no fresh water on the Mangyshlak Peninsula. These installations distill fresh water from the Caspian Sea.



tion projects breed a special sort of local patriotism. In old cities the sentiment, passed down from generation to generation, ages into tradition. In Shevchenko it hasn't had time to get old, hence, the zeal, the civic thrift and the cohesion of its residents.

Alisa Pneva, chief of the city's landscaping department, recited the cost of each tree grown here in saline soils. She was frank to admit that her staff would have a hard time without the help of volunteers. It is no simple matter to plant 7,000 trees and 150,000

A nuclear station generates the city's electricity.
Right: Shevchenko's chief architect, Mikhail Levin.

The average Shevchenko resident is in the early thirties.
Above: Try to convince them that they live in desert country.

bushes annually, and to spray the ever growing green area some 30 times during the summer, not to mention the weeding. In Shevchenko each neighborhood has its own skillful and painstaking volunteer gardeners.

This public concern and activity, says Mayor Talgat Abutalipov, explains the city's growth and progress.

Some figures: The Executive Committee of the City Soviet has some 15 full-time people on its staff, not very many. Besides that, there are 190 deputies to the City Soviet, about the usual number for a city that size. But the number of actives—5,000, a very high ratio for a population of 100,000—is a telling indicator. Thanks to these men and women, community life in Shevchenko is pleasant, varied and interesting. Not only landscaping and improvement, but also clubs, sports, theaters, work with juveniles and law and order are the concern of both the local authorities and the citizen: factory workers, engineers, teachers, doctors, researchers, and schoolchildren.

Shevchenko and Mangyshlak as a whole play important roles in the economy of Kazakhstan. The annual output of the region is estimated at 500 million rubles. Nearly 90 per cent of all Kazakh petroleum is extracted here. It goes to the other union republics and to the socialist countries of Europe. By 1975 petroleum output will be twice what it was in 1971, and gas production will go up by six times. New chemical plants are on the way. The nitrogen fertilizer plant will be increasing its production. In short, the Mangyshlak region and its capital have a big future.

This fast growth brings new problems. Additional workers are needed. People want to come, but recruitment is limited by the rate of housing construction. Some other new city might put up new arrivals in temporary housing, but Shevchenko will not. So that people are taken on by factories and construction projects strictly in accordance with the number of new apartments that are made available. Another problem is a certain disproportion in occupations. Say a man and wife come to Shevchenko. He is a building assembly worker who can find a job anywhere in the city. She is a teacher, and there are too many teachers. So the city employment agency has a problem on its hands.

There are any number of complications and difficulties. Nonetheless, Shevchenko is known all over the country as a city built for living, a city where urbanization has not pushed nature out but enriched it.

RIGHTS AND GUARANTEES

By Professor Anatoli Bezuglov
Doctor of Science (Law)

EARLIER ISSUES of SOVIET LIFE have described the human rights and freedoms guaranteed by the Constitution. In this article we shall consider how our socialist society has made these rights law and, through the political, social and economic system, ensured the conditions necessary to exercise them.

It is significant that the Soviet Union and the other socialist countries were the first to ratify the International Covenant on Economic, Social and Cultural Rights and the International Covenant on Civil and Political Rights. These international legal documents which evolved from the struggle for human rights and freedoms were adopted by the UN General Assembly in 1966. However, some countries that boast of their political and civil liberties did not sign these international acts.

Let us consider the most important rights which have become law in the USSR.

We begin with socioeconomic rights: the right of every citizen to work, to rest and leisure, to an education, to maintenance in old age and in case of sickness or disability.

Socialism has forever done away with unemployment, that social plague. All Soviet citizens, irrespective of nationality, sex, education and religion, have the right to guaranteed employment and to payment for their work in accordance with its quantity and quality. Every year millions of young people enter the work force after graduating from general education, technical and vocational-technical schools, universities and institutes or completing military service. They have no job problem.

The right to work is implemented by the socialist economy and its crisis-free planned development. This planning is a realistic guarantee of full employment. Continual economic growth and scientific and technological progress increase the demand for manpower. Long-term plans regulate the composition of the work force and the needs of different professions.

Soviet law protects the exercise of this important socioeconomic right. It prohibits the discharge of a worker by management without the consent of the trade union committee. If an administrator violates this law, he or she is subject to criminal proceedings.

The Soviet Union, almost immediately after it was founded, adopted progressive labor legislation which limited the workweek to 48 hours. It has since been changed to 40 hours. The right to rest and leisure is guaranteed by annual paid vacations for factory and office workers and by placing at their disposal health and vacation resorts, clubs, stadiums, tourist hostels and libraries. Health and vacation resort accommodations are available to every worker regardless of income: Lower-paid workers as well as those in need of medical treatment at sanatoriums receive their accommodations free or at 30 per cent of the actual cost; the rest of the bill is paid by the state.

Socialism has made education universal, not only in theory but in practice. With the development of the country and the growth of its wealth, the network of secondary and higher schools expanded and the educational level rose. The transition to compulsory secondary schooling is now under way; when it is completed everyone will receive a minimum of 10 years' education. What guarantees this right is the fact that education is free at every level. Millions of young men and women can and do get a general secondary, specialized secondary or higher education while holding jobs. Factories and offices make it easy for their workers to study part-time by giving them paid leave to prepare for exams and arranging their shifts so as not to conflict with class hours.

If factory and office workers fall sick or are temporarily disabled, their jobs are kept for them and they are paid a temporary allowance: from 50 to 100 per cent of monthly earnings, depending on their wage level and length of service. All medical care is free.

Men and women who work in factories and offices or on collective farms are eligible for retirement at age 60 and 55, respectively. They receive old age pensions, and those who are ill get additional allowances. The total number of pensioners in the USSR is 42 million; in 1973 alone, the state spent over 21 billion rubles on pensions.

The social insurance fund from which pensions are paid comes out of budgetary allocations; the workers contribute nothing from their pay. The fund is administered by the trade unions.

Among the political rights and democratic freedoms of the Soviet people are the right to join mass organizations, the right to elect and be elected to organs of state power, freedom of speech, of press, of assembly, of street processions and demonstrations.

Let us consider these rights more closely, membership in the country's many voluntary organizations, for instance. The trade unions now have a membership of 100 million, and the USSR Young Communist League has over 30 million members.

The trade unions take an active part in the lawmaking process. Together with other mass organizations, they have the right to nominate candidates for election to the Soviets of Working People's Deputies. The trade unions participate directly in drafting laws which regulate the working conditions of factory and office workers. The Soviet trade unions have the right to initiate legislation—they can present for consideration to the USSR Supreme Soviet drafts of bills dealing with the status of the workers.

Factory and other local trade union committees participate in the preparation of production plans and streamlining programs. Management must have the approval of the trade union to appoint economic executives. Relations between the trade union and management are regulated by collective agreements. The trade unions operate the social insurance system, clubs, parks, health and vacation resorts and children's facilities.

Every citizen of the USSR has the right to elect and be elected to the Soviets of Working People's Deputies. There are no restrictions whatsoever on citizens' electoral rights on account of nationality, sex, religion, property status or occupation. The present Soviets have a total of more than two million deputies—workers, collective farmers and intellectuals. Enjoying the trust of the nation, they manage the country's affairs. When the Soviet people vote for legislative representatives, they consider how the nominees work, what benefits they bring to the country, how active they are in the community, how effectively they uphold the people's interests.

The Constitution guarantees the Soviet people freedom of speech, of the press, of assembly, of street processions and demonstrations. Freedom of the press, for instance, is ensured not only materially—by providing printing presses and stocks of paper—but politically, through the active participation of millions of working people in the publication of newspapers, magazines and books, in radio and TV. Central and local newspapers daily receive thousands of letters from readers. The letters from factory workers, farmers, teachers, physicians and others raise problems about industry, farming, the state apparatus, construction, trade. They make suggestions and criticize shortcomings. Such letters get wide publicity in the press and keep people informed of the feelings of their countrymen.

Freedom of the press finds its expression in the fact that mass organizations have their own publications and publishing houses. For example, the Young Communist League organizations publish over 230 newspapers and magazines in a total printing of 70 million copies.

The law also guarantees personal rights and freedoms. A Soviet citizen may have savings and own a house, an automobile and other personal effects. The USSR Constitution permits the possession of small personal plots and workshops by farmers and artisans but limits the labor to their own. The law also permits the inheritance of personal property.

The Soviet Constitution guarantees citizens inviolability of the person. No one may be placed under arrest except by a court ruling or with the sanction of a procurator. The citizen's home is also inviolable; it may be searched only by persons specified by law when there are sufficient grounds for suspecting that it contains implements or evidence of a crime. The law also protects secrecy of correspondence.

The law guarantees the Soviet people the right to profess any religion or no religion at all and the freedom to practice religious observances. For this purpose, religious communities are given places of worship. It is common knowledge that there are churches, synagogues and mosques in the Soviet Union freely open to their communicants—Christians, Jews and Moslems. At the same time, the church is separated from the state and the school from the church, and freedom of antireligious propaganda is also law.

The Soviet Constitution commits Soviet citizens to observe the law, maintain labor discipline, carry out their obligations as citizens honestly, protect public property and defend their socialist motherland. Under socialism these legal norms have also become the ethical norms.

This brief survey of the legal status of the Soviet people reflects the actual state of affairs. Leonid Brezhnev, General Secretary of the Central Committee of the Communist Party of the Soviet Union, in his speech at the World Congress of Peace Forces (October 1973) said to the critics of socialist democracy:

"And what kind of freedoms are those who are attacking us talking about?

"For example, we have a law banning the propaganda of war in any form. There is legislation prohibiting the dissemination of the ideas of racial or national strife and hatred, and of those which degrade the national dignity of any people. There are laws combating immoral behavior, laws against the moral corruption of society. Are we expected, perhaps, to repudiate these laws in the name of free exchange of ideas and information? Or are we to be prevailed upon that this would serve the cause of détente and closer international ties?

"We are being told: 'Either change your way of life or be prepared for cold war.' But what if we should reciprocate? What if we should demand modification of bourgeois laws and usages that go against our ideas of justice and democracy as a condition for normal inter-state relations?"

This statement was met with approval by participants at the congress.

Socialism in the USSR has not only proclaimed human rights and freedoms, but has created the conditions that make them a reality in the lives of millions of Soviet working people of all nationalities.

THE ECONOMIC REFORM JUSTIFIES ITSELF

By Professor Alexander Birman
Doctor of Science (Economics)

Introduced in 1966, the Soviet economic reform has entered its ninth year. It embraces a complex of measures aimed at improving management methods in industry, transport, construction, trade and other sectors. To put it briefly, the reform puts primary emphasis on economic factors, profits included, in management. It gives greater independence to enterprises and more material incentives to collectives and individual workers. Here the author sums up its progress.

THE INTRODUCTION of the reform was preceded by a nationwide discussion of a wide range of economic problems. Most economists unreservedly supported the changes. They agreed that the general application of economic incentives and controls, better price information and the more productive use of such tools as credit would make for greater efficiency and profitability.

Some economists, however, had reservations. They thought the growing use of economic methods rather than a detailed system of administrative measures might weaken planning principles, disturb development ratios and intensify the action of uncontrollable factors.

At the time, the contemplated changes were widely discussed abroad. Responsible foreign commentators acknowledged that they were a further development of socialist methods of economic management. However, the foreign press also printed a good deal of nonsense, alleging that the Soviet Union had finally accepted capitalist methods of planning and management.

Now that the new system is well established, we have enough facts to judge its effectiveness.

Since the beginning of the reform, between 1966 and 1973, the yearly increment in national income has averaged seven to eight per cent, more than in the prereform period. Industrial output has been increasing by eight to nine per cent a year, also more than in the preceding five years. We should emphasize that the output of the means of production and the output of consumer goods are currently growing at the same rate; previously capital goods were in the lead. The Ninth Five-Year Plan (1971-1975) envisages priority rates of growth for consumer goods. This target has not been fully achieved because of the bad weather which affected our agricultural performance in 1971 and 1972. Despite this, however, consumer goods have caught up with capital goods in rate of growth, thanks, among other things, to the positive impact of the reform.

Nature treated our farms harshly for two years in a row. Nevertheless, gross agricultural output grew faster than in the five previous years. The year 1973 was especially good—we had bumper harvests of grain and industrial crops. Grain production exceeded 244.8 million tons, an all-time record for the country.

Investment in construction and the number of new capacities are growing by an average of seven to eight per cent a year. These figures reflect the accelerated rate of industrial construction and the concentration of resources. We would, of course, like to see even greater progress.

Labor productivity is rising by five to six per cent a year, an impressive growth considering the rapid expansion of such labor-consuming sectors as the extraction industry. The lag in the growth rate of consumer goods acted as a brake on labor productivity. Nevertheless, the growth rate of labor productivity has been satisfactory. That, too, can be attributed to the reform.

The most convincing proof of the new measures' success is the rise in profitability, which is the chief indicator of production efficiency, including better utilization of manpower and plant, reduced input of materials, more rational siting of new enterprises and decreased managerial expenses. In 1965 profits totaled 37 billion rubles. In 1972 they rose to 87 billion rubles. In 1973 profits continued to increase, reaching 98 billion rubles in comparable prices.

These figures should be sufficient to quiet the doubts of skeptics. The emphasis on economic methods of management has not violated either planning principles or development ratios. Those foreign observers who predicted failure for the economic reform have been proved wrong.

The growing effectiveness of our economy, largely conditioned by the reform, has facilitated major steps to raise the standard of living. The average monthly wage has gone up considerably, as have payments and benefits from public consumption funds, including free or reduced-rate accommodations at vacation resorts, stipends, and expenditures for free education and medical care. In 1971 they amounted to 280 rubles per capita as against 182 rubles in 1965. In the past two years they have grown even more.

Since the reform was introduced, the country has been building between 2.2 and 2.4 million apartment units annually. Nearly 20 million new apartments have been turned over to tenants in the past eight years. Rents in the USSR are the lowest in the world, not more than five per cent of family income.

Another indicator is retail sales. In 1965 retail trade totaled 108 billion rubles; in 1973 it reached 184 billion rubles. The output of highly nutritious foods, better quality apparel, furniture and other consumer goods has increased substantially.

The reform has improved the system of planning and management. Some nine million different wholesale and retail prices have been placed on a more solid economic footing. I would say that the problem of economic validation of prices has been solved by 80 to 90 per cent. We shall, of course, continue to adjust and correct prices, since this is a never-ending process.

The workers are playing a larger part in management. The mass organizations now have more control over management activity. Compared with the prereform period, industrial plants, research institutions and offices are tackling a wider range of problems.

This does not mean that we have solved all our economic problems or that we see the reform only in rosy colors. We know that life constantly presents new situations. In a poll by the Economics Institute of the Siberian Branch, USSR Academy of Sciences, the managers of 1,064 industrial plants in Siberia and the Far East commented on the reform. While noting the improvements since the new system was introduced, they also voiced some criticisms.

In particular, they said that plans given to enterprises did not always stay intact, that they were changed as the year went on, although not as much or as often as before. Managers also complained that the material and equipment supply agencies sometimes failed to provide the necessary quantities or the required assortment on time. Nor do all enterprises cooperate as well as they should with research institutions.

Criticisms were also leveled against building workers for not meeting construction deadlines and for low-quality work.

We do not put up with the shortcomings that the reform brings to light—remedial efforts are under way on every level.

The most important feature of the reform in its ninth year is the concentration of production. We still have a large number of small factories, construction and marketing agencies and stores. Many of our plants employ fewer than 200 workers. Experience shows that small and even medium-sized enterprises cannot avail themselves of all the advantages offered by the reform. They do not have the potential to set up computer centers and specialized departments, organize market surveys, establish research divisions. Besides that, it is very difficult for supply, design and other agencies to maintain direct contact with a multitude of small customers.

In line with a government decision, production, industrial and other associations are being organized on a large scale.

The production association, or complex, is the parent enterprise which employs a large number of workers and incorporates numerous related small and medium enterprises. These become branches of the association.

The production association is the basic unit in the system of management. Next in order is the industrial association, the middle unit of management, a combination of either large individual plants or production associations. The industrial association is headed by a director, with the boards of directors of affiliated enterprises acting as consultants. Such associations are being set up in industry, construction, transport, trade and other sectors. Industrial ministries are the uppermost units of management. We believe that associations will provide even larger scope for economic methods of management and that they will give fresh impetus to continued economic progress.

REROUTING RIVERS

Interview with Georgi Gangardt

Our country's water reserves are the richest in the world. Our rivers annually empty some 1,100 cubic miles of water into lakes, seas and oceans. But our water requirements keep rising; in the past 20-odd years they have almost doubled. That is why some 70 large water reservoirs and related facilities have been built to regulate river flow. Their total useful capacity runs to about 83 cubic miles. Nevertheless, in low water years the Urals, areas of the Ukraine, the Northern Caucasus, Central Asia, Kazakhstan and the central regions of the European part of the Soviet Union are short of water.

The Soviet Union, unlike many other countries, has no absolute shortage of water. The problem for us is the regulation and the territorial redistribution of water reserves, depending on local industrial and agricultural needs. That task has become a national concentration. Work began several years ago on a general plan for the comprehensive utilization and conservation of the country's water resources. The scale of the project may be gathered from the fact that the investment is expected to total 200 billion rubles.

In this interview, Georgi Gangardt, deputy chief engineer of the Hydrological Research and Design Institute (Gidroproyekt), who is in charge of the plan, touches on some of the problems involved.

One of the main sections of the general plan is devoted to the Volga. Why is that?

The Volga, Europe's longest river, is getting shallower year by year. In the thirties the level of the Caspian Sea receded. At first we thought the dry years were to blame. But as time went by, the situation did not change. The climate became warmer, and an increasing volume of water was being drawn off from the Volga for irrigation and industrial needs. The level of the Caspian Sea, the largest inland body of water in the world, was gradually receding. Something had to be done to replenish this sea-lake.

And that's the situation even though there is an excess of water in other parts of the country.

Right. The northern rivers in the European part of the Soviet Union have plenty of water, which is why the plan borrows water from the Pechora and the tributaries of the Severnaya (Northern) Dvina. Plans are already being worked out for a system of hydraulic installations to do just that. One plan calls for the construction of dams and reservoirs in the upper reaches of the Pechora and Kama. Water will flow of its own accord to the Volga through a canal that will connect the two rivers. This will give the Volga an additional three cubic miles of water annually. With the Velikiy Ustyug hydroengineering complex constructed, the Volga will be able to borrow water from the Sukhona River, a tributary of the Severnaya Dvina, and a dam on the Onega will make it possible to draw water from the Kubenskoye, Vozhe and Lacha Lakes.

Won't that affect the climate in the North, and won't the level of these rivers, lakes and the Gulf of Finland fall?

The plan is a comprehensive one. Leading Soviet scientists are involved, and all the consequences are being carefully weighed. We are, after all, planning our hydraulic installation network with an eye to the distant future. We have to take into account the interests of the entire national economy and, of course, we are very concerned with the protection of the natural environment.

Hydraulic installations cannot be built without long-term considerations in mind. Otherwise what we may get is another Volga-Uvod Canal. It was built to supply the city of Ivanovo with water and exhausted its potential the very year it began functioning because the city's growing water requirements were not taken into consideration.

To return to the Volga and the Caspian Sea. What other installations are to go up?

The Lower Kama and Cheboksary hydroengineering complexes will be completed in a few years. The river will become deeper at these points. As for stabilizing the level of the Caspian, in addition to the projects I have already mentioned, the Kara-Bogaz-Gol Gulf will be dammed. This gulf is a veritable storehouse of chemical raw materials. A little more than two cubic miles of water flows into it annually from the Caspian through a narrow strait, to eventually evaporate. The future dam's metal gates will open and close, regulating the inflow of water into the Kara-Bogaz-Gol and, when necessary, reducing it sharply or cutting it off altogether.

And how are the problems of the Caspian's neighbor, the Azov Sea, solved by the plan?

The Azov has no shallowing problem. Black Sea water flows into it through the Kerch Strait. More than a fifth of the Don's outflow is used for irrigation and other needs. This shortage is replenished through the Strait with salt water. But commercial fish—including sturgeon, sea roach and certain herrings—do not take well to salt water. What's to be done? We must have the use of the Don's water. We are therefore planning a dam which will shut off the Kerch Strait. It will let through fish, crabs and plankton at certain periods, but will shut out the salt water, while fresh water will enter the Azov Sea from the Volga via the existing canal. The canal will have to be reconstructed slightly. Four hydroengineering complexes are to be built in the lower reaches of the Don, which will also improve navigation.

The projects you've mentioned sound rather complicated, are they?

Yes, but we expect to get them finished before the end of this century. Plans for transferring water from the northern rivers and lakes to the south, stabilization of the Caspian Sea's level and measures to control the salination of the Azov Sea have already been worked out or are being worked out. The Aral Sea situation is more involved.

And what is threatening that sea?

Shallowing and, as a consequence, salination. The waters of the rivers flowing into it are badly needed in the cotton-growing areas, and that need will continue to increase steadily. If the Aral's store of water is not replenished, the lake may turn into two salt-bitter pools. Plans are under way for the transfer of Siberia's waters to the Aral. The future canal will pass through arid areas and irrigate them en route. This will at the same time help solve another major problem: draining the swampy and waterlogged West Siberian Plain.

For the Irtysh-Karaganda Canal there are two alternatives: One version has it extended to Dzhezkazgan; the other has it beginning from the Irtysh near Tobolsk and extended through the Turgai steppe to the Aral and even Caspian Sea.

I don't suppose you've covered everything projected by the general plan?

Of course not, I've just touched on the high points. I should mention that it includes tentative plans for building hydroengineering complexes in the upper Lena. This mighty Siberian river, as you know, is dangerous for navigation at many points. But the biggest complexes in the world can be built in its lower reaches. Hydroelectric stations will be built on the Zeya and Bureya rivers and the tributaries of the Ussuri in the Far East, a region that frequently suffers from floods. There is a project to build a canal from the Lower Amur to the Tatar Strait via Lake Kizi. It will then become possible to expand navigation on the Amur very considerably since the strait freezes over much later. Connections with Sakhalin will also improve.

Nor has the capital been forgotten. Long-term plans envisage a shipping canal that will skirt Moscow on the east. There is also a project for an Oka-Moskva canal, for the Oka in the vicinity of Serpukhov has even more water than the upper Volga.

You've said very little about new hydroelectric stations.

In the European part of the country, mostly water storage stations will be built, while in the Caucasus and Transcaucasus the concentration will be on hydroelectric stations to take care of peak loads. In Siberia, the Bratsk and Ust-Ilim hydroelectric stations on the Angara will be followed by the Boguchan station. The Yenisei will have the Sayan and middle Yenisei stations and one or two on its lower reaches. Stations will also be built on the Yenisei's tributaries. Many stations are projected for Central Asia's rivers.

Courtesy of the newspaper *Trud*

ECOLOGY AND THE COUNCIL FOR MUTUAL ECONOMIC ASSISTANCE

By Professor Gennadi Sidorenko
Director of the Sysin Institute of General and Communal Hygiene, USSR Academy of Medical Sciences

OURS is a time of extensive industrial, agricultural, transportational and urban exploitation of the earth's natural resources.

Urbanization and industrial development is accompanied by environmental pollution which disturbs the economic balance, injures fauna and flora and threatens human health, especially in industrial countries.

The United Nations and other international organizations are concerned with the global character of the pollution of the atmosphere, the world ocean and numerous inland water bodies as well as the pernicious consequences of the irrational use of natural resources.

This is as it should be since the environmental problem demands a multilateral approach. The scientific and technological potentialities of one country, no matter how large, are not sufficient to cope with this global problem.

In 1971 the socialist countries in the CMEA signed an agreement on scientific and technical cooperation in the field of conservation. About 200 research and development organizations in the CMEA countries coordinated their national environmental protection programs, setting up five scientific coordination centers to work on different aspects of the problem.

The hygienic aspects of environmental protection are being tackled by a coordination center under the guidance of the Institute of General and Communal Hygiene, USSR Academy of Medical Sciences. The center was organized under this institute because of its considerable experience in the field. In the Soviet Union environmental protection is handled by more than 4500 epidemic control stations situated throughout the country. Sanitary legislation is binding on all ministries and government departments.

The CMEA Coordination Center for Environmental Hygiene integrates the research efforts of the USSR, Bulgaria, Hungary, the German Democratic Republic, Poland, Czechoslovakia, Rumania and Yugoslavia.

Scientists from these countries are studying water pollution and its effect on human health. They formulate hygienic standards and develop physiochemical, microbiological and other methods to study the environment. As a result of collaborative projects, the countries concerned have evolved hygienic standards to determine the complex impact of various chemical compounds (from the air and water) on human beings.

This center studies sources of soil pollution, their nature and epidemic-inducing role. It develops methods for decontaminating liquid and solid wastes and formulates measures for the sanitary protection of the soil, including soil pollution control methods.

The center also devises methods to gauge noise levels and to minimize their harmful effects on humans.

The results of these research projects are discussed by experts and recommended for application. Thus, following discussions and tests, CMEA countries formulated 46 methods to determine the amounts of various chemicals in the atmosphere.

Atmospheric pollution control is coordinated by the GDR Institute of Air Conditioning and Refrigerating Technology. This center is concerned with removing sulfur dioxide from waste gas, reducing nitric oxide discharges from chemical plants and extracting hydrogen sulfide and carbon sulfide from the waste gas of viscose factories. Methods of reducing the toxic discharge from internal combustion engines are being refined.

Research on the preservation of ecosystems and landscape is coordinated by the Landscape Biology Institute of the Slovak Academy of Sciences, Czechoslovakia. This center elaborates methods of studying, planning and restoring landscapes destroyed by industry, and develops optimal landscapes for recreational and economic purposes.

The Budapest Institute of Economics and Organization of Construction coordinates research on the utilization and disposal of communal and industrial wastes. Hungarian specialists are trying to improve present technologies.

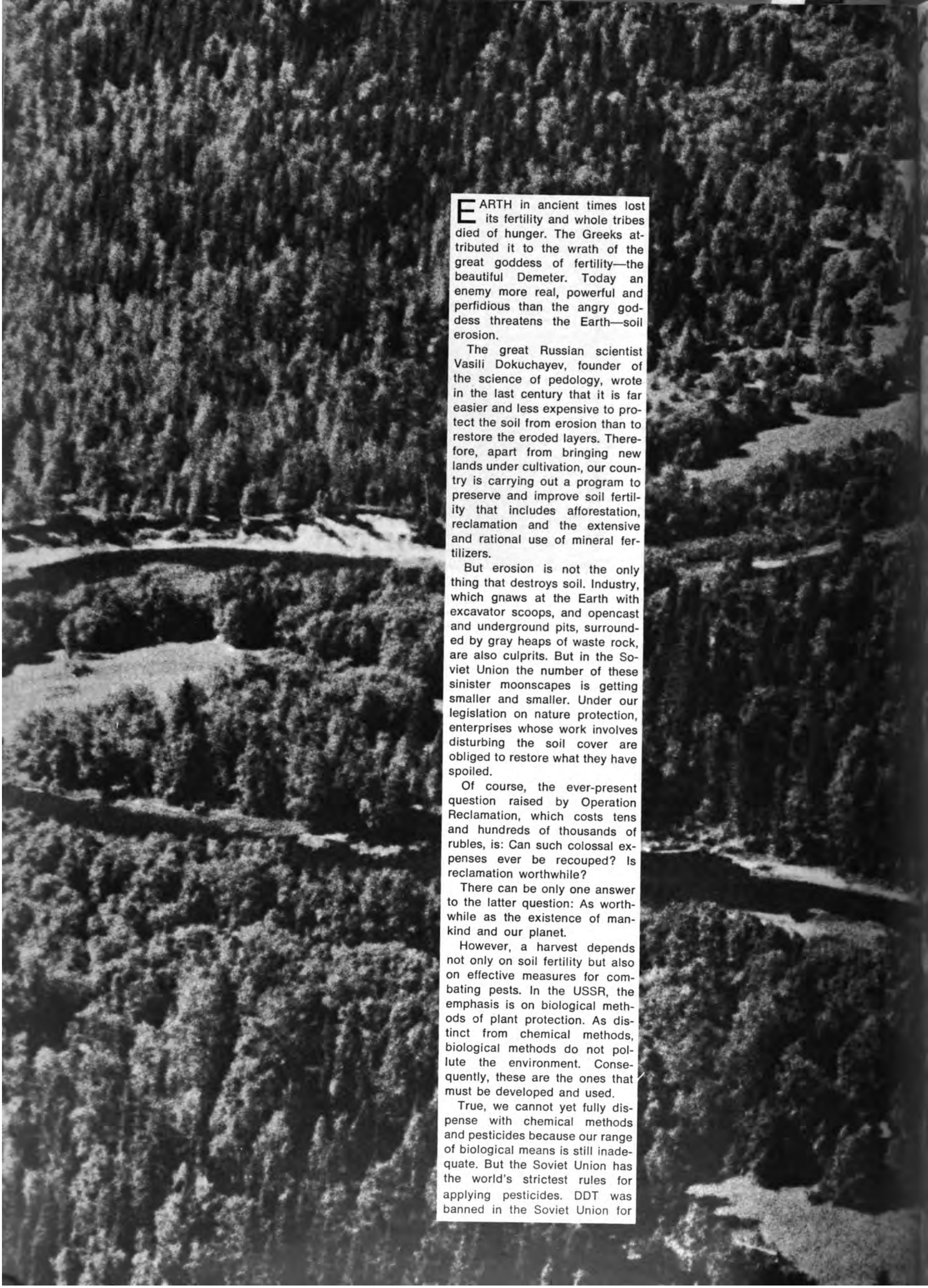
Socioeconomic, organizational, legal and pedagogical aspects of nature protection are coordinated by the Central Water Management Agency, Poland. The center's major efforts are concentrated on environmental pollution control and the legal regulation of nature protection. It also works on study aids and manuals for teaching nature protection in schools.

The water management authorities of the CMEA countries are responsible for the protection of water resources. Their work has made it possible to coordinate procedures for studying water quality, to establish automatic quality control and information-processing stations for water and to develop new, more efficient water purification facilities.

CMEA countries are continuing their collaborative projects to prevent the pollution of rivers and other bodies of water. For example, Czechoslovakia, Hungary, Rumania and the USSR are jointly engaged in conservation of the Tisza River.

The coordination centers are currently drafting a detailed program of collaborative activities for 1976-80. Long-term planning to improve existing technologies and develop new ones will make it possible to reduce environmental pollution, perhaps even to prevent it completely. The CMEA's Council for Environmental Protection and Improvement is responsible for drafting this plan.

The cooperation of the socialist countries emphasizes the necessity of worldwide collaboration in environmental protection.



EARTH in ancient times lost its fertility and whole tribes died of hunger. The Greeks attributed it to the wrath of the great goddess of fertility—the beautiful Demeter. Today an enemy more real, powerful and perfidious than the angry goddess threatens the Earth—soil erosion.

The great Russian scientist Vasili Dokuchayev, founder of the science of pedology, wrote in the last century that it is far easier and less expensive to protect the soil from erosion than to restore the eroded layers. Therefore, apart from bringing new lands under cultivation, our country is carrying out a program to preserve and improve soil fertility that includes afforestation, reclamation and the extensive and rational use of mineral fertilizers.

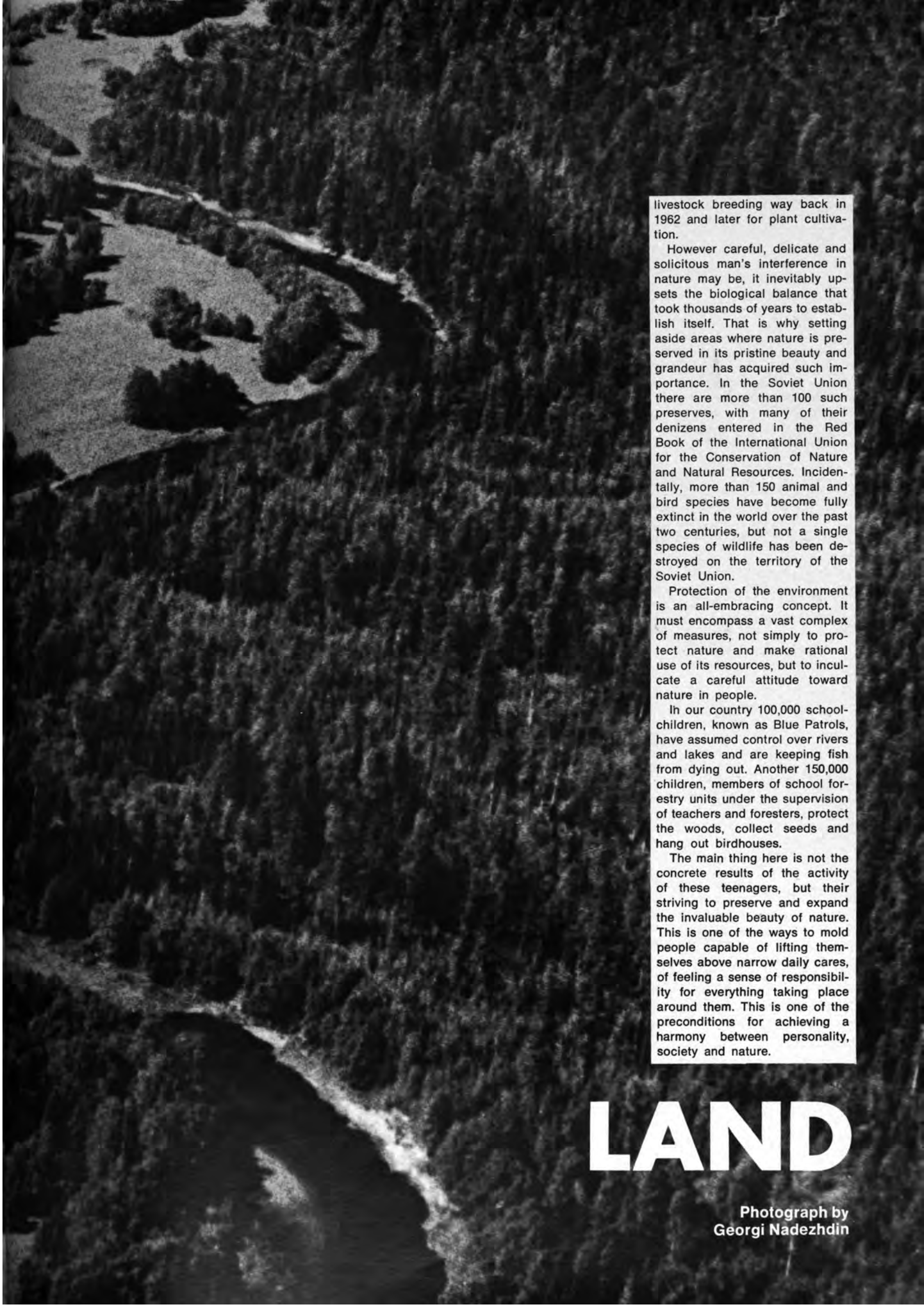
But erosion is not the only thing that destroys soil. Industry, which gnaws at the Earth with excavator scoops, and opencast and underground pits, surrounded by gray heaps of waste rock, are also culprits. But in the Soviet Union the number of these sinister moonscapes is getting smaller and smaller. Under our legislation on nature protection, enterprises whose work involves disturbing the soil cover are obliged to restore what they have spoiled.

Of course, the ever-present question raised by Operation Reclamation, which costs tens and hundreds of thousands of rubles, is: Can such colossal expenses ever be recouped? Is reclamation worthwhile?

There can be only one answer to the latter question: As worthwhile as the existence of mankind and our planet.

However, a harvest depends not only on soil fertility but also on effective measures for combating pests. In the USSR, the emphasis is on biological methods of plant protection. As distinct from chemical methods, biological methods do not pollute the environment. Consequently, these are the ones that must be developed and used.

True, we cannot yet fully dispense with chemical methods and pesticides because our range of biological means is still inadequate. But the Soviet Union has the world's strictest rules for applying pesticides. DDT was banned in the Soviet Union for



livestock breeding way back in 1962 and later for plant cultivation.

However careful, delicate and solicitous man's interference in nature may be, it inevitably upsets the biological balance that took thousands of years to establish itself. That is why setting aside areas where nature is preserved in its pristine beauty and grandeur has acquired such importance. In the Soviet Union there are more than 100 such preserves, with many of their denizens entered in the Red Book of the International Union for the Conservation of Nature and Natural Resources. Incidentally, more than 150 animal and bird species have become fully extinct in the world over the past two centuries, but not a single species of wildlife has been destroyed on the territory of the Soviet Union.

Protection of the environment is an all-embracing concept. It must encompass a vast complex of measures, not simply to protect nature and make rational use of its resources, but to inculcate a careful attitude toward nature in people.

In our country 100,000 schoolchildren, known as Blue Patrols, have assumed control over rivers and lakes and are keeping fish from dying out. Another 150,000 children, members of school forestry units under the supervision of teachers and foresters, protect the woods, collect seeds and hang out birdhouses.

The main thing here is not the concrete results of the activity of these teenagers, but their striving to preserve and expand the invaluable beauty of nature. This is one of the ways to mold people capable of lifting themselves above narrow daily cares, of feeling a sense of responsibility for everything taking place around them. This is one of the preconditions for achieving a harmony between personality, society and nature.

LAND

Photograph by
Georgi Nadezhdin

By Kirill Kondratiev

Spotting a forest fire or a shoal of fish, mapping an area more precisely, determining the maturity of crops and many other "terrestrial" jobs are made easier by observations from space. The problems and prospects of studying the Earth from outer space are considered by one of the leading Soviet scientists in that field. Kirill Kondratiev is a corresponding member of the USSR Academy of Sciences, Chairman of the Committee on Application Satellites of the International Astronautical Federation and an honorary member of the American Academy of Arts and Sciences.

THE RAPID GROWTH of the world population, the depletion and even exhaustion of natural resources and the pollution of the air and water have evoked predictions of an ecological disaster. Environmentalists warn us that only the control of population growth and the stabilization of industrial production can save the world from a grave food shortage and dangerous levels of pollution. But their theories have a number of weak spots.

Frequently the lack of adequate data on the environment interferes with accurate forecasting. Worldwide monitoring of environmental conditions and estimation of natural resources can be done effectively only with spacecraft. That is why space techniques have been increasingly used for studies of the Earth and its processes.

Investigation of the nature of our planet with space technology is a new scientific field. It opens broad prospects for solving a number of national economic problems. Among its advantages is global coverage: Observation from space makes it possible to record a whole complex of phenomena over vast areas quickly and to follow the dynamics of large-scale processes. This is especially important in studying such natural events as earthquakes, floods, forest fires, dust storms and the like, as well as in analyzing the condition of soils and vegetation.

During the past decade the USSR, the USA and other countries have been engaged in the remote sensing of various terrestrial phenomena with both conventional methods—surface, airplane and balloon observations—and space techniques: weather satellites, interplanetary probes, spaceships, manned orbital stations. The findings obtained are used by people in the most diverse Earth sciences: geology and geomorphology, geography, biology, climatology

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and atmospheric physics, soil science, oceanography, agriculture, forestry. Various methods of remote sensing give us Earth data on different scales (from global to local) and in different portions of the electromagnetic spectrum, including measurements of the infrared and microwave thermal emission of natural formations. The visual observations of cosmonauts are also an important data source.

For instance, it took dozens of years and many expeditions to compile a soil and phytogeographical map of Africa. A single photograph of the Earth made by the Zond 5 automatic station and analyzed by a Leningrad University research team improved the map considerably. Further, by taking such pictures at different seasons, we can trace the dynamics of natural events over large areas.

Dust storms and related soil erosion are a serious problem for farmers in many parts of the world. Photographs and television pictures of the Earth from space have given specialists enough data on the extent and distribution of dust storms to predict the storms and their consequences. Pictures of the Earth from space taken at different wave lengths are used for such purposes as land allocation, city development, mineral prospecting, flood forecasting and the monitoring of air and water pollution.

Soviet scientists have made important contributions to this new method of studying Earth from space. During the flight of the Soyuz 7 manned spacecraft (October 12 to 17, 1969) the USSR conducted comprehensive experiments for the first time on specially selected land and sea test sites. Subsequent experiments gave us the background to carry on synchronous observation programs with manned spacecraft, flying laboratories and surface observations. The investigation of the spectral reflectivity of natural formations, begun by Soyuz 7 and continued by Soyuz 9 (June 1 to 19, 1970) and the Salyut orbital station, showed that it is possible for an artificial Earth satellite to discern natural formations in detail from their reflection spectrum. This means, among other things, the possibility of determining phases of growth of farm crops and, with that information, predicting harvests, gathering data for soil mapping and estimating timber condition and stocks.

Spectral studies of the Earth's surface and the atmosphere by Soviet specialists have opened prospects for monitoring the natural environment on a global scale. Thus, by registering the spectrum of the Earth's twilight glow, scientists can determine the composition of the atmosphere at different altitudes and in different parts of the world. This method was used for the first time by the Soyuz 5, on January 15 to 18, 1969. It is vitally important for evaluating changes in the climate and other results of the growing dustiness of the atmosphere.

Meteorological observations show that in the first half of the present century, up to about 1940, the climate grew warmer. This was particularly noticeable in the Northern Hemisphere, especially in high latitudes. The average annual temperature in the Northern Hemisphere rose one degree. (While this increment may seem insignificant, it was substantial enough to cause marked changes in agricultural conditions in different parts of the world.) After 1940 the climate cooled slightly—the average temperature in the Northern Hemisphere dropped one degree between 1958 and 1963. The causes of these climatic changes are still not clear. It was supposed that the warmer climate could be explained by the growing volume of carbon dioxide in the atmosphere and the consequent aggravation of the greenhouse effect. But how then do we explain the present trend toward cooling? This may also be related to the growing dustiness of the atmosphere: The increased dust content may lead to a more intensive reflection by the Earth of solar radiation, so that the planet absorbs less heat. This, however, is no more than a hypothesis. Verification requires more observations from space to estimate the dust content of the Earth's atmosphere and its patterns of change. We must also determine the various properties of atmospheric dust.

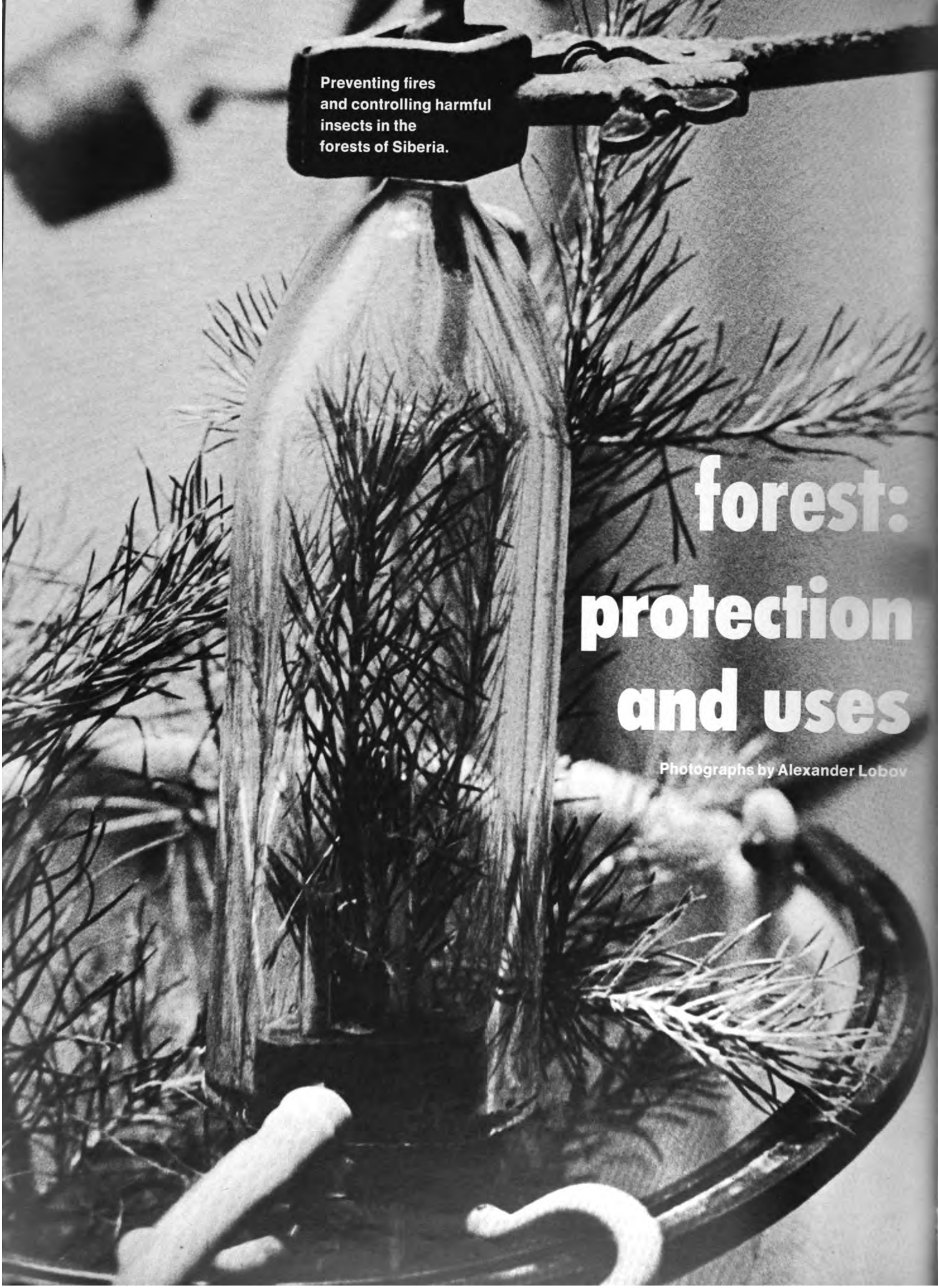
An analysis of the present state of remote sensing from space shows that the new method is already capable of clarifying a number of phenomena that affect the environment: weather and climate, pollution of the atmosphere and the ocean, ecological equilibrium and disturbances.

Earth studies from space are obviously still in the initial stage of development. It is therefore important to coordinate the efforts of different countries.

A good example is Soviet-American cooperation in environmental protection and space research, which was intensified after the signing of the summit agreements in May 1972. We should note, however, that scientists of the two countries had been working together earlier. For instance, Professor Kinselle Coulson of the University of California Los Angeles spent six months at the Voyeikov Main Geophysical Observatory in Leningrad participating in a joint studies program. I had the interesting and stimulating cooperation of such well-known American scientists as Professor Richard Goody of Harvard University; Dr. William Nordberg of NASA's Goddard Space Flight Center; Dr. Robert Jastrow, director of the Goddard Institute for Space Studies in New York; and many others.

Valuable material was collected by Soviet and American scientists on the Bering Sea expedition in 1972. Two more joint expeditions are being planned: TROPEX and POLEX. They will give us a better understanding of the role of the tropics and the polar regions in weather formation. And we're looking forward to the joint flight of the Soviet and American spaceships Soyuz and Apollo in 1975.

Increasingly, we are using the cosmos to achieve our aim of protecting the global environment. Soviet-American cooperation will play an important role in this respect.



forest: protection and uses

Photographs by Alexander Lobov

The Krasnoyarsk Timber and Wood Institute works out methods of forest management for Siberia.

Its six research centers are hundreds and thousands of miles apart. The range of their investigations is broad; it includes plant breeding, seed studies, forest hydrology, dust storms and marsh-draining methods, acclimatization of decorative and orchard plants, forest pest control.

Our correspondent Alexander Lobov interviewed the director of the institute, Academician Anatoli Zhukov.

Interview with Academician Anatoli Zhukov

Q: Is your institute the only one of its kind in the country?

A: Not at all. There are many scientists elsewhere in the country doing forest research. The Timber and Wood Institute in Siberia, the Laboratory of Forest Science, the Forest Institute in Karelia, several dozen branch forestry institutions and forestry departments under biological and academic institutes, the Scientific Council on Forest Problems set up by the USSR Academy of Sciences in 1972—these are the main research forces concerned with forest problems.

Q: How widely do practical workers use your findings?

A: Rules and recommendations worked out by scientists are now used as guides in all forest work. They specify the areas and amounts of standing timber to be cut, the scope of reforestation, the species to be used for restocking cutover areas, and methods of forest control.

Q: One of the big problems of Siberia is forest fires. Is there anything scientists can do about it?

A: Of course. Modern methods and facilities are now widely used to fight fires. Forest areas are patrolled by specially equipped planes that quickly spot fires and report them. Helicopter-borne fire brigades and all the necessary facilities are rushed to the danger area, and the fire is quickly localized. Aircraft helps considerably to fight fires, which are still a menace to Siberian forests. But to increase the efficiency of forest rescue service, we have to build more roads, a network of them, inside forest tracts. Such roads are built across great areas in line with our recommendations.

What's more, the study of the dynamics of the forest ecological system makes predicting fire-danger situations a realizable possibility. Our institute has suggested a new method of forest formation less susceptible to fire hazard: alternating coniferous and deciduous species. The method has been tested and is already being introduced. You can imagine how important it is, considering the enormous scale of our reforestation. The area of planted forests is to reach 29.6 million acres in the current five-year plan period.

Q: What do you think about the use of pesticides? How can we avoid their harmful effects? I know we can't afford to stop using them yet.

A: The way chemical preparations act, disintegrate and accumulate varies with ecological conditions in the forest. There are many factors on which their beneficial and harmful effects depend: for example, the time of year, humidity, temperature, the activity of microorganisms. On the basis of the material we have collected, we gave foresters our own recommendations for time of year and dosages of herbicides. They guarantee optimum beneficial effect with minimum harm.

Q: And what about the biological methods of pest control?

A: One of the most destructive pests is the Siberian silkworm moth. We recommended the use of a preparation called Insectin, which induces a virus disease in the silkworm moth. It was tested with success in the forests of Krasnoyarsk Territory on an area of almost 500,000 acres during a silkworm epidemic in 1971-72. Incidentally, Insectin has also proved effective against cotton pests.

This kind of pest control could be described more accurately as biological protection or even biological control.

The problem is that destruction of harmful insects may sometimes do greater damage to the forest than their mass proliferation. It may produce quite unexpected results and consequences which are difficult to correct. Therefore, instead of fighting pests as a matter of principle, we should think in terms of control, helping the forest only in critical situations and accepting the forest as a self-regulating system.

One of the main directions of research today is modeling the processes taking place in the forest, in all their complexity, interdependence and constant change.

So that we look on measures to biologically suppress centers of mass proliferation of harmful insects as only one of the elements of a complex forest protection system. This system has been developed at our institute with an eye to specific taiga conditions and modern technical facilities.

Q: What is involved in this complex forest protection system?

A: We are now using not only planes but satellites as well for aerial surveillance in order to spot possible trouble areas.

Modern instruments and special cameras help us identify pest-infested areas at an early stage. These areas photograph brown, while healthy forests appear in shades of green and blue. When we compare these pictures with those in the special standards albums, we are able to establish the boundaries of the stricken areas and the degree of damage.

The methodology worked out at our institute enables us to make long- and short-term forecasts of the proliferation of the Siberian silkworm moth. Thus, on the basis of annual biometrical data on silkworm moth populations, our specialists forecast, with an accuracy of 80 per cent, that a critical situation will develop in two or three years. There is a definite correlation between the intensity of a dry period and the mass propagation of the Siberian silkworm moth in subsequent years.

If an area has droughty summers for two or three years in succession, it is sure to have mass proliferation of the silkworm moth the next year. In this case the most effective chemical and biological control tactic is to strike before the beginning of the propagation season. This cuts the amount of protection work considerably and leaves no pest-devastated patches, which are potential sites for forest fires.

Finally, the system takes into account the relative values of all forest protection measures. And that is no simple business. For example, to make a short-term forecast for silkworm propagation, we have to have data on the mean number of caterpillars in the crown of a tree, the degree of damage done to the tree and the caterpillars' prevalent age. And such data must come from hundreds of sections. For an autumn forecast you have to know the distribution of wintering caterpillars in the forest litter. To this add the complication that young and old forests of identical species have different critical figures.

Q: The Soviet Union accounts for a quarter of the world's timber resources and more than a half of the world's resources of valuable species of softwoods. This wealth obviously implies great responsibility and great problems, does it not?

A: All of us have a sharper awareness today of the role of the forest as a generator of oxygen, an important factor for life on Earth and for maintaining the balance between animate and inanimate nature. But the economic importance of the forest does not and will not diminish. What is stressed today is that people should take greater care of the forests and use them more rationally. Does it make sense, for instance, that the deciduous forests of Siberia and the Far East, which account for 38 per cent of all timber resources, are practically unused? Why? Because hardwoods are heavy, brittle and do not raft. But larch is excellent for pulp production. Birch and aspen are also hardly used. As a result, the mature standing timber of these species is increasing disproportionately.

The need today is to set up a nationwide forest management system by which tree felling and planting will be done with an eye to long-term forecasts as well as the needs of the country. Forest protection will be one of the major services of this system.

Researching gas exchange of pine sprouts in a forestry institute laboratory.

CLEAN SKIES FOR LENINGRAD AND ST. LOUIS

Continued from page 19

about the location of industry in metropolitan areas and the timing of the release of certain pollutants, depending on weather conditions, and to predict more accurately the interaction of weather and pollutants.

In terms of theory and the development of models, the Soviet Union is quite good. The Voyeikov Main Geophysical Observatory in Leningrad has a long history of doing innovative work, and our meetings with our Soviet counterparts have shown us that the work of Berlyand, Zaitsev, Nazarov and their colleagues is quite advanced. The Soviet side has also asked for the inclusion in this project of health effect studies, and so we are becoming familiar with the work of Dr. Shitskova, Director of the Moscow Erisman Scientific Research Institute of Hygiene, and Dr. Sidorenko, Director of the Sysin Institute of General and Communal Hygiene.

The prospects of the Leningrad-St. Louis joint project are excellent. There is a mutuality of interests and an anticipated mutuality of benefit, which are the basic criteria for international cooperation projects. We are impressed with the technical capabilities of our Soviet colleagues and the spirit of friendly cooperation which exists among the members of the joint working group.

Dr. George R. Morgan

Acting Director for Monitoring Systems, Environmental Protection Agency, Las Vegas, Nevada

I think Leningrad has made a lot of progress in establishing a monitoring network.

Dr. Edgar Stephens

Professor of Environmental Science, University of California, Riverside Campus

My colleagues and I have been very impressed by the Soviet work in the field of modeling or determination of concentrations of the pollutants to be expected from given source conditions under given meteorological conditions. I think that this could be very helpful in the United States.

Charles Copley

Commissioner, Division of Air Pollution Control, City of St. Louis, Missouri

I believe progress will be quite rapid after this meeting.

Dr. Douglas G. Fox

Chief, Model Development Branch Environmental Protection Agency, Research Triangle Park, North Carolina

Soviet research in air pollution is much more oriented toward control by removal and dispersal of the sources of pollution than is ours. The planning activities go forward with air pollution strongly in mind. The effort in assessing the dispersal of pollutants is a highly scientific one, and it was amazing to see that the forefront research in our two countries was very similar and going in the same directions.

There were so very many fascinating things that it is hard to be specific. I think we were greatly impressed with how well the Soviet mass transportation system seems to work, in particular, in the harsh climate of Moscow and Leningrad. Scientifically some of the Soviet work in the theoretical aspects of pollution diffusion and in understanding the turbulent motions of the atmosphere is second to none. My own personal scientific interests are in these directions, and it was exciting to meet with people whose translated papers we have labored over and have an opportunity to discuss our mutual work.

My responsibilities on the St. Louis project are to develop computer models of air quality in the environment, which can, in turn, be used as tools to aid in evaluating the impact of changes in pollution sources. Models in this sense are generalizations that develop from detailed data in, say, one specific city and in turn apply to other cities. Leningrad will then offer an excellent control on our experiments. In certain ways, what we learn in St. Louis should be true for Leningrad, and vice versa. I am hopeful that our project will continue to the point of making actual exchanges of data and models and mutual studies of these. It is very exciting.

USSR-USA Cooperation in Environmental Protection

The second annual meeting of the Joint Committee on Cooperation in the Field of Environmental Protection—the first to be held in the United States—took place in Washington, D.C., from November 13 to 16, 1973. After the committee reviewed the past year's work, Russell E. Train, Administrator of the Environmental Protection Agency, and Yevgeni Fyodorov, Chief of the Soviet Hydrometeorological Service, signed a Memorandum of Implementation to continue and expand the work in the 11 areas of environmental concern covered by the USSR-USA agreement of 1972. These include air and water pollution studies, studies in enhancement of the urban environment, in organization of nature preserves, biological consequences of pollution, the influence of pollution on climate, and earthquake prediction.

One of the projects in operation is on air-pollution monitoring. Identical stations have been set up in St. Louis, Missouri, and Leningrad. A group of American scientists have already visited several facilities in the Soviet Union in this connection (see story page 18).

Another is a water pollution study of the Delaware and Ohio rivers in the United States and the Seversky Donets in the Soviet Union. The experts of one country will be permitted to draw up a plan for one of their own rivers, using the methodology and data from the other country.

The level of activity of the second year's program is expected to double that of the first.

FACTS AND FIGURES ON LAND IMPROVEMENT

The Soviet Union has a number of hydroprojects under way: the Kakhovka irrigation system and the North Crimean Canal in the southern Ukraine, the Big Stavropol in the Northern Caucasus and the Saratov Canal in the Volga region. The first section of the Volga-Ural irrigation canal will be in operation by 1980. These projects, built in grain-producing areas, will guarantee high and stable yields. In Saratov Region alone, more than 490,000 acres of land will be irrigated over the Ninth Five-Year Plan period (1971-75).

The large-scale land-improvement program scheduled for the 1971-75 period will bring under cultivation 7.9 million acres of newly irrigated land and provide water for 102 million acres of pastureland. Drainage work is planned for 12 million acres of arable land; for 7.4 million of them closed drainage methods will be used.
In the first two years of the current five-year period, 3.2 million acres of newly irrigated land and 4.2 million acres of reclaimed land were made available for farming.

Large-scale efforts to create seeded pastures and hay areas started in 1970, when 74,000 acres of pasture were cultivated. Another million acres were developed in 1973.

Eight years ago, a billion rubles was spent on land improvement; by 1972 the figure had climbed to 3.8 billion. In 1973 a third of the state budget appropriations for agriculture, 3.5 billion rubles, went to land improvement.

Irrigation in the cotton-growing areas made possible a bumper crop of eight million tons of raw cotton in 1972. A yield that large had not been scheduled by the plan until the end of the current five-year period (1971-75). Rice production more than tripled in recent years. Previously 60 to 70 per cent of the domestic demand for rice was met by imports; today the Soviet Union can manage with rice grown at home.

In the last four years antierosion and field-protection afforestation belts planted on more than 4.9 million acres increased the grain crop by an estimated 71 to 82 million tons, which adds up to about 7 billion rubles a year.

The major grain-growing districts in Altai Territory, Western Siberia, are in a high-risk farm zone, often hit by dust storms. Soil protection methods have been introduced there: Moldboardless plowing in the early fall preserves the soil and collects moisture. Of the 55 districts in the Altai, 48 are using this method on an area of more than 7.4 million acres. As a result, harvests in the Kulunda Steppe have quintupled in the past seven years.

More than 2.5 per cent of the national income, some eight billion rubles a year, is budgeted for environmental protection and improvement.

EXPO '74 THE SOVIET PAVILION IN SPOKANE

A world exhibition on environmental protection, Expo '74, will open in Spokane, Washington, on May 4. Our correspondent interviewed Boris Kokorev, director of the Soviet display.

Q: The exhibition has aroused a great deal of interest among government officials, public figures, scientists and laymen. How will it differ from earlier exhibitions on environmental protection?
A: Earlier shows of this kind emphasized the superiority of human beings over nature, their seemingly unlimited ability to subordinate the environment to their interests and goals. The aim of Expo '74 is to disprove the belief that natural resources are inexhaustible, that we can continue to exploit them unconcernedly and to dump our wastes into the soil, the world ocean and the atmosphere.

Q: Are these the problems the exhibition will highlight?
A: Yes, and it will show you civilization can continue to advance without polluting the environment. This is a complex problem with scientific, technological, political and social aspects.

Q: What will the Soviet display be like?
A: It will be the largest at the exhibition, covering an area of 69,000 square feet. At the entrance a huge sculptured map of the Soviet Union will give visitors an idea of the country's vast expanses, its natural resources, flora and fauna, and productive forces.

The first section will feature legislation on nature protection adopted by the Soviet state under Lenin's leadership immediately after the Revolution. This includes the Decree on Peace, which declared that war was the gravest crime against humanity, and the Decree on Land, proclaiming the land the property of all the people. These acts set standards for the rational use of the country's natural resources. Shortly afterward the government issued 200 decrees on the environment, covering such subjects as forest and fish conservation, hunting regulations and nature preserves.

Q: The next section is devoted to the relationship between human beings and the biosphere. Isn't this an important key to understanding the whole complex of ecological problems?
A: You are quite right. In this section you find yourself in the wonderful world of nature—a fresh carpet of grass under your feet and green trees and shrubs all around. The section is flooded with sunlight coming from its center. This is a model of the biosphere, and you are inside it, because human beings are its creators and inhabitants, participants in the complex life process.

The human race has progressed scientifically and technologically to the extent that its activity has assumed global proportions and begun to upset the balance of environmental processes. That is why a planned and scientifically regulated relationship between man and nature is the only alternative to the impending ecological crisis. This crisis is the result of the gradual transformation of the biosphere into a noosphere—organized and regulated by man.

The concept of the noosphere was originated 30 years ago by the eminent Soviet Academician Vladimir Vernadsky. Visitors to Expo '74 will have the chance to acquaint themselves with the ideas of Academician Vernadsky and other Russian and Soviet scientists on the rational use and conservation of natural resources.

Q: What else will people find out from this section?
A: It also deals with man's activity in the biosphere: atmospheric pollution, water resources, land utilization, city development. For instance, forests and the phytoplankton of the world ocean constitute the largest oxygen-producing "factory" on our planet. Visitors will find in this section information on the forests' role in providing oxygen absorbing carbon dioxide, preventing erosion, conserving water and fish resources.

They will also be able to "breathe" the fresh air of Moscow and find out why it is purer than that of any other large city.

Q: What do you have in mind for the water resources section?
A: It will give an excellent idea of the country's rational use of water and of our antipollution measures, particularly for the Volga and Ural rivers. The section will feature a model of a large oil refinery whose volume of waste water discharge is almost zero. It will also outline such conservation measures as biological purification of water and artificial breeding and acclimatization of fish.

Q: What about Baikal? Will there be any information on this unique lake?
A: We haven't forgotten Baikal. This lake contains a fifth of the world's reserves of fresh water —and crystal clear water, at that.

It's surrounded by preserves containing 2,000 different species of plants and animals. The only industrial enterprise nearby is a pulp and paper mill with excellent waste treatment facilities. The lake area is beautiful, and people take care to protect it.

Q: What can we see in the other sections?
A: There will be exhibits on the struggle against water and wind erosion of the soil, on measures to increase soil fertility, on reclamation and irrigation. Other displays will deal with nature preserves and biological methods of protecting plants against pests.

Q: Does the display show the government's role in environmental protection?
A: Yes, especially since the government has emphasized antipollution measures for a number of years. Of course, the economic and political organization of socialist society offers considerable advantages in this respect. The Communist Party is a leading force in the struggle to preserve a healthy environment. Government bodies as well as trade unions, the Young Communist League, Young Pioneer groups and nature protection societies work together to conserve the country's natural wealth.

Q: Nature is also a source of inspiration and esthetic awareness. Has this role influenced the Soviet exhibit?
A: Indeed it has. The exhibit includes a display of works by Russian and Soviet artists reflecting the infinite diversity of the world.

Q: How about the section on international cooperation in environmental protection?
A: In the atmosphere, as in the ocean, there are no boundaries between countries: Only the united effort of all nations can prevent further pollution. That is why cooperation in this field is a matter of mutual interest.

The Soviet Union has been cooperating with a number of countries on conservation measures. An important step in this direction was the May 1972 agreement between the USA and the USSR on environmental protection. The participation of the Soviet Union in Expo '74 is another step toward broader cooperation in this field.

The Soviet Union has been actively cooperating with the socialist nations in environmental protection. It has a number of similar ties with France, Canada, Sweden and other countries.

Q: Expo '74 is a sort of exhibition-symposium. Will leading ecologists from different countries be meeting in Spokane to exchange ideas?
A: Yes. Moreover, song and dance companies, including the Moiseyev Dance Company, Georgian ensembles and others, will perform at the exhibition. A special event will be USSR National Day.

I am taking this opportunity to say: Come to the exhibition. I am sure that many visitors will find the Soviet display particularly interesting.

strip-mine landscape

By Vladimir Travinsky

Opencast mining is widespread in the Soviet Union. Done with modern, highly productive machinery, it has obvious advantages: The country gets more raw materials, mine profits rise and so do earnings. But strip mining scars the earth, creates huge conical mounds of rock and soil. One answer is reclamation, tried at the oil shale mines in Estonia, the coal basin near Moscow, and in the Ukraine. This article describes strip mine reclamation in the Ukraine.

THE PATTERN of green fields and forests ended abruptly. The musty, warm smell of earth faded, and so did the bird sounds. A moonscape appeared: For as far as I could see, dull dark-brown cones interspersed with black ones rose from the ground. At intervals there were echoing pits that reached deep into the lifeless earth. It looked as though some callous but purposeful stranger from the Moon had rearranged large hunks of our planet in a way that made sense only to him.

The architect of this pitted landscape was the opencast mining industry.

I am sitting in Grigori Sereda's office. Sereda, the director of the Ordzhonikidze Ore-concentrating Complex, is short, sturdily built, square-shouldered. His face is broad and forceful, his gestures energetic, and his voice rumbles. He is telling me about the advantages of opencast mining.

Impressive! In 1952 the complex extracted only a twenty-third as much manganese ore from opencuts as from underground mines; in 1960 the volume of opencast mining ran ahead of underground mining; in 1965 it was four times more; in 1970 10 times; and by 1975 there will be no underground manganese mining at all.

Labor productivity, earnings and bonuses have gone up. The complex's planned annual profits have topped the 55-million-ruble mark—that means there are funds on hand to get things done. The incidence of accidents has dropped by two-thirds in the last 10 years—the miners are not digging away in a dark, cramped space underground, but in the fresh air with plenty of room!

Are there disadvantages, too?

"Here are some other figures," Sereda told me. "We extract about 11 million tons from the surface workings each year: 5 million tons of ore and 6 million of muck. The manganese is at an average depth of about 200 feet. This means that before we bring out any ore or muck we must strip off a 200-foot-thick layer of earth."

I'm strolling along a path with Nikolai Tkachenko. He's the chief mine surveyor of the Ordzhonikidze Ore-concentrating Complex. To our left spreads a malachite-green bristle of young wheat, to our right the darker shades of alfalfa. Melons have just begun to appear; the plum trees are covered with white silk; and we can see the first pink in the apple orchards. Trees taller than I am sway their branches softly as if getting used to the warmth of the late spring. The trunks are limed, as they should be, and the soil around them is loosened. A wheel tractor is rumbling nearby.

"These are the Zaporozhsky Mine spoil banks," Tkachenko explains. He is a thorough, businesslike young man, wholeheartedly taken up with this project, a most unusual one for a mine surveyor. "The yield on these spoil banks is double that at local collective farms. The forest you saw is on the site of the former Alexandrovsky Mine spoil banks. Now, over here there'll be a pond. And it's almost time to bring out the hives, it's getting warm."

Again we pass through plowed land—a wheat field—then through a thicket of grapevine poles, some melon fields and an orchard. We are walking on the spoil banks of the world's biggest deposit of manganese, where an apiary will soon begin operating, because the fields and orchards must be pollinated.

This type of metamorphosis has a name: reclamation. For a long time it designated a dream rather than any actual change. Efforts to turn strip-mine moonscapes into terrestrial landscapes either failed completely or were largely ineffective. The reclamation program at the Ordzhonikidze Ore-concentrating Complex is probably the most successful anywhere.

Before going into detail, I'll quote one more fragment from my long talk with Sereda.

"But this is very expensive," I told him. "The average cost of reclaiming a single acre is about 12,000 rubles. And instead of being satisfied with planting trees—the usual method—you want to grow farm crops, which is even more costly! Simple arithmetic shows that you won't recoup your investment in 10, 20 or even 40 years. Why are you working at it so hard?"

"I don't like fancy explanations," he said, "but I guess it can't be helped. You see, what we're dealing with here, after all, is soil. You can't apply the usual notions of profitability and return on investment to it. The soil nurtured our distant ancestors, it is nurturing us, and it will be just as indispensable a thousand years from now. Do you consider the survival of humanity profitable? Then the survival of the soil is no less so. The question is: How can you measure this profitability? Even with today's methods, reclamation will yield a return to perhaps two generations. Soil must be assessed not in terms of rubles or years, but of generations. Besides, in the near future . . ."

But first let's take a look at the recent past.

In the early sixties several government decisions made it mandatory for mining

enterprises to reclaim the stripped area. The decisions gave the directors a free hand, left everything to their energy and initiative. But when the Ordzhonikidze Ore-concentrating Complex and others tackled the job, they found themselves with a brain twister. At the time there was the experience of no more than two major projects to go by: the oil shale mines in Estonia and—a less successful attempt—the coal basin near Moscow. The conditions in both those districts did not fit those at the complex at all.

So the complex turned to the Dnepropetrovsk Agricultural Institute. The institute had no better idea about how to reclaim spoil banks. But it was eager to help, especially since the complex director promised to finance the reclamation effort, and with no delay. As an experienced manager, Sereda knew that words were fine, but they had to be buttressed with rubles if you wanted to get things done. And the money was found: Even before reclamation began, the cost was incorporated in the production cost of every ton of extracted ore. In other words, the more soil you destroy by strip mining, the more money you get for reclamation. Simple but excellent economics. A team of scientists from Dnepropetrovsk, headed by Professor Nikolai Bekarevich, left for the "moonscape."

The first success came in 1965. Trees were planted on the spoil banks of the Alexandrovsky Mine. The cones were leveled and the soil fertilized, but the question remained: Would anything take root? No one here had heard of life taking hold on a spoil bank.

Sereda got the project off to a substantial start: Forests were planned according to the highest standards, and the planting was mechanized. Where there was no room for machines to maneuver, volunteers did the work by hand. More volunteers turned out than were needed. Every tree became the pride and joy of its planter, and to this day the planters look after their charges, taking time out on weekends or in the evening to hill, hoe, water, prune and fumigate.

The Alexandrovsky Mine's last trench had reached almost to the city proper. It was filled with water, its banks were lined with colored stones, cottages were built and a recreation zone appeared: woods, water. . . .

The saplings took root, and how they grew! In only two years a grove of young trees was rustling on the city's outskirts.

What's the moral, then? Reclamation doesn't simply repair the damage, it adds to the environment, makes it more beautiful than before the area was mined. Around the same time the Dnepropetrovsk scientists and management people from Ordzhonikidze hit on an idea which today gives special color to their efforts to renew the soil.

The logic was simple: Suppose the same machinery, the same people and the same funds were used to rearrange, rather than reclaim, the soil? Spoil banks are, after all, a kind of rearrangement themselves.

A bit of popular science: Not all soil is fertile. The most fertile is chernozem, which is about 16 inches thick in Dnepropetrovsk Region. Under it is some 65 to 100 feet of so-called potentially fertile soil. Wheat won't grow in it, but trees will. And then comes lifeless earth.

In starting strip-mining operations, the chernozem is first removed. Those 16 inches of topsoil are carried to one side and stored. Next the potentially fertile layer of soil is removed and piled on the other side. Only then do the machines dig down for ore. When the mine has been exhausted, it is filled with earth in the reverse order: a non-fertile layer, then a potentially fertile one, and finally the chernozem.

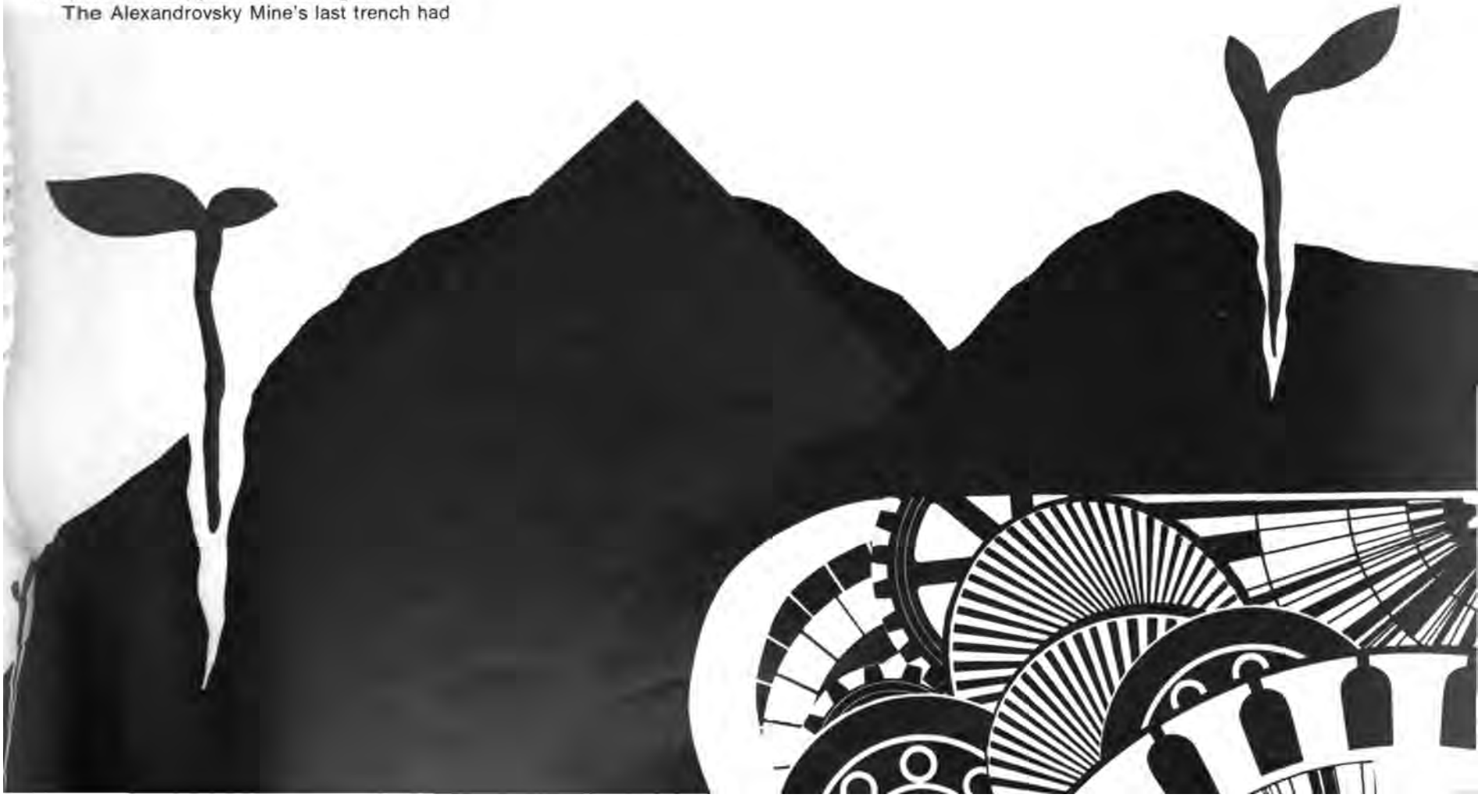
But why use exactly 16 inches of chernozem? Why not more? The scientists experimented and found that the thicker the layer, the higher the wheat yield. The best results were obtained with 32 inches of chernozem; a further thickening had no effect. But if 32 inches are used, half the area has to do without chernozem. Very well. The second half can be covered with potentially fertile soil and an orchard—or bean and forage crops—planted. The grain yield is the same as before, but in addition there are fruit and fodder. The reclaimed area now yields both grain and meat.

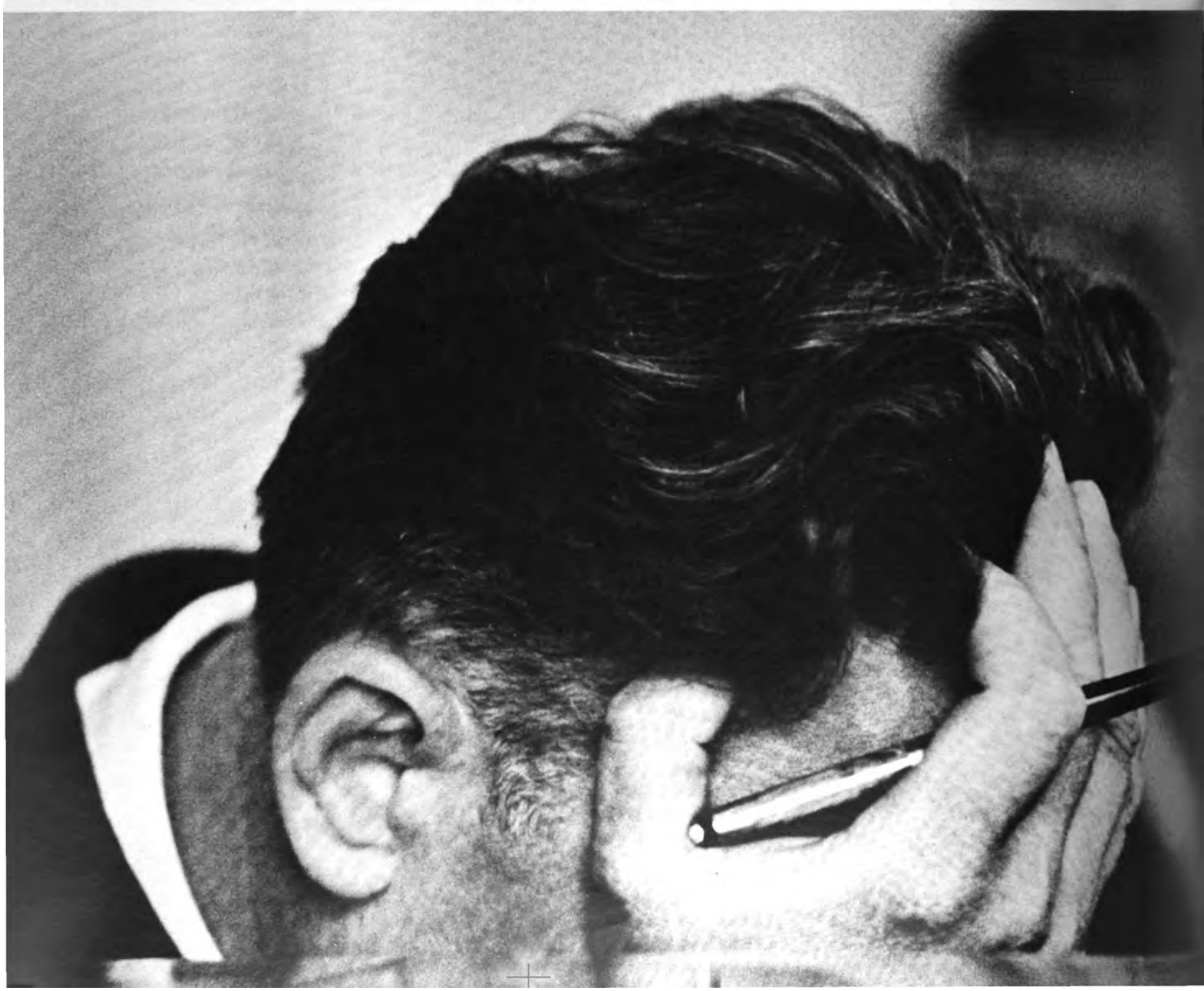
These are not theoretical calculations. For three years in a row, twice as much has been harvested on the complex's reclaimed lands as on the surrounding collective farms. In 1959 the complex sowed 170 acres to grain, melons and orchards, and the first 570 acres of woodland were turned over to a tree nursery.

A special experimental plot of eight and a half acres was planted. One portion had no chernozem at all—the wheat yield was half the usual. The second portion, with 16 inches of chernozem, yielded a normal crop; the third, with 24 inches, a 150 per cent crop. The fourth portion, with 32 inches of chernozem, had a double yield! There it was plain as day for the skeptics to see!

Again, Sereda speaking: "Our ore deposit spreads over an area of 62,000 acres, with another 17,000 branching off. So far we've worked 5,000 acres and restored the soil on 1250. But I assure you, we're going to restore every single acre. We have confidence in ourselves now, we've learned the job."

. . . I left in the morning. As the bus rolled past soft green fields, I recalled the moonscapes. And suddenly an extravagant thought crossed my mind: If people could pitch in this enthusiastically to revive the land—however groping their first attempts might be— why couldn't they do the same for the Moon? Perhaps that field outside the bus window, that brightly painted tractor, the silky plums and the bonfire beside the road were really the projection of a future moonscape.





Their foundry was polluting the air, a criminal offense.

THE TRIAL went on for days. After the indictment and speech by the public procurator the court heard 39 witnesses, including 6 experts, and 3 defense lawyers.

Nikolai Isayev, the director of a small Moscow foundry that makes nonferrous metal castings, and Samuil Yavelov, chief engineer, were charged with polluting the atmosphere. The foundry they supervised was emitting harmful lead oxide fumes.

"Their actions jeopardized the health of a great many people, including sick people and children," Vadim Milayev, public procurator of the Moscow district in which the foundry is located, told the court. Experts testified that the amounts of lead oxide emitted exceeded the city's permissible level.

Cases of this kind do not often reach Soviet courts. The sanitary inspection bodies, the public and the press usually dispose of environmental hazards as soon as they are noticed.

The quality of Moscow's environment is good enough to serve as a model. The water is cleaner and better tasting here than in any other big city in the world. Moscow residents do not hesitate to open their windows wide: Diesel buses were banned from the city a long time ago, and the use of leaded gasoline is prohibited. A total of 186 factories are being moved outside the city limits, and green protective zones are being set up around those that remain. The most modern waste-treatment installations are being built. In the past 15 years air pollution has been reduced by 65 to 75 per cent. In no other industrial country will you find a city of comparable size with elk, deer, wild boar, fox and other animals nearby, with such good fishing and such an abundance of mushrooms and wild berries.

Nature has generously endowed the Muscovites with rivers, lakes and forests, but this natural wealth has to be preserved.

Environmental protection is of vital concern to people the world over. It is significant that one of the agreements signed during the U.S. President's Moscow visit provides for cooperation between the Soviet Union and the United States to protect the environment.

Pollution is a criminal offense in the Soviet Union. Article 223 of the Criminal Code of the Russian Federation declares: "The contamination of rivers, lakes and other bodies of water and sources of water with raw, untreated sewage, refuse or waste of industrial, agricultural, municipal and other enterprises, institutions and organizations, that injures, or might injure, the health of people or agricultural production, or fish resources, as well as contamination of the air with industrial waste that is a hazard to health, is punishable by corrective labor for a term of up to one year or by a fine of up to 300 rubles.

"If the above actions cause substantial damage to people's health or agricultural production, or entail the wholesale destruction of fish, they are punishable by deprivation of liberty for a period of up to five years."

It was for a violation of Article 223 that Nikolai Isayev and Samuil Yavelov were tried.

The People's Court of Sverdlov District in the city of Moscow found Isayev and Yavelov guilty and sentenced each of them to one year of corrective work at their place of employment, with 15 per cent of their salary deducted and transferred to the state. They also had to pay court costs.

Expert Isaak Yunik.
Below: Procurator Vadim Milayev addressing the court.

Photographs by Sergei Lidov

ELK-BREEDING FARM

By Matvei Khromchenko

EVERY MORNING the year round, no matter what the weather, a bugle calls through the village of Sumarokovo. The bugler is patient, persistent, repeating his notes until the elk appear on the edge of the forest. The day has begun for the elk-breeding farm at the Kostroma Agricultural Experimental Station.

Elk were close to extinction at the turn of the century; they were much too tempting and easy game for hunters. Only extreme conservation measures saved them, and today there are half a million in the Soviet Union. From the central forests (including those in Kostroma Region), the elk gradually moved up to the Caucasus and the Carpathians.

Cliff drawings discovered in Siberia show that the elk was once as domesticated an animal as the horse and the cow. We do not know why it went wild again.

People tell the story of a year-old female that strayed from a herd in open pasturage in the Siberian taiga. Two years later the animal accidentally came upon the person who had been its herdsman. Hearing the voice, it ran up to him, sniffed at the man's face and nose and poked its muzzle into his pocket, where he used to keep tidbits for the animal. It followed the man some five or six miles to the elk-breeding farm and never left the place. It is interesting that the elk had not turned wild in the two years it had lived with wild elk.

So domesticating elk is not too difficult. The problem is to get them used to herd life and a fixed order of things.

But the job is worth doing. Some elk cows at the Kostroma farm yield as much as six quarts of milk a day. And what milk! It is five times richer in protein and fat than ordinary cow's milk: it churns to excellent butter. The elk are not at all fussy about their feed, and that makes them ideal domestic animals in forested and taiga-covered regions, Siberia and the Far East, for example, where the fodder is sparse.

There are already more than 40 elk at the Kostroma farm, which is only eight years old. Early in the morning, in answer to the bugle call, the elk come out of the forest to the pens. Salted water is ready for them and milk and oatmeal for the calves. The cows have to be milked and, from time to time, weighed and measured. Then they're led out to the forest to graze till evening. This is not to keep them from scattering but to get them more accustomed to herd life.

Four young people—Alexei Mikhailov, the farm's director, and his wife Polina (both are graduates of Kostroma's Agricultural Institute) and laboratory assistants Nadezhda Durkina and Alexei Kelip—make up a team whose practical research has awakened interest beyond Kostroma Region. Last spring something happened at the farm which even got some attention abroad. Nineteen calves were born on one day. And not one of them died. An acknowledged record holder here is Nakhodka, who has already dropped nine calves: one the first year and twins annually ever since.

Photographs by Edward Ettinger

...e contentedly in
...sticated herds
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...near the Volga.

The Desert Will Be a Garden

By Vladimir Rybin

Botanist Nina Nechayeva turns the desert into sheep pasture.

"When a bird flies over the Kara-Kum Desert, it loses its wings, and when a man crosses the desert, he loses his legs." So goes a Turkmenian proverb. The literal meaning of Kara-Kum is black sands. The sands are actually the usual yellow-gray color, but centuries ago people named them black because of the fear instilled by their lifeless expanses.

I WAS TRAVELING through the Kara-Kum Desert with Agadzhan Babayev, director of the Institute of Deserts of the Turkmen Academy of Sciences, the only institute of its kind in our country and one of the few like it in the world.

There are many deserts on our planet, one out of every five acres of land is covered with sand, inhabited by only one per cent of the Earth's population. The Soviet Union has its share, millions of acres of desert and semidesert in Kazakhstan, Uzbekistan and Turkmenistan. They have been opened up to giant irrigation projects launched in Central Asia. The major Kara-Kum Canal stretches across the sands for 500 miles. My companion and I watched this artificial river from the plane, pointing out to each other the white ships running on the sparkling water, the green orchards and fields spread along the banks. We talked about other artificial waterways soon to be built: The Amu-Darya and Syr-Darya rivers already supply water to the irrigation system of Central Asia, now the Siberian rivers Irtysh and Ob will be doing their part.

But science looks a long way ahead—in 10 or 20 years even the joint efforts of these Siberian waters will not be enough to transform all the deserts and semideserts into life-bearing oases. What else must be done to ensure that the only deserts left will be those that are natural wildlife sanctuaries? Soviet scientists, and particularly the researchers of the Institute of Deserts, are trying to answer this question.

Our plane turned sharply from the blue vein of the canal to the north, where large sand hills stretched to the horizon like stiffened waves of an enormous sea. Soon a welcome greenish strip of land appeared in the distance, spreading along the railroad tracks. This was Repetek, the mecca, so to speak, of world scientists studying deserts. It was declared a sanctuary in 1928. In Repetek you can find nearly every kind of desert landscape, as well as nearly all the animals and plants that live in the sands. The regimen of the sanctuary is very strictly observed. The staff studies the animals and plants, the movements of the sands, determines the degree of their agricultural usefulness and works out methods to fight drifts and light sand.

Takyrs, as the flat argillaceous plains are called here, make very interesting and promising research areas. We rode along the *takyr* as if it were an endless asphalted square. To the left and to the right the smooth clay desert had hardened into stone under the hot sun. Nothing grows there. The rain that falls in winter does not penetrate the soil, it just drains off.

"There are seven million acres like that in Turkmenia," said Babayev. "And we decided to make that useful, too. We have planted an experimental orchard on one of the *takyrs*. Just look at it," and he pointed to the even rows of apple and pistachio trees. A short distance away from the orchard a tractor was making deep furrows. Machines were digging holes in the ground, and workers were planting trees.

"And how do you water the trees?" I asked.

"From the sky," said Babayev with a smile. "The *takyr is* impermeable. We turn this to our advantage—we dig ditches in the *takyr* to collect the winter rain under the ground. There the water doesn't evaporate but feeds the roots of the trees. It has taken us years to work out the agrotechnics, but now we have the expertise to lay out orchards, vineyards and melon fields right here on the *takyrs*."

"But the greater part of the desert is covered with light sand; it's hardly suitable for farming," I said.

"When the right technique is developed, everything is possible," said the director and took me to see another research center—the South Kara-Kum Station.

It was hard to believe that just a few years ago there were only

bare sand hills here. Now water-sprinklers, silvery pipes, lie on the easy slopes, marking off square plots of green field.

"The sand absorbs water very quickly. At night artificial rain soaks the soil thoroughly. Of course in the daytime the sun quickly dries the upper layer, but, underneath, the sand remains moist. Then the stems grow tall and protect the sand from the sun. Water consumption here is half what canal irrigation requires. On the experimental plots they grow such forage crops as sorghum, corn and alfalfa close to 12 feet high. The yield reaches 44 tons per acre."

Again the road led us into the depths of the Kara-Kum Desert. We visited Karakul, where researchers from the Institute of Deserts were conducting a unique experiment—building an artificial underground water reservoir.

The idea is borrowed from nature. Flowing down the *takyrs*, winter rain partly penetrates the sand and sometimes accumulates in the impermeable layers of the Earth's bowels. The scientists decided to reproduce this process. They chose a suitable site, dug a pit, bored holes and started pumping underground the water flowing down the *takyr*. In five years they stored up 10 million gallons of water. It takes nature centuries to collect that volume of water. Each cubic meter (264 gallons) of water costs 25 to 30 kopecks; in the old days water had to be brought here from other places and it cost 730 kopecks per cubic meter. In Central Kara-Kum alone, the most arid part of the desert, about 70 sites have been found where such underground water reservoirs can be built.

Every day life presents the staff of the institute with new problems, and they solve them creatively; more than a little self-sacrifice and a good deal of dedication and courage are needed. Many of the researchers are women. One of them, Nina Nechayeva, grew up in the forests and meadows of the Smolensk region in Central Russia. After graduating from the institute, she went to work in the desert. Though living conditions are difficult there, the desert offers maximum opportunities to the researcher who wants to find out whether there is any limit to the adaptability of living things, especially under the most unfavorable natural conditions. In 1934 the 25-year-old Nina, a botanist, set out on her first expedition to the Kara-Kum Desert. They moved from one well to another, over rough terrain, under the scorching sun, close to the point of despair sometimes when the next well, after a long trek, proved to be dry.

Nina brought abundant material back from the desert. Later it enabled her to compile the first geobotanical and pasture maps of Turkmenistan. Just as, earlier, she had been attracted to the most remote and hopeless parts of the desert, in 1937 Nina went to the arid, saline and sagebrush districts of the republic, 75 miles from the nearest railway station. Her investigations made it possible to start desert development there. Now there are several state karakul sheep farms in the area.

Nina also studied sandy pastures and compiled a sheep-breeding manual which was later recommended by the USSR Ministry of Agriculture to all the farms of the republics of Central Asia and Kazakhstan.

And then something terrible happened to her. One dark night in October 1948 she regained consciousness under the ruins of her shattered house, victim of an earthquake. At the hospital she learned that her mother, son and two-year-old daughter had been killed. Recovery was tough. The Turkmenian land for which she had done so much had deprived her of her dearest ones. But Nina was too strongly attached to the people and to her work in the desert to leave.

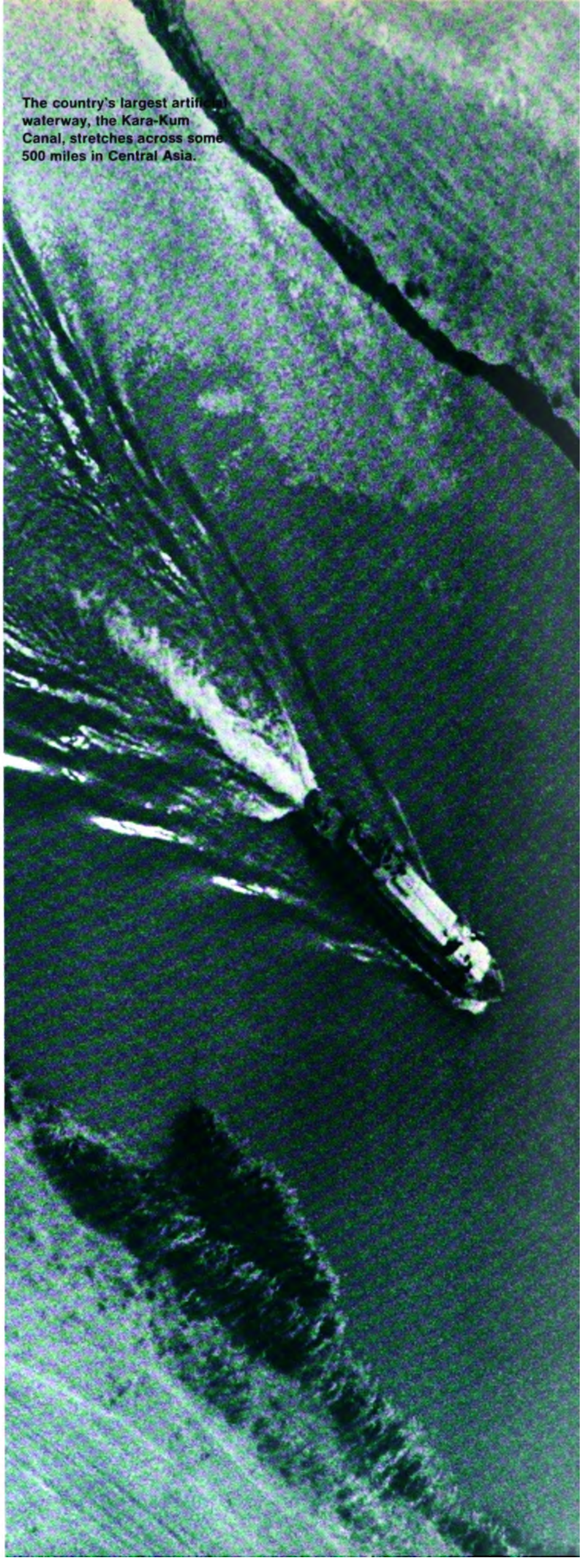
A year later, barely recovered, she went to south Turkmenistan to organize the Badkhyz station for the development of the perennial winter pastures so important for the local cattle breeders.

At the same time she made a study of desert plants to determine their potential for agriculture. Nina devoted many years to this work, and as a result over 70 wild grasses and shrubs were cultivated. She proved that they could be sown, that they could produce yields four to six times larger than on natural pastures. Now, whenever an increase of the sheep stock is planned around artificial pastures, people turn to Nechayeva's work in the field.

She is also compiling a pasture map of Turkmenistan and is working out methods which will make it possible, based on meteorological conditions, to predict accurately the future yield of grasses. She travels to the very heart of the Kara-Kum Desert to pursue her interest in plants growing under unfavorable conditions. As always, her place of work is not a quiet laboratory but the expanses of the desert with its light sands, slippery saline soil, gnarled saxauls and resinous camel's-thorn.

Nature has decreed that Turkmenia have little water or vegetation, but at the same time it has endowed its grasses and shrubs with great vitality. To use this strength for bringing life to the Kara-Kum is Nechayeva's whole purpose.

Courtesy of the magazine *Soviet Woman*



The country's largest artificial waterway, the Kara-Kum Canal, stretches across some 500 miles in Central Asia.

THE KURSK MAGNETIC ANOMALY

By Boris Tulunin

In the center of European Russia, some 300-400 miles south of Moscow, is the iron ore basin known as the Kursk Magnetic Anomaly (KMA). Its geological stocks of ore and ferrous quartzite are estimated at many billion tons. The area has large deposits of bauxite, chalk and other raw materials required for chemical processes and for industrial and housing construction. Substantial quantities of iron ore are mined at the KMA; the metal made from this ore is produced at mills in other industrial areas of that part of the country. Planned for the future at the KMA is the construction of a large metallurgical complex.

IN THE KURSK Magnetic Anomaly nature has deposited such a storehouse of minerals that it is matched perhaps nowhere else in the world. The ore is in the bowels of the Central Russian highlands, spreading over an area of almost 600 miles longitudinally. Soviet power has transformed the locality. New branches of industry, such as engineering, metal processing and chemicals, have been added to the old, and dozens of industrial cities and towns have sprung up.

But when people talk of the KMA, they are thinking primarily of the part it now plays and will play in the development of the iron and steel industry. In 1972 the country produced 138 million tons of steel. By 1975 (the end of the current five-year plan) steel production will be 160 million tons. The increase obviously requires a substantial rise in iron ore production. This is where the KMA comes in; the cost-price of a ton of iron made of KMA ore is the lowest in the country. One other point: The basin is situated in an industrially advanced part of the country, and local industry needs increasing quantities of metal. All this presumes a rapid development of the iron ore deposits at the KMA.

Some History

The striking anomaly of terrestrial magnetism in the Kursk area was first noticed by Russian Academician Pyotr B. Inokhodtsev. In 1783 he reported his observations to the Imperial Academy of Sciences, but his discovery did not stir up any special interest. A century passed before there was talk again of the mysterious phenomenon. Then, after long study of the region, Professor Ernest E. Leist of Moscow University explained that immense iron ore deposits were responsible for the magnetic anomaly at Kursk.

In the second half of the nineteenth century, after the abolition of serfdom (1861), Russia accelerated its industrial development. The growing need for metal demanded of industrialists increased output of ore at operating deposits and the opening of new mines. Businessmen and profiteers became rich from the purchase and sale of land and all kinds of other money-making transactions.

Test drilling began in the Kursk area. But though one drill went down 699 feet and another 804 feet, there was still no ore (it was found much later that 100 feet more would have reached the ore-bearing layers). Professor Leist was accused of inaccurate forecasting and ridiculed. And the search ended.

Was there indeed a mineral treasure-trove? And if so, how large was it? Was it accessible? What could a prospector do single-handed? All these questions remained unanswered for 150 years.

It was only with Soviet power that prospecting in the anomaly area was activated and systematically organized. Lenin devoted a good deal of attention to the problem. In 1920 he signed a special decree, which said in part: "All the work related to the prospecting of the Kursk Magnetic Anomaly should be considered of special state importance." Simultaneously a research and prospecting commission was formed, headed up by Academician Ivan M. Gubkin, the eminent geologist.

In June 1923 drilling teams found iron ore at a depth of 548 feet. Nature's mystery was solved. An atlas of the magnetic charts of the basin was compiled. The more promising deposits were determined, a study was made of the specific features of the ore, and techniques were worked out for the production of metal. The first experimental mine was built, and in the spring of 1933 it began producing ore. Before June 1941 (when the Nazis invaded the USSR) several mines had been tunneled.

New Stage

The postwar years saw a more detailed prospecting of the deposits. A wide range of problems were tackled by several research and design institutes, three of them set up right at the basin. The Learned Council for KMA Problems, USSR Academy of Sciences, became more involved. As early as January 1945, before the end of the war, work was begun to rebuild the experimental mine. Subsequently more mines were built, along with a dressing factory and an agglomeration mill.

For a long time, in spite of the rich iron ore deposits found, the KMA was considered an area predominantly of ferrous quartzite deposits. In 1958 this opinion was changed by the discovery of the Yakovlevsky deposit of high-quality ore, followed soon after by the finding of several other similar deposits. Deep prospecting got under way with the intention of rebuilding more mines. In 1959 the first rich ore began coming from the Lebedinsky deposit at the KMA. It was mined by the opencut technique, from a quarry. In subsequent years this method saw priority development. Currently five large deposits are being worked.

The modern quarry is too big for the eye to take in. It is a vast bowl with a radius of about two miles and with tiers of worked rock going down in steps from the fringes to the center. There are roads and train tracks on these steps. Everywhere you see the jibs of superpowerful excavators, conveyor-belt loaders and winding trains. Only from a helicopter flying high above can press photographers shoot the whole panorama.

Young people in large numbers work at the KMA. The young men are attracted by the vast scope of the project and the potential of the area. At local classes they learn the trades of machine operators. Those who are interested study at colleges after the day's work is over. In the growing towns newlyweds settle into apartments of the new residential areas.

One of the developing centers at the KMA is the city of Gubkin (pop. 56,000). It has a mine research institute and a branch of the National Correspondence Polytechnic Institute. Other centers of the basin are Zheleznogorsk and Stroitel.

The Future

What are the prospects for the KMA? By the end of the current five-year plan period (1975), the annual output of ore in the basin will be 44 million tons. Along with the development of opencut mining, the construction of a large underground mine is planned at the Yakovlevsky deposit.

This deposit (in the southern part of the basin) is the gem of the KMA. Its ore reserves are estimated at over 11 billion tons, six times more than in the country's well-known Krivoi Rog Basin (the Ukrainian SSR). The ore has an iron content of over 60 per cent, but it is at a depth of 1,475 to 1,650 feet. That depth has never been tapped, and this is where the basin's first large mine, with a capacity of 20 million tons of ore a year, is to be built. The experience acquired at this mine in underground production technology will be invaluable for the extensive development of other deep deposits in the area. In the remaining years of the five-year plan period there will be a substantial enlargement of the operating quarries, more pits will be dug and new dressing mills built.

Work is being done also to extract deposits of other minerals. A cement factory and a mineral-pigments mill have begun producing. Construction is under way of a building materials plant and of large prefab reinforced-concrete plants.

Last but not least, problems involved in building a metallurgical complex are now under study. This complex of enterprises, consuming immense quantities of water and electricity and requiring the construction of a big city nearby, demands careful consideration. But the country needs metal, and the problems will be solved.

Work is nearing completion (under the guidance of the USSR Academy of Sciences) on a master plan for the development of the KMA for a period up to 1980. It takes account of such problems as the efficient utilization of minerals, transport facilities, construction of cities, protection of water resources, preservation of the fertile layer of the land used for quarries.

Lenin said about the KMA: "We have there almost surely a stock of wealth unequaled anywhere in the world and capable of revolutionizing the whole of metallurgy." Time has amended that description somewhat by eliminating the words "almost surely." The wealth of that area is so great that it will be worked for a long time to come, providing industry and the consumer with the necessities and comforts of life. As the basin is developed, it will make an increasing contribution to the country's industrial and economic potential.

people and events

Turishcheva's Triumph

Soviet gymnast Lyudmila Turishcheva gave a brilliant account of herself last fall at the Ninth European Women's Gymnastics Championship held in Britain. This champion of the World, Europe and Olympic Games won five gold medals, was first in all four events of the program—the vault, the parallel bars, the beam and the floor exercises. Lyudmila exhibited some fine choreography and remarkable sports technique. The British press called her the great gymnast of our time.

Olga Korbut was second. The participation of the two famous Soviet gymnasts in the European championship made the tournament—the first of its kind in Britain—an outstanding and very popular event.

USA-USSR Earthquake Forecasters

Early in October 1973 a Soviet-American working group for earthquake prediction met in the USSR for two weeks. The delegation of leading American seismologists was headed by Dr. Robert E. Wallace, chief scientist of the U.S. Geological Survey, Office of Earthquake Studies. This was the second joint meeting; the first, held in the USA in April 1973, drew up a general program of cooperation in earthquake prediction. This time the American seismologists came to see the research being done by their Soviet colleagues.

"I was very pleased by the fact that the working group on earthquake prediction of the USA had this opportunity to see what the Soviet seismologists were doing," declared Dr. Wallace. "We made a trip from Moscow to Tashkent and Dushanbe and concluded it with a visit to the Seismological Field Station at Garm (Tajikistan). We were much impressed by the research done in earthquake prediction with the aid of radon gas and other chemical elements, which is being carried out in the Institute of Seismology of the Uzbek Academy of Sciences in Tashkent. At the laboratories of the scientific seismic center in Dushanbe, Tajikistan, we were interested in the different predicting methods. Finally, in Garm the American delegation had an opportunity to study the practical results and trends of seismic research. The work done in Garm largely reflects the high degree of creative inquiry going on at the Otto Shmidt Institute of Physics of the Earth in Moscow."

The Soviet-American working group discussed and adopted a Program of USSR-USA Cooperation in Earthquake Forecasting for 1974-1975. The program calls for joint theoretical and practical work in prognosticating earthquakes, laboratory research in the physics of the Earth, the forecasting of localities of strong tremors and seismic engineering.

From left: Donald Kendall and Vladimir Alkhimov, Cochairmen of the U.S.-USSR Trade and Economic Council; Nikolai Patolichev, USSR Minister of Foreign Trade; and U.S. Secretary of the Treasury George Shultz.

Soviet and American Trade Representatives Meet

A group of Soviet directors of the U.S.-USSR Trade and Economic Council headed by honorary member Nikolai Patolichev, USSR Minister of Foreign Trade, visited the United States from February 20 to March 3. The delegates included Vladimir Alkhimov and Nikolai Osipov, Deputy Ministers of Foreign Trade; Nikolai Inozemtsev, Deputy Chairman of the USSR Planning Committee; Boris Borisov, Chairman of the USSR Chamber of Commerce and Industry; and Vladimir Sushkov, Chief of the Main Administration of the Ministry of Foreign Trade.

They were here at the invitation of U.S. Secretary of the Treasury George Shultz to participate in a Washington, D.C., meeting of the council's board of directors. In addition to working out a charter and budget, the board discussed the council's basic principles and plans for the future.

The USSR delegation met with representatives of the Administration, members of Congress and the press, businessmen and the general public. Their discussions emphasized the further development of trade and economic relations between the USSR and the USA.

New Bread Coming

Professor Andrei Shulyndin of Kharkov (the Ukraine) is the first scientist anywhere to synthesize three bread grains: winter hard wheat, soft wheat and rye. Preliminary research has shown that this new plant is a promising species of triticale, which selectionists of many countries are trying to create. According to many scientists, triticale is the bread of the future.

The first crop of this new species created by Shulyndin and sown in the fields of the Ukrainian Research Institute of Horticulture, Selection and Genetics yielded 5,500 pounds per acre. The new grain has a high protein content (16 to 17 per cent against 14 to 15 per cent in wheat), and greater frost resistance (3 to 3.5 degrees). The grain is also resistant to the diseases specifically associated with the traditional bread grains.

Jewish People's Theater

At a review of People's Theaters of the cities and villages of Khabarovsk Territory (Far East), the Jewish People's Theater of Birobidzhan came in for high praise. For its Yiddish production of *The Witch,* by Avram Goldfaden, the classical Jewish playwright, the company was awarded a Diploma, First Class.

The same honor was given to individual actors who played leading roles—Berta Shilman, Max Epstein, Basya Epstein, Igor Tsipperman—and to music director Semyon Grossman and conductor Georgi Shmatko.

More than 10 years old now, the company features in its repertoire the Jewish classics, notably adaptations of Shalom Aleichem's stories, and plays by Soviet dramatists.

The theater often tours the cities and villages of the Far East. Berta Shilman, director and actress both, graduated from the Moscow Drama School 35 years ago and came to Birobidzhan with a number of other graduates.

Around the Country

SCHOOL EQUIPMENT EXHIBITION

The flags of 18 states were flown not long ago in Sokolniki Park, Moscow, where an international school equipment exhibition was under way. It was the first such exhibition in the Soviet Union. Some 130 industrial associations and firms from Australia, Austria, Great Britain, the Federal Republic of Germany and other countries displayed their products.

BOOK BY STUDENTS

The recent countrywide contest of student work sponsored by the USSR Ministry of Higher and Specialized Secondary Education awarded a First Degree Diploma to students of the Daghestan Teachers Institute (Northern Caucasus). They won the contest for a book on studies dealing with the international education of children.

AZERBAIJAN'S GREENEST CITY

Sumgait is the third largest city in Azerbaijan. Although it is an industrial city with several major plants for synthetic rubber, pipes and aluminum, Sumgait is striking for its abundant gre ery—322 square feet of gar and park area per inhabitant

The planners of this relat new town took climate and w into account. Factories were cated in the western part o city and residential areas in the eastern, with a broad g zone in between. The winds the sea blow the factory f away from the residential area

FACTORY PASS GOOD FOR THEATER

Recently 35 actors of the Moscow Sovremennik Theater visited the huge Volga Auto Plant at Togliatti, where the theater is staging Mikhail Shatrov's *Weather Forecast for Tomorrow*. The theme of the play is the construction of the plant. Each of the actors in the cast found his or her prototype at the plant. No charge for admission to the plant personnel when the play opens; their work pass is sufficient.

VAKHSH CANAL 40 YEARS OLD

Farmers in Tajikistan, a Soviet republic in Central Asia, have a landmark date to celebrate: the Vakhsh Canal was opened 40 years ago. The canal has made it possible to irrigate tens of thousands of acres of barren land in the Vakhsh Valley. The new lands were turned over free of charge to farm cooperatives, which have planted gardens, orchards, vineyards and cotton. Farmers here get the highest yields of fine-fiber cotton in the republic.

BAKHOR MEANS SPRING

A USSR State Prize for 1973 went to a group of artists and the artistic director of the Bakhor Uzbek State Folk Dance Company. *Bakhor* means spring in Uzbek.

A dance symbolizing spring opens each concert of the en-

semble. Almost every one of th 60 women dancers in the com pany has a solo part in one o another of the more than 1 numbers in the group's repertoi It includes Uzbek dances of Fe gana and Bukhara origin, danc of the peoples of the USSR a Arabian and Indian dances.

Mukarram Turgunbayeva, Pe ple's Artist of the USSR, who w formerly a famous Uzbek danc and is now ballet mistress and a tistic director of the compan has staged more than 200 nu bers in her 40-year dance caree

IL-86 ON BLUEPRINTS

A new intercontinental jetliner to be called the IL-86 will carry 350 passengers, nearly twice as many as the well-known IL-62. The fuselage, 20 feet in diameter, will be divided into two tiers. The bottom tier will house the luggage compartment and the top, four passenger salons. The IL-86 will fly the major passenger routes. Its cruising speed will be 590 miles per hour.

GORKY REGION ARTS AND CRAFTS

A show of the traditional arts and crafts of Gorky region has opened in an ancient tower of the Gorky City Kremlin. On display are samples of wood objects carved, polished and painted, pieces of filigree work, metal engravings, clay and bone items, rare laces and gold embroidery.

The sponsors of the exhibition also announced a contest for the best display. The first prize went to Alexander Shvetsov for his tableware set made of birch bark with a stamped design. It includes a big bowl, a ladle, six spoons, cups and tumblers.

INSTRUMENTS FOR HOLOGRAPHY

Soviet scientists have designed a number of instruments and devices based on recent achievements in integrated holography. Holography is a new method of photography without the use of

MEMORIAL PRIZE WINNER

emorial to fellow villagers
ho lost their lives in the
r has been erected in the
at Peski (Voronezh re-
he memorial was the proj-
ne by Vasili Kosyachenko,
l schoolteacher, to meet his
ition requirement at the
ic Arts Department of a
r training institute. It was
ed a first prize at the USSR
ition of memorials to war

TTAGES CARRIED BY HELICOPTER

new type of cottage, in-
ended for lumberjacks liv-
ing in the North, in Siberia and the Far East, is now in production. It has 100 square feet of living space, room for work tables and collapsible beds, and weighs a mere 770 pounds. The cottage, which can be transported by helicopter to any spot in the taiga, takes three hours to assemble.

Comfortable, economical and transportable, the new cottages have won the praise of many taiga expeditionary groups.

FIGHTING THE SANDS

The drift sands of the Kara Kum desert, which covers about 80 per cent of Turkmenia, are a serious threat to gas and oil pipelines and power-line pylons. Now the Desert Institute has worked out effective methods to fix moving sands. The sand directions and movements make it possible to locate construction projects so as to minimize the effect of sand drifts.

SCIENCE HEADQUARTERS

A new building for the Presidium of the USSR Academy of Sciences in Moscow has just been designed. The new headquarters for the country's scientific research will have a total floor area of 538,000 square feet.

ANTIDOTE FOR SNAKEBITE

Until now the only effective antidotes for snakebite have been various antitoxic serums. To save the victim, the doctor had to know exactly what kind of snake had bitten him. A unique antidote for the poison of three species—a polyvalent antitoxic serum—has been evolved by the Tashkent Vaccine and Serum Research Institute.

ST COMET SIGHTED

hty-four years ago American
tronomer Brooks discovered
omet named after him. As-
ners have observed the dis-
comet on 10 occasions when
owed up regularly every
years. In 1966 and 1967,
it was expected to come
view, the comet could not
etected by telescopes. The
usion was that it had van-
This can happen to celestial
s.

ff members at the University
azan checked the observed
and found errors in previous
utations of the comet's posi-
Their calculations, that the
would appear in 1973,
d correct. Recently a letter
ed at the University of Kazan
the United States. American
nomers reported that they
observed the Brooks comet once again. It made its appearance exactly in the region of the galaxy that the Kazan scientists had pinpointed.

SCYTHIAN SCULPTURES

Archeologists at Kharkov University have unearthed a camp near the village of Belsk, Poltava Region. The ancient settlement covers an area of more than 9800 acres.

They believe that the newfound handicraft, trading and cultural center was the city of Helon mentioned by Herodotus in the fifth century B.C.

The dig has turned up 170 sculptures dating back to the Scythian epoch: various implements, knives, chisels, a file, a sickle and arrowheads; round clay credence altars, on which priests burned their sacrifices, and a great many figures of men and animals.

The finds provide a wealth of material for the study of the art, religion and customs of tribes that date back to the Iron Age.

ALL-JANANOV GROUP

Khatira is the signature title of one of the several hundred vocal and instrumental groups in Azerbaijan. This family group got its name from the youngest soloist —13-year-old Khatira, the daughter of Mamed Jananov, a mechanic. All her five sisters—Zemfira, Rakhilya, Tamilla, Gakhira and Elmira—are singers in the group. Jananov's son Aidyn plays several instruments and writes songs. The family council made him the group's artistic director when Aidyn entered the Baku Music School.

NEW DUMP TRUCK

Design engineers in the Byelorussian Auto Plant have worked out the model of a new dump truck with a gas turbine engine, a giant dumper with a loading capacity of 120 tons. The dumper maneuvers well, turns on a small radius and controls easily. The Byelorussian engineers are also designing a 120-ton trailer truck with a self-tipping trailer.

s. Unlike the conventional
ograph, the holographic pic-
is three-dimensional, making
us kinds of research much
er and faster. It's done with
s.

microminiature holographic
ra developed in the Soviet
provides a detailed three-
sional picture of the walls
stomach that is very help-
in diagnosing diseases. The
e's small diameter—one-half
makes it relatively easy to
duce it into the patient's
ach. Photographic and re-
ng cameras can be attached
e device.

holographic meter of the
M type, now being serially
ced, is designed to investi-
fast processes, for example,
ions, two-phased streams of
and wire breakdowns.

lography is used in fault de-
radio engineering and
other fields.

NEW CITY PLANNING METHODS

A new residential area is being built in Tallinn on the shores of the Baltic Sea. Known as Lasnamae, it will be the city's largest district, with a population of 180,000. The architects have incorporated such new elements as dual neighborhoods separated by canals for transport, with underpasses for vehicular traffic and overpasses for pedestrians.

AMERICAN YEARBOOK, 1973

The third issue of *American Yearbook* has been published by the Institute of History of the USSR Academy of Sciences. It carries documents, studies and surveys made by Soviet specialists on American history.

Papers in this issue deal with the colonization of North America, the ideology and policies of the American Federation of Labor after World War I, the Christian-Socialist movement at the beginning of the twentieth century, the pacifist movement in the United States on the eve of the 1907 Hague Conference, and the development of Soviet-American scientific and cultural contacts in the twenties.

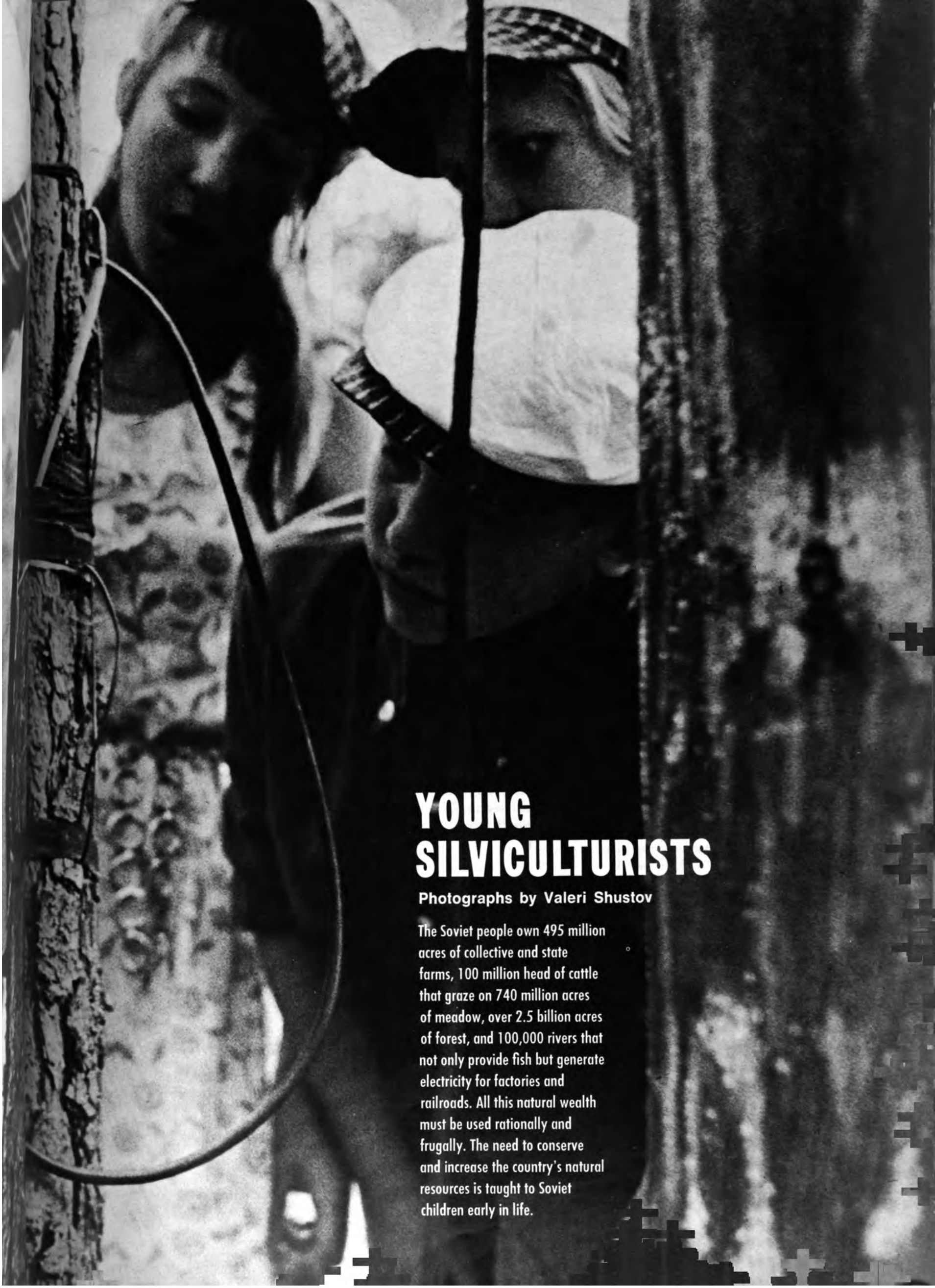
125-MPH TRAIN

The fastest train in the Soviet Union has completed its trial run. Known as the Russian Troika, it will make the 404-mile Moscow-Leningrad run. On many sections of the road it will do as much as 125 miles an hour.

The eight cars, attractively finished and unusually comfortable, seat 544 passengers.

SALTWATER TROUT

Fish breeders of Murmansk Region have launched an experiment to grow trout in seawater. It was observed that this freshwater fish grows twice as fast in uncommon conditions. Rainbow trout was brought to ponds on the Kola River, and in autumn the fry was shipped by helicopter to the Kola Gulf and let out into seawater ponds.



YOUNG SILVICULTURISTS

Photographs by Valeri Shustov

The Soviet people own 495 million acres of collective and state farms, 100 million head of cattle that graze on 740 million acres of meadow, over 2.5 billion acres of forest, and 100,000 rivers that not only provide fish but generate electricity for factories and railroads. All this natural wealth must be used rationally and frugally. The need to conserve and increase the country's natural resources is taught to Soviet children early in life.

Five-minute bird watcher test. Which kind of bird makes its home in which birdhouse?

A leaf-identifying contest at a rally of young silviculturists.

SOVIET YOUNGSTERS get their first lessons in conservation from the Young Communist League, the largest of our youth organizations. Since it was founded, the Komsomol has made concern for the environment its special province. As far back as 1923, when the young Soviet republic began to rebuild the war-ravaged economy, the Komsomol sponsored an All-Russia Forest Day. The appeal on the occasion said: "The forests prevented the defeat of our Revolution by famine. It is the responsibility of each of us to plant trees to replace the ones that have been cut down. Of course, it will be decades before they mature. Such a long-term task can be undertaken only by the younger generation." That was 50 years ago, but the young people still see reforestation as an urgent task.

There are several kinds of children's conservation groups: Green Patrols, Blue Patrols, antierosion and school forest units. The almost two million children in the Green Patrols watch out for forest fires, build bird shelters, collect forage during the summer and fall, and in winter feed elk, deer, wild boars, hares, and other animals.

The 4,650 Blue Patrols make holes in the winter ice so that the fish can breathe, and in spring, after high water, rescue small fish stranded in pits, ditches and gullies.

Antierosion units are formed in areas where ravines make farming difficult. In Kursk Region, Central Russia, alone there are over a thousand such units. The children map places where ravines are beginning to form and grow trees and plants on the slopes.

Over 500,000 boys and girls work on the almost five million acres of school forests. They plant trees, keep a lookout for fires, collect seeds. If the trees are infected by pests they bring in natural enemies, in this case, ants. Children do a great deal of useful experimental and practical work in forest nurseries.

These units are composed mostly of rural children. The town and city equivalents are greenery-planting groups. For instance, pupils of Moscow Boarding School No. 58 transformed a vacant lot into a seven-acre park with more than 400 rare plants received from other Soviet republics and foreign countries.

Periodically, rallies and get-togethers are held at which schoolchildren meet their counterparts from other regions and republics for an exchange of conservation experience. The magazines *Young Naturalist* and *Young Pioneer* and the newspaper *Pionerskaya Pravda,* which has a circulation of 10 million, regularly print articles and reports on the activities of children's units.

Last summer an all-Russia rally of young silviculturists was held in the Karelian Autonomous Republic, Russian Federation.

The progeny of one fly, we know, could fill the whole world in a single year. There are other insects no less prolific. Under normal circumstances nature does not permit such runaway productivity; its complex relationships maintain the necessary balance. But there are times when the mechanism goes awry. Not too long ago, for example, we had hordes of locusts and Eurygaster bugs destroying the greater part of certain crops. And even now the silkworm moth is still denuding many acres of woodland. The statistics tell us that about 20 per cent of the world's agricultural produce is lost to pests like these.

According to the USSR Research Institute of Plant Protection, steps taken in the Soviet Union to fight pests save agricultural products worth some five billion rubles. Mostly biological methods are employed so that no damage is done to the environment. Phytoseilus, a predatory mite, is now in general use. In Lithuania this mite has been responsible for an increase in the vegetable yield of almost three-quarters of a pound per square foot. One of the chneumon flies has also been used for some time to fight pests. All told, more than 500 kinds of insects useful to agriculture have been found in recent years. The number will certainly grow.

The achievements of science in this field will be one of the subjects discussed at the Eighth International Congress on Plant Protection in Moscow sometime in August 1975.

Soviet scientists will report on their breakthrough research involving the pest-devouring insect Trichogramma.

GOOD INSECTS versus BAD ONES

FOR SOME 40 YEARS NOW, scientists in different countries of the world have been very close to a discovery vital to agriculture. The persistent work of Soviet researchers has paid off with the design by Leningrad scientists of special equipment for artificially breeding insects that destroy agricultural pests.

The tiny Tortrix moth (there are some 50 species) makes gardeners tremble. In the course of two weeks a single moth will lay as many as 300 eggs on fruit trees. One week later its larvae appear. Eating into the green fruit, the caterpillar reaches the seeds, devours them too and forthwith crawls up another tree. The caterpillar turns into a pupa, the pupa into a moth and the process starts all over again. In a single summer the Tortrix moth produces two to three generations capable of wiping out 80 per cent of a fruit crop.

A host of measures have been used to battle these insects. They have been showered with insecticides, caught in traps. Oceans of liquid soap and glue, mountains of powder containing sulfur, phosphorous, arsenic and nicotine have deluged and buried them, but nothing has really worked. Sometimes farmers just gave up and abandoned their orchards.

And then scientists remembered the Trichogramma, the most vicious enemy of the Tortrix moth.

The Trichogramma is a small insect that looks like a wasp and is quite as industrious—day and night it searches the leaves of apple, pear and quince trees for the eggs of the Tortrix moth. It pierces the egg cover with its feelers and lays its own eggs inside. In warm weather larvae of the Trichogramma appear in a few hours and feed on the Tortrix moth eggs. The insect produces some 14 generations in one season.

The Trichogramma does not stop with the Tortrix moth; its offspring feed on the eggs of many pests found in wheat, cabbage, peas, corn and cotton.

The problem has been, however, that this useful insect is seldom found in nature. Researchers have therefore been trying to increase its numbers by artificial means.

This idea was first proposed in the mid-1930s. But at that time scientists were not able to breed these insects on a mass scale. All sorts of problems cropped up: how to preserve the Trichogramma larvae in winter, how to breed them in the billions, how to bring them to the fields, vegetable gardens and orchards and, finally, how to make each of these processes cheap enough.

The problem was finally solved by the joint effort of scientists from the USSR Research Institute of Plant Protection in Leningrad and Moscow designers from the research complex Agropribor.

Trichogrammas feed on the eggs of the grain moth, which lives in grain storehouses and elevators. So the first requirement was to design equipment for breeding the moth. Grain infested with these moths is poured into flat perforated boxes and sent to large chambers in which a given temperature and humidity are maintained. In a few days a cloud of moths fly out of the holes in the boxes. A fan then sweeps them into a container.

Inside a darkened chamber in an adjacent building the moths lay eggs on nets from which they can be easily brushed off. Two specially designed machines are at work. One unwinds an endless roll of paper, at the same time making small holes in it; the other picks up the perforated band, smears it with glue and stretches it under the stream of falling eggs.

The paper bands covered with the eggs of the grain moth go to the building where the Trichogrammas are. Now they have to be induced to lay their eggs. Light serves as the stimulator: It creates the illusion of a sunny summer day. The insects proceed to lay their eggs in the eggs of the moth. Now the paper bands with Trichogramma larvae can be sent to their destination.

Factories near Kishinev, Nalchik, Voronezh and Kiev produce 20 million larvae a day. In 1972 Trichogrammas prevented the spread of pests on 15 million acres of land, at a cost one-quarter what pesticides would amount to. And since, unlike dichloro-diphenyl-trichloroethane (DDT) and other chemicals, Trichogrammas do not poison the environment, the advantages of artificial breeding of the larvae are obvious.

There is only one nagging question—whether sooner or later the Trichogramma will destroy all its enemies and die a hungry death or whether it will start eating other, possibly useful, insects.

Still many years' experience indicates that useful insects know how to protect themselves from Trichogrammas—it is only the unwelcome pests to whom they are a proven threat.

Courtesy of the magazine *Znaniye Sila*

This is the story of Vladimir Peller, from the village of Waldheim in the Jewish Autonomous Region, Soviet Far East. He is a Hero of Socialist Labor and a deputy to the USSR Supreme Soviet. He served with distinction throughout the war against fascism, fought in scores of combat missions in the Kursk Bulge, Odessa and Stalingrad, and escaped death by inches. Peller settled in the Far East and is chairman of the big Zavety Ilyicha Collective Farm.

"HELLO, FOLKS!"

By Arnold Pushkar

Photograph by Felix Dunayevsky

THE PICTURE in Vladimir Peller's house shows a curly-haired sergeant major, dashing, tall, broad-shouldered and sharp-eyed. He is standing beside a combat flag. Pinned to his army shirt are three Orders of Glory. That was in 1944, when his division photographer snapped scout Peller in Vitebsk. Lucky Peller, the Sixth Army used to call him.

Now, thickset and wrinkled, he sat at the head of the table, the blue eyes under sandy eyebrows moving from one face to the next. We were not the only company; Peller's two grownup daughters were visiting him. One is secretary of the neighboring Village Soviet Executive Committee, the other a nurse at the local hospital.

"It was tough," he said, "very tough at the Kursk Bulge."

The war began for Peller on August 1, 1941, and ended on May 9, 1945. Fierce defensive fighting in the Baltic republics. Odessa, Stalingrad, the Kursk Bulge. Scores of combat missions to capture prisoners for information. A wound in the leg near Odessa; in the stomach at Stalingrad; in the head at the Kursk Bulge. Once, he was nearly finished off by the Nazis: Caught in an enemy trench, he would have been beaten to death if his buddies hadn't rescued him. Only a heart of steel could have survived. But every time, lucky Peller made it back to his unit with a "Hello, folks!" his blue eyes shining.

There is still the impression of uncommon physical power about him. But when he was younger, people say, his strength was something formidable. They tell all kinds of stories about him, some true, some probably dreamed up: how he stopped a bull by grabbing its horns, how he swam the Amur at flood tide to rescue some cows. Peller himself enjoys telling you how Odessa's stevedores played around with 350-pound bales.

Son of a drayman from the Ukrainian town of Olgopol, Vladimir Peller was handling heavy sacks at 16; then he became a tractor driver and really learned what it meant to work, a word he pronounces with respect. And no wonder. Most of his life, with the exception of his thousand days at the front, he has been a farm worker. The village he lives in now is called Waldheim; it's a Yiddish word meaning home in the woods. There was nothing but a path here and not a living soul in these areas of the Far East when Jewish settlers from the Ukraine first came to this virgin soil, which they drained and cleared.

After his army service in the Far East, Peller decided to stay there. He was 25 when he was elected collective farm chairman. He had matured into a hard-working man. His inquiring mind and good memory were enlisted in the study of field crops, animal husbandry and the use of farm machinery, everything bolstered by practical experience.

People are accustomed to seeing Peller with an abacus—whether he is in his jeep, out in the fields or in his office. He knows how to save and multiply the collective farm's money. No writing pad for him, all the figures are in his head: how many cattle were sold, how much extra was made on weight, what the yield and profit of vegetables and soya were. A farsighted man, Peller took extreme care to select productive varieties, thoroughbred cattle and see to it that hothouses were built. Today the Zavety Ilyicha (Lenin's Bequests) Collective Farm is a large and profitable enterprise.

The farm has first-class livestock barns, schools, clubhouses and shops. Next in sight is a sweeping rebuilding of the village houses.

The whole of the Jewish Autonomous Region, which spreads from the Amur and its tributaries Biro and Bidzhan to the foothills of the picturesque Little Khingan Mountains, saw its development during the years that the Zavety Ilyicha Collective Farm also began to flourish. Some 30 collective and state farms were established on lands that had never been broken by a plow. As for industry, 50 factories turn out caterpillar combine harvesters, transformers, cement, paper, lumber and tin.

Birobidzhan, with its footwear, knitgoods, stocking, garment and textile factories and mills, has grown into a light industry center for the Far East. It took only a single generation, Peller's, to bring all this into being.

"Brick houses are what we need," says Peller. "But the collective farm board is against borrowing money. A farm brickyard is the only answer. In another three or four years we'll have modern houses with all the conveniences; we'll have a new canteen. But who knows whether I'll still be around to see them. I'm beginning to feel my age."

Peller is a Hero of Socialist Labor, a deputy to the USSR Supreme Soviet and a member of the CPSU Central Inspection Committee. His reputation as the man always there when you need him is well deserved.

whether his concern shows itself in little ways or very important ones. He will get an apartment in a collective farm housing project for a village hospital nurse, see that a new settler is given a pedigreed calf rather than an everyday variety, have the kitchen garden plowed for a family that lost its man in the war. On May 9, Victory Day, no matter how busy he is with the sowing, Peller will drop in on the war veterans and stop by the monument to fellow villagers, where honor guards are posted on that day.

"I would love to visit Kursk and Stalingrad. When I last saw Stalingrad it was in ruins, every single house was a battlefield," he said.

After he suffered a coronary, Peller's leg began to swell. He was operated on, and the surgeons had to use a magnet to extract a great many tiny shell fragments, souvenirs of Stalingrad. They had been there all that time.

Peller wanted to resign and take a well-earned rest. When he announced his intention at a general meeting, the farmers rose in protest. They voted to give him two assistants so he could work only four hours a day. The assistants are a help, but Peller is still at it from morning to night.

He's 60 now. And the lands, rugged and fertile, are plowed and settled. Everything is growing, spreading and climbing upward in this countryside those big, powerful hands and generous heart helped to shape.

"When we began, we looked for ways to increase yields and raise earnings. Now a family with two working members makes five hundred rubles a month. And this is clear profit because nothing has to be spent for education and medical service and next to nothing for housing: The state covers everything."

Peller got up, walked around the room.

"We have gas, electricity and television in every house," he continued. "I really couldn't name one thing the countryside still needs today. What would be good, though, is to have our young people know more about those days and nights when a person's life hung by a thread and things were measured by a different yardstick. They must never forget that their fathers paid dearly for the way they live today."

Early in the morning we rode with Peller and a column of trucks to haymakers along the Amur. The rest of the day we rode around the collective farm's holdings, stopped by the farm's sawmill and the glittering houses; we drove by fields that stretched right up to the blue hills; we watched the planting of tender cabbage seedlings.

Stepping out of the jeep now and then, the chairman greeted the farmers with the familiar "Hello, folks!" His quick eye saw at a glance how the work was going, he had a few words with a team leader, joked with a farmer. In everything, friendly but decisive. "No," he said to one man. "I don't have an extra tractor for you. And I won't have one. You'll have to manage. I'm sorry," with a smile to soften the refusal.

In the evening we were guests at Peller's, ate stew and pickled melons, drank wine and tea. The rather severe collective farm chairman was gone. Sitting with us was a relaxed and humorous man, a considerate father, an interesting person to talk to.

NEXT ISSUE

Human beings are still a key element in the production process despite the rapid advance of science and technology. In socialist society the staffs of enterprises, from assembly line workers to chief engineers, see themselves as planners, administrators: This concept in large measure determines the relations between management and labor and influences the attitude toward work. A large steel plant in the Ukraine and its workers are the subject of a group of stories in June.

Last October we reported on a class of tenth graders who were approaching graduation at a Moscow school: their views on life, what they had learned at school and what their plans were. In response to a questionnaire, 30 of 32 teenagers said they would either enroll at a university or take jobs and study in the evening. They also answered questions on war, friendship, love. In the June issue we meet them again to see what careers they have chosen and how their plans are working out.

Alexander Pushkin, poet, novelist and playwright, was the progenitor of the new Russian literature, the founder of Russian realism. In the nineteenth century he was described as the Sun of Russian poetry and in the twentieth as "the source of all sources." For 150 years poets, literary critics, linguists, psychologists, sociologists and even experts in cybernetics have been publishing analyses and appreciations of Pushkin's work. He is the conscience of Russian literature. Two articles commemorate the hundred and seventyfifth anniversary of the poet's birth.

June 1 is International Children's Day. An illustrated article describes the work of the USSR Academy of Medical Sciences' Pediatrics Institute, which emphasizes child development studies and preventive care. In another story our correspondent accompanies a group of American educators on a tour of facilities for blind, deaf and otherwise handicapped youngsters.

Agnia Barto is the best known and loved children's poet in the country. Her monthly radio program "Find This Person" and her recent book on the same theme have helped reunite hundreds of parents and children separated during the war. Our correspondent asked Barto what influenced her to write for youngsters and how she devised her unique method of using children's memories to help trace their families ten or twenty years later.

An illustrated article about an improbable theatrical success written by Ignati Dvoretsky. It's the story of a young engineer who persuades the staff of a traditionally run factory to try new ways of thinking and working.

COMING SOON

Exploring the world ocean

New Stamps On Wildlife

Wedge-tailed gull
Barnacle goose
Black-headed gull
Eider
Crested cormorant
Lynx (Byelovezhskaya Forest)
Deer (Byelovezhskaya Forest)

Wild boar (Byelovezhskaya Forest)
Ussurian tiger (Sikhote-Alin Preserve)
Black stork (Byelovezhskaya Forest)
Red deer (Sikhote-Alin Preserve)

Aurochs (Byelovezhskaya Forest)
Mountain turkey (Caucasian Preserve)
Mountain goat (Caucasian Preserve)
Deer (Voronezh Preserve)
Yellow-necked marten (Sikhote-Alin Preserve)
Aurochs (Caucasian Preserve)
Beaver (Voronezh Preserve)

SOVIET LIFE

STEEL MILL AND ITS WORKERS

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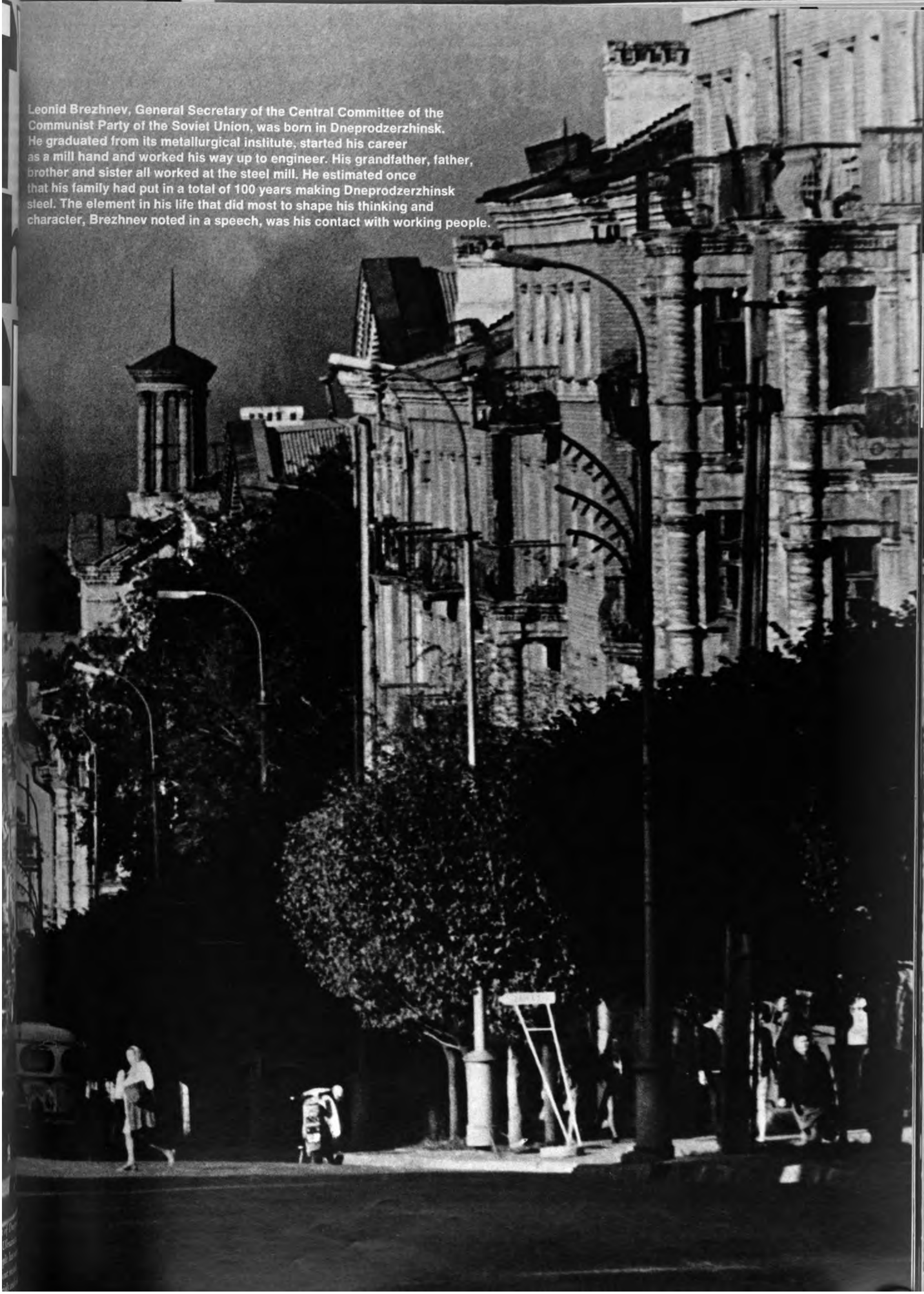
CITY on the DNIEPER

Lenin Avenue, the main street of Dneprodzerzhinsk, runs straight to the steel mill. This Ukrainian city with a quarter-million people has more than 30 big industrial plants that turn out metals, paint, fertilizer, building materials and other goods.



Leonid Brezhnev, General Secretary of the Central Committee of the Communist Party of the Soviet Union, was born in Dneprodzerzhinsk. He graduated from its metallurgical institute, started his career as a mill hand and worked his way up to engineer. His grandfather, father, brother and sister all worked at the steel mill. He estimated once that his family had put in a total of 100 years making Dneprodzerzhinsk steel. The element in his life that did most to shape his thinking and character, Brezhnev noted in a speech, was his contact with working people.

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Front Cover: Soviet children are covered by a comprehensive network of medical care, general and specialized schools and summer camps. ***Photograph by Sergei Lidov.***

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LETTERS TO THE EDITOR

When I go to the library, I always look for the latest issue of SOVIET LIFE. It is one of the best all-around magazines I have seen anywhere. It is written on high-quality paper, has beautiful pictures and interesting articles. SOVIET LIFE helps many United States citizens get a more balanced view of your country. This is very important in developing peaceful relations between the two countries.

Julian Clinkscales
Porterville, California

I would like to express my appreciation for your March 1974 issue about women in the Soviet Union. I have often wondered how women rank in the Soviet society.

I was especially interested in the two-page fold entitled "Women in the USSR—Facts and Figures." It was encouraging to see such high percentages of women working in professional occupations. It is highly commendable when 80 per cent of all able-bodied women in the Soviet Union have a chance to work or study in things of valuable interest.

Beth Drake
Sterling, Virginia

So glad our two nations are working together for World Peace. Your magazine SOVIET LIFE is more than an interesting magazine to me—so good to know more and more about the people of the Soviet Union.

Mayme B. Sloan
Portia, Arizona

I am proud of being able to send a SOVIET LIFE subscription to one of my boys. It is just a pity that our young people, at least most of them, do not read SOVIET LIFE. But there are better days coming. I know it and I know you know it also. I am proud of the wonderful work the Soviet Union is doing for peace all over the world. The time will come when the educated people in our land will change their minds. With much love to you and your good work.

I am yours for Peace all over the world. I wish you could begin his subscription with the October 1973 issue that has on page 11 an article on Peace that is so important. Will you do the best you can.

J. P. Baehr

Yes indeed, your 64 [illegible] pages have indeed given us a more informed judgment of Soviet affairs. These issues have added tremendously to our library collection of Soviet magazines—dating back to 1949 or earlier. We treasure every copy—many of which have been circulated among officers and crew members on Soviet ships during their stay in the port of Seattle. I work as a checker of cargo for the port and the Pacific Maritime Association.

Harold Millett
Seattle, Washington

people and events

All-Khrennikov Concert

The Academic Symphony Orchestra of the USSR presented a concert recently in the Grand Hall of the Moscow Conservatory featuring the works of composer Tikhon Khrennikov. People's Artist of the USSR Yevgeni Svetlanov, a Lenin Prize laureate, conducted. In addition to the Piano Concertos No. 1 and No. 2, in which the composer was soloist, the selections included his Symphony No. 1.

Khrennikov, one of the most versatile of the contemporary composers, has produced operas, operettas, songs, and music for stage and screen shows. His Concerto No. 2 has been nominated for the Lenin Prize, awarded annually to the most outstanding works in science, engineering, literature and the arts. In addition, Khrennikov is a deputy to the USSR Supreme Soviet, First Secretary of the USSR Composers Union and a member of the Soviet Peace Committee.

He began his career in the early thirties after graduating from the Moscow Conservatory in the piano and composer departments, where his teachers were the famous musicians Genrikh Neigauz and Vissarion Shebalin.

Soviet Pianist To Perform in U.S.

Prize-winning Soviet pianist Vladimir Viardo will present a concert this summer at the 1974 Festival-Institute for Young Artists sponsored by the James Dick Foundation for the Performing Arts. The festival is held each year from June 7 to July 7 in the historic old town of Round Top, Texas. Viardo's concert will be part of its International Guest Artist Series. The pianist was first prize winner at the Fourth International Van Cliburn Piano Competition in Moscow and also won the competition's Rachmaninoff Prize and the Performance Award for a commissioned work by Aaron Copland.

Among last year's composers-in-residence at the Round Top event was the outstanding Soviet composer and pianist Arno Babajanian. His work "Six Pictures for Piano" received its U.S. première by Artist-Director James Dick at the 1971 festival.

Since its inception three years ago, the Round Top festival-institute, through the language of music, has been making an increasing contribution to international cooperation and friendship.

Air Link Between Washington and Moscow

A new air route was inaugurated on April 5 between the capitals of the United States and the Soviet Union. Aeroflot's Il-62, the flagship of the USSR civil aviation fleet, now provides service from Washington, D.C., to Moscow via Paris each Friday.

Conceived specifically for long-range, nonstop flights, this largest of turbojet planes carries 12 first class passengers and 126 economy class travelers. Despite its size and range, the sleek, highly dependable aircraft does not require specially prepared runways and operates efficiently into and from airports in capitals and large cities in 64 countries around the world.

The new route, an addition to the one between New York and Moscow, will make travel easier for a number of tourists and businessmen.

Among the officials at the inauguration ceremony on April 5 were U.S. Secretary of Transportation Claude Brinegar and Yuli Vorontsov, Minister-Counselor of the Soviet Embassy.

Armenian Folk Ensemble Visits the United States

A group of folk singers and dancers from the Armenian SSR, accompanied by the famous Armenian poet Vahkan Davtian, toured the USA this spring at the invitation of the Armenian Art Society of America. The group presented concerts in New York, Washington, Los Angeles, San Francisco, Fresno and Chicago.

Among the performers was the well-known tenor Hovanes Badalian, who emigrated from Iran to the Armenian SSR in 1945. Badalian's selections included Persian as well as Armenian songs. Other members of the company were flutists Elia Minasaian and Jivan Gasparian, folk dancer Levon Gasian and singers Melania Garabedian and Melania Abovian. Juliet Svastian was the piano accompanist.

THE PARTY AND THE PEOPLE

By Yevgeni Bugayev Doctor of Science (History)

POLITICAL PARTIES, even when they represented a relatively small group, have invariably claimed to speak for all of society. History has demonstrated, however, that not every party can achieve such a position.

The Communist Party of the Soviet Union, which has traditionally represented the interests of the working class and of all working people, was able to rally to its side the majority of the population of Russia and, later, all the working people in the country. By reorganizing society along socialist lines, it became the party of all the Soviet people.

In its First Program, adopted in 1903, the Leninist party formulated the immediate goal of the working class, ending the reactionary czarist regime, and its ultimate goal, the building of socialist and then communist society. At the same time, the Party Program advanced democratic demands in the interests of all the working people: the establishment of a democratic republic; the confiscation of all land belonging to the landlords, the czar's family and the church and its distribution among the peasants; and the establishment of the right of every nation to self-determination, including the creation of its own national state, education in the native language and freedom of conscience.

These demands were the result of the special historical role of the working class, its special position in society. Obviously, the workers could not achieve liberation from economic and social oppression without abolishing private ownership of the means of production, which leads to the exploitation of man by man. Thus, in freeing themselves, they freed all working people from economic, political and social oppression.

None of Russia's other political parties, even those which claimed to represent the workers and peasants (the Mensheviks,[1] the Socialist-Revolutionaries,[2] and so on), had a clear program which took into consideration to some degree the interests of the working people.

Nevertheless, the people did not immediately recognize the Leninist party as their leader. This required time. A comparison of the political declarations and actual practice of the different parties helped the working people distinguish between the genuine champions of their interests and the political demagogues.

On the eve of the first Russian revolution of 1905-1907, the working people of Petrograd, driven to desperation by their wretched living conditions, made their way to the czar's palace to petition him for help. The Communists had warned them against such a demonstration, pointing out that the czarist government represented the landed gentry and capitalists—the oppressors of the people—and would defend the interests of its supporters. But the peasants and artisans and many of the workers did not heed this warning. At the czar's orders, his troops opened fire, and many demonstrators were killed.

In February 1917 the second Russian revolution overthrew the czarist autocracy. Supported by the Mensheviks and the Socialist-Revolutionaries, the bourgeois Provisional Government—subsequently headed by the Socialist-Revolutionary Alexander Kerensky—came to power. The Mensheviks were also included in the government. They had a majority in the Soviets of Workers' and Soldiers' Deputies, set up on the initiative of the masses. In a word, they had the support of the people who still believed in their promises.

How did they defend the interests of those whom they represented? The people were tired of the war,[3] which had brought them nothing but suffering. They yearned for peace. The Socialist-Revolutionaries and the Mensheviks, however, called for continuation of the war to "a victorious end." In this they supported the bourgeoisie, which wanted to weaken Germany, recarve the spheres of influence and gain markets for the profitable investment of capital. The Communists demanded the immediate conclusion of a democratic peace without annexations or reparations.

The workers wanted bread, better wages and working conditions and an eight-hour day. The Menshevik and Socialist-Revolutionary ministers called upon them to make sacrifices "for the sake of the homeland" while the bourgeoisie was deriving immense profits from the sale of military supplies and equipment. Only the Communists, despite severe repression, upheld the demands of the workers.

The peasants wanted land. The Socialist-Revolutionaries, who called themselves a peasant party, forgot on coming to power that they had once proposed equal distribution of the land among the peasants with compensation to the owners. Their ministers sent troops to pacify the peasants who were attempting to divide the landed estates. Only the Communists stood firmly and consistently for immediate distribution of the land to the peasants, without any compensation, and for the abolition of all large estates.

The many nations and nationalities of the country that had been oppressed by czarism were aspiring to equality and self-determination. Finland, for instance, demanded independence. A number of other nationalities chose national autonomy within a single state. But Kerensky and his government continued to pursue the czarist policy of national oppression of the non-Russian nationalities. The Communists, on the other hand, defended the principle of equality of all the nations of Russia and insisted upon a free union in which the working people of all nationalities would cooperate.

That explains why between February and October 1917 the working people of Russia, judging the political parties of the country by their actions, were attracted more and more to the Communist Party.

It is significant that soon after the February Revolution the Socialist-Revolutionaries and the Mensheviks lost their majority in the Soviets, the organs of people's government. By September the situation had changed sharply and Communists, Leninists, were elected in their place.

In March 1917 the Leninist party, with a membership of 24,000, emerged from underground; by October it had 350,000 members. The influence of the Menshevik, Socialist-Revolutionary, Anarchist and other petty-bourgeois parties was disappearing, splits were taking place within them, they were losing the backing of the masses. (In February, for example, the Menshevik newspaper had a circulation of 100,000 copies; by September the figure had dropped to between 10,000 and 15,000.) The supporters of these parties left them; many went over to the side of the Communists.

By the eve of the Great October Socialist Revolution, the Leninist party of the working class represented the majority of the people and expressed Russia's national interests. Its policy was supported by the masses, and the Socialist Revolution triumphed with relative ease. It should be recalled that during the peaceful demonstration of workers petitioning the czar on January 9, 1905, some 4,600 people were killed or wounded according to very incomplete data. During the bourgeois-democratic revolution in February 1917 in Petrograd 1,382 people were killed or wounded. During the Socialist Revolution in October 1917 six people were killed and 50 wounded in Petrograd.

The victory of the Socialist Revolution paved the way for a new historical era in which society was reorganized along socialist lines. During this period the party of the working class had not yet become the party of the entire people. Classes hostile to socialism, to the power of the workers and peasants, still remained; the foundations of the old system had not yet been fully removed; broad groups of small owners had not gone over completely to the side of the proletariat (for instance, in 1928, 4.6 per cent of the population still belonged to the exploiter classes and 74.9 per cent consisted of individual farmers); and the proletariat had not yet freed itself of the remnants of bourgeois psychology and morality. During this period the working class did not represent a socially homogeneous group. Rather, it was being replenished with people of nonproletarian origin and included, in addition to fighters tempered in the Revolution, the workers aristocracy on which the bourgeoisie had depended.

Throughout these years the party pursued a policy which convinced all the working people, through their own experience, that only socialism could satisfy their needs and demands. It showed the people that their interests coincided with the aims of the working class and that they could depend on its party—the Communists.

In 1919 the Russian Communist Party (Bolsheviks), having become the ruling party, adopted a new program that advanced the building of socialism as its immediate goal. In effect this meant:

—freeing all strata of the working people from exploitation by abolishing the property of the big capitalists and landlords;

—creating an economy that would ensure rapid growth of the people's well-being, freeing them from the scourges of unemployment, poverty and insecurity;

—establishing conditions in which millions of small owners and independent tradesmen would be freed from the fear of ruin, loss of earnings, and poverty in old age;

—ensuring the economic and cultural development of all nations and nationalities, the abolition of their former backwardness, and the inclusion of all citizens in the management of society;

—implementing a foreign policy that would strengthen peace and cooperation among nations and prevent the scourge of war.

The implementation of these practical measures met the needs of the entire people as well as its various strata and groups.

It made the Communist Party the party of the people, who turned to it because they recognized that it defended their interests. Having created a general platform, the working class earned the support of all the working people in the country—the peasants, artisans, intellectuals, small traders. But the peasantry and other sections of the working people, even after entering the road to

---

[1] Mensheviks—the opportunist wing of the Russian Social-Democratic Labor Party which subsequently went over to the side of the bourgeoisie. It emerged at the Second Congress of the RSDLP (1903) during the elections to the central organs of the party. Lenin's supporters received the majority vote and became known as the Bolsheviks, while the minority was called the Mensheviks.

[2] The Socialist-Revolutionaries represented the petty bourgeoisie of the towns and villages. While demanding democratic changes, they proposed individual terror as the chief means of struggle against the autocracy.

[3] The First World War of 1914-1918. In it 10 million people were killed and 20 million wounded.

socialism, retained their specific interests for a long time. The Communists recognized that they might form political parties which reflected these interests and, in fact, encouraged cooperation between parties representing different groups of the working people. In forming the first Soviet Government, they invited the Left Socialist-Revolutionaries to participate. The leaders of that party, however, did not accept until they saw that the mass of the peasantry demanded such participation and might otherwise reject them.

Confirming that a government coalition including the Left Socialist-Revolutionaries was imminent, Vladimir Lenin said on November 18, 1917, at the Extraordinary All-Russia Congress of Soviets of Peasants' Deputies, "The alliance of the peasants and workers was a basis for an agreement between the Left Socialist-Revolutionaries and the Bolsheviks." [4]

This government represented an alliance between the proletariat and the peasantry in order to draw the latter into the building of the new society. However, it did not last for long. The leaders of the Left Socialist-Revolutionaries held 7 of 18 government posts, but as a result of differences in principle, they resigned from the government in the spring of 1918 and in July staged an armed anti-Soviet uprising. By this policy they antagonized the peasantry and lost large-scale support. Finally, after numerous splits, they disappeared from the political arena like the other petty-bourgeois parties, whose leaders had taken the side of the counterrevolutionaries and foreign interventionists during the Civil War and with them had been driven out of the country.

The representatives of these parties who genuinely supported socialism joined the ranks of the Communists. At the Tenth Congress of the Communist Party in 1921, after the Civil War had ended, 24.6 per cent of the delegates had previously belonged to other parties.

Thus, all the parties that had opposed socialism found themselves politically bankrupt and, as the leader of the Left Socialist-Revolutionaries, Maria Spiridonova, wrote, "flickered out in a void." If these parties, which represented one or another group of the working people, had actually pursued the goal of building socialism and drawn their members into the work of construction, they could have counted on the loyal cooperation of the Communists. In fact, this is what happened in a number of socialist countries.

It took the Communist Party of the Soviet Union more than a decade to achieve the main goals of socialist construction, to become a party of all the people. By the mid-1930s the socialist system had been established in the Soviet Union. Article 1 of the new 1936 Constitution noted that the USSR "is a socialist state of workers and peasants."

This meant, actually, that radical changes had taken place in the country's socioeconomic, political and cultural life. Public ownership of the means of production had become the basis of the national economy. Such distressing phenomena as unemployment, poverty and economic crises had disappeared forever. Conditions for a prosperous and cultured life had been created for all.

The class pattern of society had changed: The exploiter classes had disappeared, and their representatives had begun to live by their own labor. The workers, peasants and intellectuals formed a strong alliance of working people welded together by common interests and goals.

The country's different nations and nationalities united on the basis of equality in a single socialist state.

All citizens were granted equal rights to elect representatives to the governing bodies, to participate in the management of society and the state, the right to work, rest and leisure, to education and to maintenance in old age or in case of sickness or disability.

Thus, the principles of socialist democracy were implemented in practice.

The vast amount of work done by the party in creating a socialist society strengthened its leading role. The Constitution, which had been discussed for more than five months by people all over the country, stated that the Communist Party of the Soviet Union "is the vanguard of the working people in their struggle to strengthen and develop the socialist system and is the leading core of all organizations of the working people, both public and state."

The party also proved its loyalty to the ideals of the people during its most severe test, nazi Germany's war against the Soviet Union (1941-1945). The party's organizational and educational activity ensured the victory of the Soviet people over fascism. In this war, the ranks of the party were thinned by one-half.

Now socialism is firmly established in our country. Economically and culturally, the Soviet Union is one of the most highly developed nations in the world. The living standards of the working people have risen considerably, and the Soviet people's confidence in the future is based on what they have already achieved.

All citizens are guaranteed work in accordance with their training and abilities. The economy of the USSR has been freed from crises, slumps and currency fluctuations by scientifically planned development.

All citizens are covered by the social insurance fund, which includes such benefits as paid sick leave and maternity leave, paid vacations and old age pensions. Medical care is free. So is education, and, in addition, students receive state stipends.

During the Eighth Five-Year Plan period (1966-1970) alone, the real per capita income of the population increased by 33 per cent (as against the 30 per cent projected).

In the current five-year plan period (1971-1975) a still greater rise in the standard of living is projected. Rapid progress toward the fulfillment of this goal has been made in the first three years.

Before the Revolution three-fourths of the population over nine years of age was illiterate, and more than 40 nationalities had no written language of their own. Now the country is completing the transition to universal secondary education. Every nation and nationality has an equal opportunity to develop its economy, culture and science, and all the working people participate to some extent in the management of society and the state.

The desire of the working class for a peaceful world is reflected in the consistent policy of the party and the Soviet Government. The Peace Program adopted by the Twenty-fourth CPSU Congress is being steadily implemented. By easing international tensions and promoting world peace, it also creates the conditions for the further progress of Soviet society toward communism.

These advances, marking a high point in the development of the economy and socialist social relations, were inevitably reflected in the character of the party, its social base and its role in society.

The ways of completing communist construction were mapped out by the party in its Third Program, adopted in 1961. It emphasizes that "the party exists for the people, and it is in serving the people that it sees the purpose of its activity."

The development of the party itself is inseparably linked with the consolidation and development of socialist social relations. As a result of this development, the party is now in the vanguard of Soviet society, representing the interests of all the Soviet people.

That it is a party of the entire people is demonstrated by its social composition. Of the 15 million party members, 55.4 per cent are workers and collective farmers; among the new members these groups constitute 69 per cent. The intellectuals in the ranks of the party also represent these two classes, which they were born into.

The party is characterized by profoundly democratic principles. It regularly submits important problems of economic and political development to the people for discussion, explaining its political line and the necessity for a particular action.

The influence of the party in Soviet society, the confirmation of its leading role, is growing. As the problems inherent in building a communist society become more varied and complicated, their interdependence and their influence on general development must be taken into account. Therefore, in approaching communist construction, the party sees the complex of problems as a whole and formulates long-range goals on the basis of Marxist-Leninist theory.

All this increases the party's responsibility for decisions adopted, for the elaboration of its political line. After winning the people's trust in a difficult struggle, it is constantly aware of their support, of the need to justify their faith.

The nature of the party's activities demonstrates that it does not replace administrative or state organizations, but implements its line through the Communists working in these organizations. When assured of the support of the masses, it organizes them for the achievement of specific goals and the implementation of a scientifically elaborated policy.

While it represents all strata of society, the Communist Party of the Soviet Union has remained the party of the working class. It expresses the communist ideals shared by all the Soviet people, who have been welded by their ideology and their socioeconomic system into a new historical community of people. At the same time, the working class, as the source of the most advanced ideas, retains its position of leadership, and its party assumes the role of the leader of the whole society. "A party armed with Marxist-Leninist theory, expressing the will of the working class and the working people, is a decisive force in the struggle for socialism and communism," said General Secretary Brezhnev. "It is at the same time the surest guarantee that in the development of socialist society the interests of all the working people and social strata composing it will be most fully taken into account and harmoniously combined." His conclusion is based on more than half a century of experience in the working class's struggle for liberation and in the building and consolidation of the new social system.

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[4] Vladimir Lenin, *Collected Works*, English edition (Moscow: Progress Publishers, 1964), vol. 26, p. 331.

CITY on the DNIEPER

Dneprodzerzhinsk is growing, and its steel and chemical plants make pollution a very real problem. Mandatory purification installation

s abundant greenery do not meet the problem completely. So a new city is planned on the Dnieper 9 to 12 miles from the factories.

CITY on the DNIEPER

DNEPRODZERZHINSK is a typical Ukrainian city. What makes it look different than other cities with a population of a quarter million is the large number of factory chimneys: They tower like giant tree trunks above the greenery that hides both the residential and industrial districts.

Dneprodzerzhinsk's rhythm is set by its metallurgical and chemical plants. Their production cycle is continuous so that the city is never really asleep. Its more than 30 big plants turn out cast iron, steel, rolled metal, paints, mineral fertilizer, railroad cars, building materials and a variety of other items which go to cities in the Ukraine and elsewhere in the Soviet Union.

The trademarks of Dneprodzerzhinsk factories are highly regarded in the socialist countries as well as in Western Europe, Asia and Africa.

The Dneprodzerzhinsk Hydroelectric Station meets all the city's power needs. The Industrial Institute has a student body of 4,500. Its campus with well-equipped laboratories, workshops, libraries and dormitories is on the scenic shore of the Dnieper.

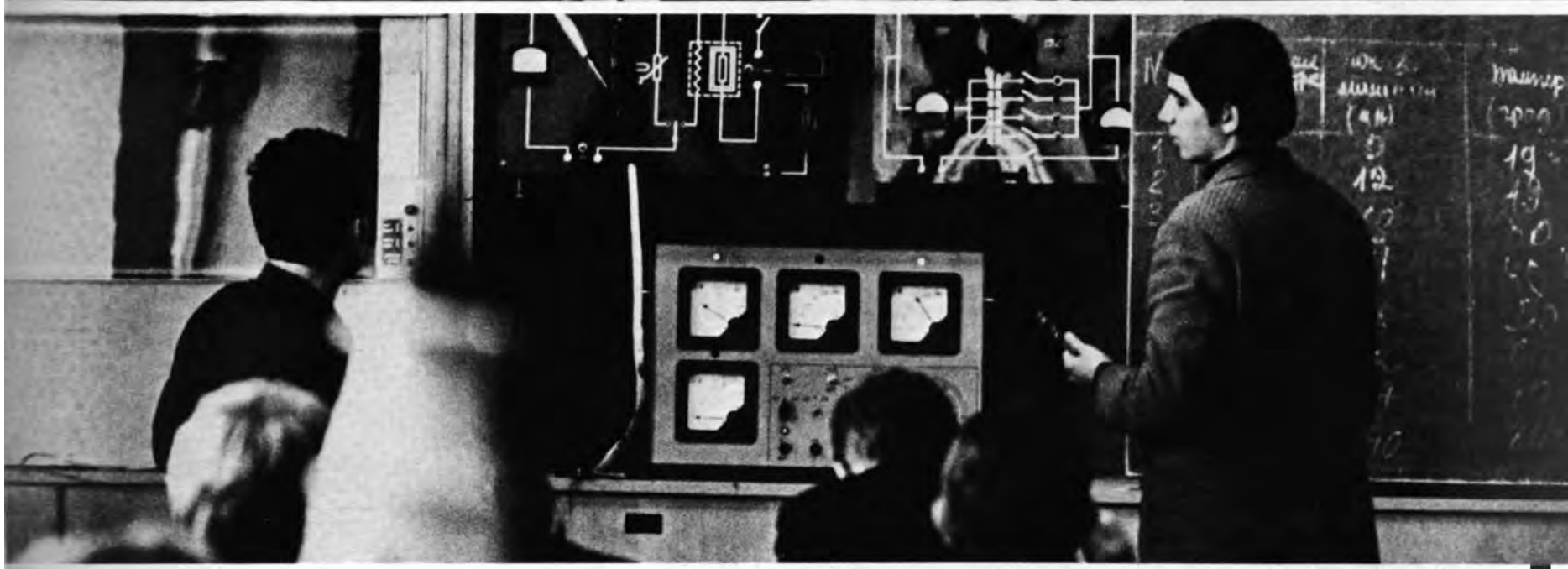
There are some 10,000 students in the city's specialized secondary schools training for careers in metallurgy, chemical technology, industrial transport, commerce and medicine.

More than 40,000 children are enrolled in the general secondary schools. The city has 129 public and specialized libraries.

There are any number of palaces of culture and factory clubs. One of the most attractive is the recently built palace of culture of the chemical plant—an airy building with two auditoriums that seat 1,500 and enough facilities for sports and hobby groups to take care of 1,000 participants.

The city's amateur groups perform to full and enthusiastic houses. The fame of the Dnipro Dance Ensemble of the metallurgical plant's palace of culture, for example, has spread far beyond the city. The company has toured other Soviet cities and foreign countries.

This is a young people's city, evident in the multiplicity wedding processions, the large number of students the general interest in sports.



This housing is planned for the new all-residential city on the Dnieper.

Available to Dneprodzerzhinsk citizens are sports complexes with swimming pools, stadiums and gymnasiums built and financed by the trade unions.

All this is a far cry from the prerevolutionary village of Kamenskoye, around which the city began to grow 50 years ago.

It is still growing. The concentration of metallurgical and chemical plants makes the problem of industrial pollution very immediate. All factories, of course, have purification installations that reduce atmospheric pollutants to a minimum, but the municipal authorities are still not satisfied. The development plan schedules a radical solution: The construction of a completely new city has begun on the left bank of the Dnieper at a considerable distance from the industrial areas.

Dneprodzerzhinsk's chief architect Alexei Krymtsev explained:

"We decided to build a new city on a new site instead of rebuilding the old one."

His point is that since the first blast furnace was blown in at the metallurgical plant, the city has been growing very fast, but the growth has been chaotic, unplanned. Most of the apartment houses and other buildings went up on areas adjacent to the plant. The result was that the huge plant occupied the site best suited for housing, while apartment buildings spread out over the hills and valleys nearby.

In time new factories began crowding the city from all sides. Industrial lines of communication created additional blocks to further construction and better living. Looking for a way out of the situation, some architects recommended that the plant be moved, others, that the city continue growing along the Dnieper, thereby moving even farther away from the plant. But these and other versions had a common flaw: They called for large-scale reconstruction of the present facilities and, furthermore, did not solve the clean air problem. The presence of the factories was felt despite their water and air purification facilities.

Several years ago plans were approved for the construction of an entirely new city. The idea had originated earlier, but only now were the conditions ripe. Immediately after the war all efforts had to be channeled into the rehabilitation of the country's disrupted economy.

The new city will stretch some 9 to 12 miles from Dneprodzerzhinsk along a water reservoir created by the dam of the hydroelectric station.

There are no industrial plants here, and the atmosphere will stay clean.

The left bank of the Dnieper is known for its flood plain, and the ground here is swampy. That is why the entire city will be built on a 10- to 20-foot hydraulic fill platform. Construction costs will be high, but the decisive consideration is that the project will provide the best possible living conditions.

The new city is being planned for a population of about 250,000.

A movie theater-concert hall, city history museum, Young Pioneer palace, exhibition hall and shopping center—all linked by multilevel gardens—will be located in the city center. On the bank of the man-made lake a hotel will go up.

The new city, surrounded by a belt of greenery, will be separated from the industrial area by the river. But an express streetcar line will get the workers to their jobs in 20 minutes.

The old sections of the city and its factories, in particular the metallurgical plant—the original reason for the city's existence—are also being rebuilt.

In a word, this is to be a city for pleasant living, working and relaxing.

CLOUD CUTTERS

By Alexander Lobov

IT WAS in Dneprodzerzhinsk that I saw these strange pigeons. They hover in the sky over the city, each one by itself, fluttering their wings like larks or butterflies. The thing that is unusual about them is the way they fly. They rise into the air as high as 1600 feet on a strictly vertical line and do not deviate from that invisible line by more than six feet.

My interest in this eccentric breed brought me into contact with the city's pigeon fanciers, who get together in a sort of informal club. I learned from them that these were Nikolayev doves, believed to have originated in the city of Nikolayev in southern Russia. This is the only breed of its kind in the world.

The Nikolayev pigeons are remarkably strong. They can make seven- to ten-hour flights nonstop. Sometimes they cannot be seen from the ground, the reason they are called "cloud cutters." They don't fly in flocks like other pigeons but are complete individualists. They rise in the air alone, stay up at different heights and alight separately.

Ukrainian pigeon fanciers release adult doves at twilight. The birds set off into the darkening sky and return to the loft at dawn, with the rising sun. Unfortunately the Nikolayev pigeon orientates poorly and is unstable in horizontal flight. If the wind carries it off high up, it generally cannot find its loft and is likely to perish. So that these pigeons are let out only in calm weather.

It is fascinating to watch them in flight. Their color, a speckled red, and their white, broad tails give them the look of bright butterflies. That impression is strengthened by the fact that you don't hear the sound of flapping wings characteristic of other pigeons.

The Dneprodzerzhinsk enthusiasts constitute only a fraction of the huge number of pigeon fanciers in the country. An exhibition organized by the pigeon club of the Moscow City Nature Protection Society drew people from 15 other cities. The 100 or so breeds of pigeons on display included "cloud cutters."

The people at the exhibition were as interesting as the major attraction, the pigeons. Fanciers of a variety of ages and walks of life were absorbed in the talk, some of it even heated: a farmer exchanging notes with a colonel, a professor with a Young Pioneer.

People's Artist of the USSR Sergei Obraztsov, head stage director of the famed puppet theater, whom I met there, told me:

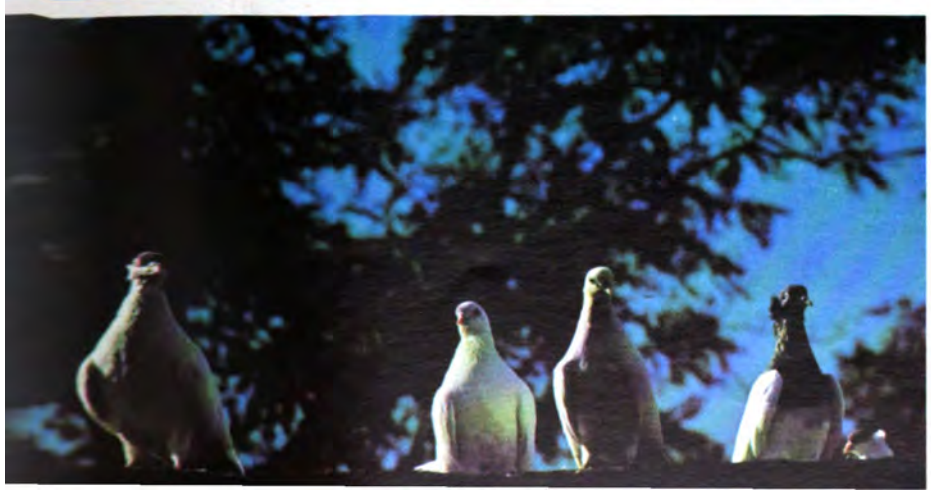
"Some people consider pigeon racing and building lofts an occupation for ne'er-do-wells. Actually, flying pigeons is an ancient pastime. It used to be called 'pigeon hunting.' In old encyclopedias you find maps of Europe crisscrossed by the fanlike routes the birds took. Since time immemorial these messengers have been a help to people during enemy invasions."

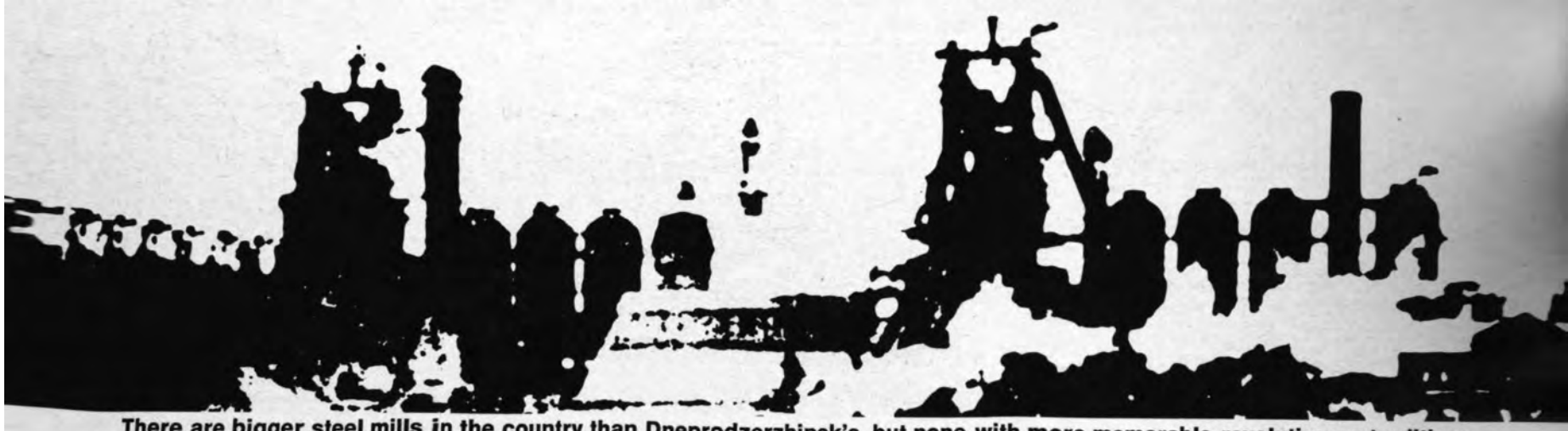
True pigeon fanciers believe that history gives them more than sufficient reason for claiming not only the great antiquity of their pastime but its great usefulness as well. They will tell you that the pigeon post was mentioned as far back as 5,000 years ago and let you know, with a touch of pride, that the bird telegraph delivered dispatches not only in the times of Rameses but also during World War II.

Alexander Timoshenko, assistant director of a metallurgical plant and a pigeon fancier, told me that in bygone days pigeons were used at the old factory in Kamenskoye as indicators of gas content in the air. The bird is very sensitive to the presence of carbon monoxide. Now they are kept at the factory for esthetic reasons. On quiet summer evenings it is restful to watch them in the sky over the city.

Red-speckled Nikolayev pigeons dear to the heart of metalworker Nikolai Nagoga flutter over his loft on fine days. Watching them in flight, he is lost to everything else around him. Asked what this hobby of his costs, he is embarrassed and says defensively (pigeon fanciers don't talk about such things) that this is a general family hobby and that nobody keeps track of the cost. He could have added that in times of yore a gray Moscow tumbler might bring as much as a purebred Orlov steed. But he is too absorbed in watching his cloud cutters hover in the sky like bright flowers.

One look at the almost vertical takeoff of Nikolayev doves and you understand why these Dneprodzerzhinsk steelmen are pigeon fanciers.





There are bigger steel mills in the country than Dneprodzerzhinsk's, but none with more memorable revolutionary traditions.

THE PLANT A

) THE PEOPLE

One of the USSR's pioneering ferrous metallurgy plants

By Leonid Glazovsky

Photographs by Alexander Lobov

THERE IS a monument in Dneprodzerzhinsk: the figure of Prometheus on a high column. In one hand he holds a piece of the chain that bound him to the mountain, in the other an eternally burning torch, and at his feet is a prostrate double-headed eagle, symbol of the czarist autocracy.

The idea for the monument originated with the workers of the Dzerzhinsky Metallurgical Plant. It was designed by Alexei Sokol, an engineer at the plant, and the cast-iron sculpture was made by Sergei Grechnev, a veteran foundryman at the plant.

All this was long ago, in 1923. The Soviet people had just begun building their new socialist way of life. The metallurgical plant in Dneprodzerzhinsk was also coming back to life after the economic dislocation of World War I and the Civil War. The workers decided that Prometheus would most aptly symbolize their struggle for freedom. On the base of the monument were carved the names of those workers of the plant who had given their lives for the Socialist Revolution.

When the Nazis occupied the city during the Second World War, they blew up the monument. The column was destroyed but the figure survived. The Nazis were going to move it to a scrap metal storehouse. But one night a group of partisans crept up, carried the statue to the outskirts of the city and hid it. There the sculptured figure remained until Dneprodzerzhinsk was liberated. It was then rebuilt, and the names of the local heroes who had fought the Hitlerite invaders were added.

The history of the plant is made up not only of the stages in the development of production, but also of the destinies of people that were shaped there, the traditions the times created.

The plant was built by foreign capitalists in 1889. Its site was not accidental: There were rich iron ore deposits not far away, in Krivoi Rog, as well as coal in the Donbas. The district's principal centers were linked by a railroad. The Dnieper carried freight, and the surrounding villages provided cheap manpower. The city around the plant developed later; at first there was just a village called Kamenskoye.

The expectations of the owners were justified: The plant made very high profits due to the merciless exploitation of the workers. Documents in the archives and personal recollections create a dismal picture of the living conditions.

The working day was 12 hours, as much as 16 to 18 on the days the shifts were changed. Hard manual labor was the rule: Iron ingots were broken and loaded into cars by hand, open-hearth furnaces were loaded manually, and white-hot metal was turned over by hand in the rolling mills.

The Penalty List spelled out a rigorous 17-point system of fines. The slightest violation—"entrance or exit through the wrong gates," "disobeying the foreman's orders," and the like—meant deductions from wages that were low enough to begin with. Workers lived either with the local peasants, two and three families in a single room, or in the plant barracks, where one plank bed often served two persons—while one worked, the other slept. Pensioner Nikita Averenko, one of the plant veterans, recalled:

"I came to the plant from the countryside when I was 13, at the turn of the century. I worked from dawn to dusk and earned kopecks, actually that. Children were paid even less than adults—just enough to keep body and soul together. I lived with the family of an old worker who took me in out of kindness.

"I gradually got used to the workingman's surroundings. I would listen to people talk about how they were living, about the need to fight for their rights. And in 1903 a strike, something unheard of, began at the plant. It was triggered by a pay cut in the blast furnace shop. Some 3,000 workers—there were 6,000 altogether—struck. Police and troops were called out to crush the strike. The leaders were arrested and many sentenced to prison.

"I was too young then to take an active part in the struggle, but that strike hastened my maturity. I became active in the workers movement. When another big strike was called in 1916—during World War I—many of the participants, including me, were mobilized by the czarist authorities and sent off to the front."

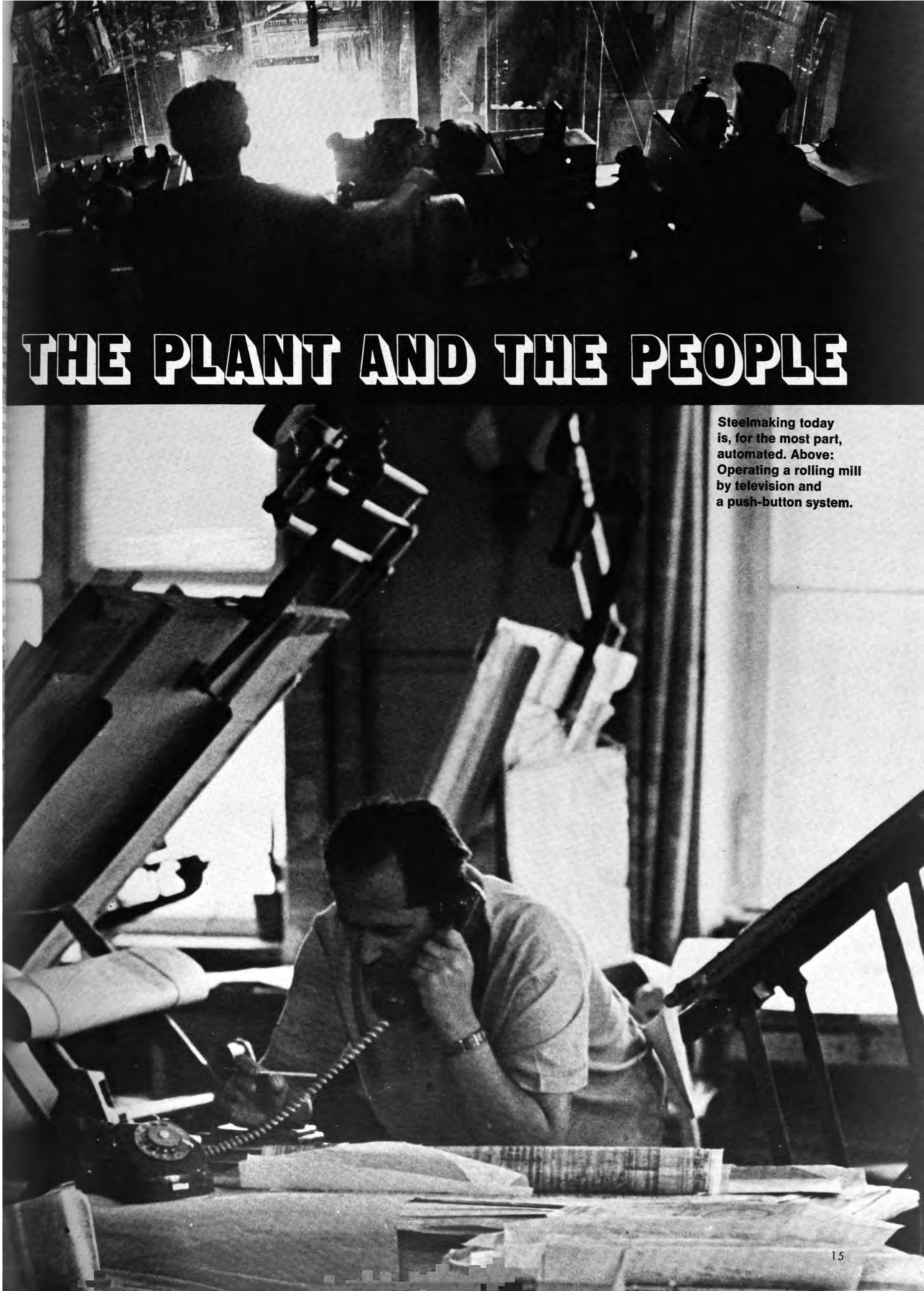
Pensioner Vladimir Korolyov, another veteran worker, recalled: "I started at the rolling mill in 1914. An underground group of Bolsheviks was then operating at the plant. They had ties with other Leninist party organizations. Under their influence the workers kept coming out with political demands—the overthrow of czarist power and the foundation of a democratic republic.

"We young workers willingly and enthusiastically took assignments: secretly passed out revolutionary leaflets, posted them around the city, notified workers of secret meetings."

Continued on page 23

Prometheus unchained stands in the city's main thoroughfare, the double-headed eagle, symbol of the czarist autocracy, prostrate at his feet. The statue was erected in 1923.

THE PLANT AND THE PEOPLE



Steelmaking today is, for the most part, automated. Above: Operating a rolling mill by television and a push-button system.

Grigori Medyanik heads a team of young foundrymen with so high a production record that people come from other steel mills to learn the formula.

LIFE STORY

By Leonid Glazov

GRIGORI MEDYANIK has been with the Dneprodzerzhinsk Metallurgical Plant for almost 30 years and is one of its most highly respected workers. He has used his experience at the open-hearth furnace to train dozens of newcomers. Medyanik met his wife at the plant, and the family now lives in a two-bedroom apartment built with the enterprise's public consumption funds.

He was sitting opposite me, thoughtful and somewhat diffident, as he sought for words to describe the guiding principle of his long, at times difficult, workingman's life.

"Here is how I would put it: A person lives for others. If you think only of yourself, you miss both the joy and the essence of life. The important thing is not to be famous (although that's pleasant too), but to live and work so that other people appreciate you."

Medyanik was born not far from Dneprodzerzhinsk, in the village of Petryakovka. There were seven children in the family, six of them girls. Two sisters and his 70-year-old father still live there, and he often drives out to see them.

When he was a teenager, his native village was occupied by the nazi invaders. His father was at the front, and he remembers having to grow up fast.

Medyanik recalled: "We were cold and hungry. When you're 14, you react to such things strongly, and you don't forget them. We youngsters came to know fear and humiliation. I started to attend the school the invaders had opened, but then dropped out. When the Nazis took over, they appointed a new teacher who beat the children mercilessly. The police, made up of local traitors, was equally brutal."

As soon as the city was liberated, the Soviet state began to restore the disrupted economy. Medyanik entered a vocational school and after graduation went to work as an assistant steelmaker at the metallurgical plant. Though young and inexperienced, he had to put in long hours under difficult wartime conditions. Several times he was tempted to give up the job, try his hand at another trade or even return to his village.

But he began to like the work more and more. He got married and in 1953 became a full-fledged steelmaker.

"All the hardships have receded into the past," he said, "but it's impossible to forget them. In fact, we wouldn't want to—our young people should know the price we paid for their life today."

Grigori's character, his attitude toward work and people, was shaped in a difficult time. He is equally demanding of himself and others, but gentle and affectionate with children, and he sees a good life for the new generation as one of the most important goals.

"Children outgrow their parents quickly nowadays," he said. "Our older daughter Natasha is graduating from secondary school this year.

"As things turned out, I wasn't able to finish either technical secondary school or an institute. After I started at the plant, I did take a two-year course for foremen. I could have continued my education and entered an evening or correspondence institute. People often tell me that it's not too late yet. But I don't really want to. I don't want to leave the team, the young people I can teach all I know, and I really like the steelmaker's trade. You know, people in this country can be proud to be workers. It's we who create the material values of society."

Medyanik was too modest to mention that he is constantly educating himself, that he has acquired a good deal of useful information by visiting other metallurgical plants and by reading technical publications.

He is known not only as a highly skilled steelmaker, but as someone who shares his know-how with others, who has a way with younger people. Since 1957 he has headed a youth team in the open-hearth shop.

Medyanik treats his younger colleagues as equals and, at the same time, expects a good deal of them.

"I try to make them feel that the work they're doing is important," he says. "In that way, they develop a sense of responsibility to their fellow workers, and the shop has an atmosphere of

LIFE STORY

friendship and mutual assistance.

"The composition of the team keeps changing—as people get more experienced, they begin to work independently as steelmakers, or they finish a technical or engineering course and leave the shop. New young workers replace them—our team has turned over completely four times. They're fine young men. Anatoli Nakonechny, for instance, graduated from technical school and is now studying at an evening institute. Yevgeni Burkhan is a little younger than Anatoli; he's studying at an institute, too. My first assistant Alexei Shapoval always fills in for me when I'm away, and I'm never worried. They're all reliable."

Behind his sparing praise you can see the satisfaction of the teacher and older colleague, the pride of a father in his sons. Sensing this, people trust Medyanik, and the younger workers try to learn all they can from him. He frequently visits the secondary schools and attends parties and discussions at the vocational school rooming house.

In the 1972 national steelmakers competition, Medyanik's team took first prize. The team leader himself is one of the Ukraine's best steelmakers, and recently he joined his colleagues from other republics in a smelting demonstration at the Cherepovets Plant. Nineteen seventy-two marked the fiftieth anniversary of the formation of the USSR, and the demonstration symbolized the indissoluble friendship of the peoples united in the Soviet state.

Medyanik looks forward to each steelmakers meeting or contest as a source of added knowledge, a chance to familiarize himself with new techniques that have been tested at other plants: for reducing smelting time, and the like. "It's gratifying to bring back something you can share with the other steelmakers," he said.

Medyanik has a good deal to share, and for years he has been helping workers in the smelting division increase their efficiency. Recently, after a good deal of discussion, his team increased its quota for the current five-year plan period (1971-1975) by more than 3,300 tons. They adopted a number of innovations suggested by colleagues at other plants and worked out some ideas that they shared with others.

The members of Medyanik's team have a wide reputation in the plant for their production achievements and participation in community affairs, and they're proud of it.

The team leader himself serves as an example by contributing his efforts wherever they're needed at work and in the community.

Every job is important, he feels, if it helps improve people's lives.

As a member of the plant People's Control Committee, Medyanik was once confronted with a problem involving the use of working time. The public inspectors had discovered that in one of the shops the workers were leaving 15 to 20 minutes before their shift ended. The reason, it turned out, was that the showers were out of order, and it took people 15 to 20 minutes to get to another shop with operating showers. Management had been delaying repairs, despite the trade union committee's demands. So the workers chose this way to apply pressure.

As a result of Medyanik's efforts, the shop management got a good dressing-down from the plant administration and the Communist Party committee, and the showers were quickly repaired.

Medyanik has twice been decorated with the Order of Lenin, the country's highest award. The plant's Communists have repeatedly elected him to leading party bodies, and he is a frequent delegate to the party congresses.

"I could retire on pension now," he said. "But when I think what it would mean to leave the plant and my friends here, I just can't make up my mind to do it. Of course, as a retiree I wouldn't be completely divorced from plant affairs, but it would be different. Like everyone else, I get a lot of satisfaction from my work, from the constant challenge, the feeling of shared effort in the shop, the trade union committee and the party.

"This feeling that you're useful makes living worthwhile."

PALACE OF CULTURE

Since it was opened in 1933, the steel mill's pala of culture has been a veritable beehive of amateur arts groups, including dance compan and chamber music ensembles. More than a thousand children and grownups, anywhe from six to sixty years old and over, are active in these groups. Coached by profess actors, musicians and dancers, they perform regularly in Dneprodzerzhinsk and other Soviet c The Dnipro dance company is a special favorite. It has played to enthusiastic audiences a home and abroad, in Bulgaria, Czechoslovakia Finland, Holland and Japan. A company of bal players also has a very wide reputation.

E PLANT AND THE PEOPLE

IVAN BENIDZE:

A PROFILE

THAT'S the kind of man Ivan Benidze is—his feelings are written all over him. He emerged from the chief engineer's office with a long face. Benidze's team members knew something had gone wrong. But they also knew he seldom stayed bothered long. He'd soon perk up, be his determined, efficient self again.

Benidze's opinion carries weight, and not only in his shop. The engineers in the design bureau frequently draw on his experience and practical knowledge. Even the plant's chief engineer seeks his advice. Why the gloom after this meeting in the chief engineer's office on a current project? Benidze had found out that because of an error in calculation all the thought he had given to improving the operation of the pneumatic hammer was wasted.

Benidze is an equipment maintenance fitter in the rolling shop. He's been with the plant for 30 years and almost from the beginning has been making improvements in machines and equipment. He's been doing manual work all his life, a good enough reason to spend his skill and talent eliminating such work.

His first invention had to do with stencils to mark finished goods. That was long ago. Now he'll show you a marking machine—one of his most recent creations. The machine does the job of an entire team. In between these two he submitted over 200 rationalization proposals. Applied on the job, they have saved the plant thousands of rubles.

Efficiency promotion was never just a hobby with Benidze. To improve or, as he puts it, "get maximum performance" from outdated or poorly functioning machinery is almost a compulsion with him. So that if any machine or device in the shop is operating below potential, you can be sure Benidze has made a note of it. His inventing is a creative process in which theory and practice combine to make up for his lack of technical education. He will frequently work out certain parts and even whole units in his mind, storing them away for future use: "This change would help here, or here." And when the concept finally matures, his improvement is so basic that you wonder how the machine could ever have been different.

You often hear people in the shop saying, "Benidze is a born fitter," and he is. When a machine is being made, it's impossible to foresee everything—certain defects will emerge only in operation. A good fitter, to Benidze's mind, is one who can not only quickly and skillfully repair a break, but also foresee the possibility of its happening. When he can do that, then he can find a way of tackling the problem. A taste for perfection, a keen eye for irregularities and the ability to find an alternative are what distinguish the inventive from the ordinary fitter, says Benidze.

A billet shearer on the roller-conveyor once broke. There was no spare on hand, and that meant stopping production and upsetting the schedule. Several possible solutions were examined. Benidze proposed that flame cutters be mounted instead of the broken shearer, and what's more, as though the idea had matured in his mind earlier, he drew up a rough plan for siting the cutters.

"That experience," Benidze recalled, "gave me an idea of how important the ordinary worker can be. I realized I could be useful to the entire plant. No bonus —although I did get a pretty good amount—can matter as much as the respect of the other workers."

Benidze usually submits his ideas for criticism at meetings of the shop rationalizers society. There are a good many inventors like him in the group—about 250. Several experienced engineers are always there to offer advice and help with the calculations. If a suggestion approved at the meeting involves considerable reorganization of production and affects several shops, it is submitted to the plant rationalization and invention bureau, which has the final say. For minor improvements, on a shop scale, the trade union organization does the deciding. The union frequently assigns rationalizers specific projects involving labor safety or production. For instance, they may be asked to find ways of rolling metal to a particular thickness. Say the specifications call for 20 millimeters. The tolerance in this case may not exceed plus or minus one, that is, the thickness of the sheet may vary between 19 and 21 millimeters. The trade union and the shop's rationalizers, like any interested manufacturers, look for ways to economize on metal and increase output.

As a repair and maintenance man, Benidze sees this as part of his and his team's job. It's important, he feels, to make sure that worn-out parts are replaced in time or adjustments made for the proper tolerance. That feeling of responsibility he extends to the entire shop, the entire plant. If he can help out, he will. Here is a case in point.

A young man by the name of Nikolai Moskalenko was working in the same team as Benidze. He was not very good at his job and was frequently criticized. Eventually Moskalenko was given the simplest of assignments because the others had no confidence in him. His performance became even worse. Benidze finally stepped in and offered to help. He knew from personal experience what such an offer could mean.

Benidze was about the same age when he became a prisoner in a nazi concentration camp. Eight times friends helped him escape, risking their own lives. He was caught seven times and brought back. The Nazis beat him, starved him, hunted him with dogs, but he kept trying. In the spring of 1943 he made an eighth attempt, moving east toward the front lines, and finally reached the Dnieper. It was spring by then—there were few ice floes left, and no way to cross the river. For several days he hid in the ravines and woods along the river until he collapsed in a snowdrift on the outskirts of Dneprodzerzhinsk. A Ukrainian woman found him and, with her daughter, nursed him back to health. The daughter eventually became his wife, and the Ukraine his second homeland.

At first he longed for his native Georgia: He missed the mountains and the hot sun. But gradually he learned to love the steppes. . . .

Young Nikolai Moskalenko also responded to kindness and warmth.

The two did a lot of talking. Benidze, of course, taught his young friend everything he knew. "Nikolai has the makings of an excellent fitter," Benidze said with a smile. "I've noticed how much time he spends fussing around the reductors." Benidze was right. Now his ward's photograph hangs on the shop bulletin board with those of other outstanding workers.

Since he works in a "hot" shop, Benidze could have taken early retirement at 55, his present age. But he doesn't look like a pensioner and certainly doesn't feel or act like one. He spends his evenings poring over drawings, and by the familiar expression of determination on his face, you can guess that another invention is under way.

THE PLANT AND THE PEOPLE

A spectacular display of fireworks: pouring liquid steel

THE PLANT AND THE PEOPLE

Continued from page 14

The Struggle Spreads

The revolutionary struggle of the workers spread. The Bolsheviks kept them informed of the fight against the autocracy in other industrial centers. Along with a sense of solidarity with the working people of the whole country, their support of the fighting workers in other cities grew.

February 1917. Czarism had been overthrown. Soviets, the organs of popular power, were being formed all over the country. The workers at the metallurgical plant in Kamenskoye also formed a Soviet in which the Bolsheviks played a leading role. When the Socialist Revolution triumphed in the fall of 1917, and power passed into the hands of the workers and peasants government led by Lenin, the Soviet in Kamenskoye took over as well.

But rather than resign themselves to the victory of Soviet power, the counterrevolutionaries started a bloody civil war. Supported by interventionists from abroad, they tried to overthrow the workers and peasants government. The workers at the metallurgical plant joined the struggle, forming their own Red Guard detachment which fought victoriously against the counter-revolutionary forces. The workers built two armored trains for their detachment: the Soviet Russia and the Soviet Ukraine. Nikita Averenko was a member of this group.

The Civil War lasted for several years. The plant was seized by the White Guards and then by the Kaiser's troops. The Soviet and the local Communist Party organization were forced underground.

One of the Bolshevik leaders in Kamenskoye at the time was a young man named Mikhail Arsenichev. He got a job in the boiler shop as a teenager, and at 16 joined the Bolshevik Party. Arsenichev distributed leaflets to the workers, explained the goals of the struggle and led strikes. After the Revolution he headed the local Communist Party organization. Despite his youth, he had gone through an austere school, living underground and in exile. But the suffering had not broken his spirit.

Like many other revolutionary workers, Mikhail Arsenichev fell in the fighting of the Civil War.

He was caught by the White Guards in 1919 and shot. Now his name is carved on the Prometheus monument together with the other heroes of the struggle for Soviet power. The metallurgical institute in Dneprodzerzhinsk was named after Arsenichev.

Reconstruction

When the Civil War ended in 1920, the young Soviet Republic turned to peacetime construction. The primary task was to rebuild the country's industry. The metallurgical plant in Kamenskoye also had to be rebuilt.

During even the most trying days of the Civil War the plant workers, under the leadership of the Communists, had done what they could to preserve the equipment and machinery which had become the property of the people. Now again they showed their workingman's spirit, their devotion to the cause. As early as 1922 they were able to open the first two rolling mills. True, they were turning out only band steel for hoops and tires, but even that was important for a country emerging from economic chaos. Other small shops also began operating. But by themselves, without government help, they could not hope to rebuild the entire plant.

The young socialist state did not have the funds to help. It had established an order of priority in the reconstruction of ruined factories. In 1925 the plant's party and trade union organizations decided to send a delegation to Moscow to see Felix Dzerzhinsky, who was then Chairman of the Supreme Council of the National Economy.

Moscow's specialists believed it would be impossible to rebuild the Kamenskoye metallurgical plant in the next few years. The delegation of workers insisted it was possible. All they needed was help from Moscow.

Dzerzhinsky listened attentively to both sides and then said: "This is a complex matter. We all realize how important it is for the country to restore its large metallurgical enterprises as soon as possible. But we also know how limited our possibilities are as yet. However, we'll look into the matter and try to set aside some funds to rebuild the plant in the town of Kamenskoye."

The delegation had hardly returned home when news came that money had been allocated for the plant. Construction began immediately, and by April the first blast furnace began operating there.

The years went by, and the plant continued to build its capacity and output. New blast and open-hearth furnaces and high-capacity rolling mills were opened. With the five-year plans, industrialization of the country was proceeding at an accelerated pace, and Kamenskoye was becoming one of the country's major ferrous metallurgy plants.

In 1936 the Soviet Union commemorated the tenth anniversary of the death of revolutionary

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It was in Dneprodzerzhinsk that Leonid Brezhnev, General Secretary of the Central Committee of the Communist Party of the Soviet Union, was born and began his working career. He graduated from the metallurgical institute and got a job as an engineer in the Dzerzhinsky Metallurgical Plant.

"We still think of Leonid Brezhnev as our coworker," said Ivan Protasenya, senior gas purifier operator. "You know, he comes from a worker's family—his father was on the plant staff, too. As an engineer, Leonid Brezhnev was always for technological progress, he was always advising us to study and improve our skills."

Another veteran worker at the plant, Trofim Zemlyanoi, said, "Leonid Brezhnev took a special interest in the young people."

Semyon Smirnov, a former member of the City Soviet, recalled:

"I frequently met Leonid Brezhnev in those days. People liked him for his efficiency, his attention to their needs. His working-class background unquestionably influenced his character: He was always cordial, always ready to listen attentively to other people's ideas. Even in those early years he displayed fine organizational abilities."

Leonid Brezhnev, at a reunion of 18th Army veterans in Moscow. Brezhnev, who began working at the Dzerzhinsky Plant in the 1930s, served in the field throughout World War II, participating in a number of campaigns.

PROFIT: WHERE DOES IT GO?

A socialist enterprise is public property: both its output and its profits belong to the state. Each enterprise operates autonomously within the framework of a single national economic plan. Part of the profit goes toward state income. It is then redistributed and returned to those who have produced it in such forms as free health services, free education or housing construction.

At the same time, a large share of the profits is left at the disposal of the enterprise as a remuneration for efficient production. How this share is used at a typical large enterprise—the Dneprodzerzhinsk metallurgical plant—is described below.

IN 1972, thanks to the introduction of new equipment and improved methods of work, the profits of the Dneprodzerzhinsk metallurgical plant exceeded 40 million rubles. This marked increase in comparison with the previous year has led to an appreciable rise in the workers' standard of living, their real income. How is the growth of profits related to this improvement in people's lives?

Roman Starodubsky, head of the planning and economics department of the plant, explained:

"It's simple: The greater the profits, the more funds there are available to meet the needs of the workers. As a result of the national economic reform, the plant's share of profits has increased by 11 per cent. This means that each worker has a larger stake in the over-all performance of the plant, in the growth of production, because they directly affect his or her earnings.

"The incentive funds are formed from this portion of the profits. There are three: for material incentives; recreational and cultural needs and housing construction; and the expansion of production. While this last fund is used mainly to increase production, promote the innovation movement and improve working conditions, the first two are earmarked specifically for providing better living conditions, recreational facilities and the like. For example, in 1972 nine million rubles were allocated to the plant's incentive funds. One-half of this money went to the material incentives fund and was paid to workers in the form of bonuses. These bonuses are awarded for the fulfillment of plan targets, the display of creative initiative and high labor productivity, as well as for technical proficiency.

"A bonus is also paid for the over-all performance of the plant personnel. It's known as the thirteenth monthly pay check because it's paid to all shop and office workers at the end of the year, when we know we've succeeded in fulfilling the state plan.

"This thirteenth pay check—sometimes as much as 70 per cent of the monthly wage—has an important feature: It is distributed by the plant personnel themselves. They decide, on the basis of each worker's personal contribution, what amount he or she has earned. The trade union's participation in the distribution of this fund is indispensable. Money from the material incentives fund also goes for the individual encouragement of workers, for the fulfillment of exceptional production assignments, for instance.

"Just as important as material incentive is the incentive of making a contribution to the collective that will be honored by a commendation or certificate, or by a title such as Honorary Metallurgist."

"The fund for recreational and cultural needs and housing construction," said Vladimir Gudymenko, chairman of the plant trade union committee, "is actually a collective bonus. About 60 per cent of it goes to housing construction, in addition to what the state allocates for this purpose. The remainder is used for sports competitions and equipment, books for the plant library, and the like. In this way, the plant meets the cultural, recreational and health needs of the workers and their families.

"A portion of the funds goes toward maintaining sanatoriums, vacation hotels and children's facilities, including summer camps. The plant has its own health and vacation facilities on the Black Sea and in the Carpathian Mountains, where workers can stay for a fraction of the actual cost; the plant trade union organization pays the rest. The union also pays one-half or even two-thirds of the cost of accommodations at overnight sanatoriums, facilities for people who need preventive treatment or rest. In 1972 the plant spent more than 50,000 rubles for these purposes.

"Provision for rest and recreation, both during the working year and in vacation periods, is strongly emphasized here. Metallurgical production is still one of the most arduous occupations, so that protection of the workers' health becomes particularly important for the plant's public organizations and for management. The plant maintains more than 30 recreation centers that workers and their families can use on weekends.

"Our sanatorium is just an hour and a half's drive from Dneprodzerzhinsk, in a pine wood. Accommodations there cost only 20 rubles a month; the rest is covered by the union. Near this facility is a preschool sanatorium. The younger children come here twice a year for preventive care under the supervision of doctors and other specialists. Summer camps are provided for the older children.

"The plant palace of culture is a very popular recreation center both for the workers and for their families. It has a music school, drama, song and dance groups, and, for the children, ballet and art studios, young technicians circles and model aircraft clubs. The plant covers all the maintenance expenses and purchases equipment, costumes and musical instruments.

"Profits are also being used to build a new sports complex—the old one isn't big enough anymore. Training by qualified coaches is free.

"Finally, part of the fund for recreational and cultural needs and housing construction is used to maintain greenhouses and a farm. These provide the plant canteens with fresh fruit and vegetables all year round.

"So you can see that the plant's concern for its workers is very broad indeed. And the workers sense this. Their time and energy for study, hobbies and sports seems inexhaustible.

"In 1972, 257 workers' families moved to new apartments. This year another apartment building will be ready for occupancy. Thanks to the annual contributions from profits for housing construction, which supplement the state allocations, we have succeeded in solving the housing problem almost completely. Most of the plant workers now live in modern apartments with all the conveniences.

"And, finally, the fund for production expansion," Gudymenko continued. "A portion of this fund is used to encourage innovators and inventors, but its main purpose is to improve working conditions, carry out safety measures and introduce technical innovations that ease the labor of steelworkers. We call this 'small-scale mechanization.'

"At first glance, you'd think that this doesn't benefit the worker directly. But the money spent on improving production and accelerating technological progress ultimately adds to the plant's profit and thus increases the incentive funds, which benefit everyone."

Health and recreation get as much attention from management as steel production. Mill funds are used to build health and vacation facilities for adults and summer camps for children in suburban Dneprodzerzhinsk and in the country's famous resort areas. Steelworkers and their families are accommodated at a fraction of the actual cost; the trade union covers the rest.

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leader Felix Dzerzhinsky, who had made major contributions to the development of the country's industry, including the restoration of the plant at Kamenskoye. At the workers' request, it was renamed for him. So was the city, which became Dneprodzerzhinsk.

War Again

By the end of the thirties the plant was operating full force. New generations of workers had grown up and mastered the sophisticated production processes. Families were moving into new housing. New secondary, technical and higher schools were being opened in the city. The prospects for a good and fruitful life seemed assured. But history willed otherwise.

In June 1941 nazi Germany's armies invaded the Soviet Union.

The front moved rapidly toward the Dnieper, and a grim necessity emerged: The plant had to be evacuated to the Urals, deep into the country's interior, where it would fill orders for the front.

The equipment and machinery was all dismantled and moved out in seven days. Despite wartime difficulties, the workers and engineers soon had the plant operating in the East, and in record time it was turning out steel for armor and ammunition. The plant workers organized and equipped a division in the Urals, which late in the fall of 1941 took part in the fighting near Moscow.

Those workers who remained in Dneprodzerzhinsk, under the guidance of their underground political organization, did everything possible to hinder the invaders in their efforts to get the plant going. Forced by the threat of fierce repressions to show up at their jobs, the workers risked their lives to wreck machinery and equipment, delay repairs and destroy or hide critical materials.

Recalling that period, Kirill Lyaudis, who was secretary of the underground Town Committee of the Ukrainian Communist Party during the occupation of Dneprodzerzhinsk, said: "The workers, both old and young, resisted stubbornly. The city was in enemy hands for 26 months, but the occupation forces could not start production in a single section of the plant."

Finally Dneprodzerzhinsk was free again. Despite terrific damage, the plant was quickly rebuilt, and 26 days after the Nazis had been driven out of the city, it produced its first steel. By 1948 it had reached its prewar output level.

The Present

Since then the plant has been steadily expanding. Four new blast furnaces have been installed and the number of open-hearth furnaces and rolling mills increased. The plant now produces 35 varieties of steel and 50 types of rolled stock.

Dneprodzerzhinsk is famous for its many shock workers of all generations. Among the most productive is the youth team of rolling mill operators headed by Victor Anyukevich. The team runs a fully automated mill of unique design, producing rolled steel in complex shapes.

Current scientific and technological findings are applied here boldly. New refractory materials, new metal notch testing machines and the latest monitoring apparatus, are all in use.

A novel unit replacement method was introduced here for the first time in Soviet ferrous metallurgy. A new furnace is assembled alongside an operating one. When the assembly is completed, the old furnace is taken away and the new one moved onto its foundation, with production interrupted for only three months. Chrome-magnesia open-hearth furnace roofs were developed in this rolling mill and introduced here for the first time in the country. The authors of this innovation—scientists, engineers and workers—were awarded the State Prize.

The Soviet Union was the first nation in the world to use natural gas in blast furnaces. This innovation was also first introduced at the Dzerzhinsky Metallurgical Plant by Vasili Piltyai's team of blast furnace operators in cooperation with staff members of the Ukrainian Academy of Sciences.

Incentives

Here is what engineer Leonid Chevela, chief of the plant's technical department, told us:

"Our workers and engineers are active in technical improvement. The plant's Rationalizers and Inventors Society has 6,000 members. An example of their efforts is the technical proposals made by Fyodosi Barabu of the rail beam shop, which saved the plant one million rubles. A proposal by Mikhail Ivanin, chief blooming mill operator, to roll two ingots simultaneously also proved very profitable."

"How do you explain the workers' interest in improving production?"

"Many factors contribute, including higher earnings and bonuses. But the main thing is that the workers consider themselves owners of the plant. Management consults with the plant personnel in drawing up annual and five-year production plans. Workers submit their proposals and discuss draft plans at trade union meetings and production conferences. They also participate in management through the Permanent Production Conference. Proposals adopted here are binding on management, just as the collective agreement is. Naturally, all this stimulates worker participation.

The Collective

Nikolai Popik, assistant secretary of the plant Communist Party organization, has an even more detailed explanation for the individual worker's feelings about the collective and the activity it generates.

"Here is the situation. The plant builds housing, sanatoriums, cultural and sports centers and other facilities for its workers. They use these facilities free or pay just a fraction of the actual cost. The better people work, the higher the plant's profits. More profit enables the enterprise to satisfy more of the material and cultural needs of its workers. Everybody realizes this, and that realization knits the staff into a single united body.

"The enterprise provides its workers with more than a steady job, guaranteed wages and the chance to improve their job qualifications, important as these are. The plant comprises a collective, a body, but it is also an environment in which shop and office workers and engineers can prove their worth in political and community activities.

"Many of our workers are members of the Communist Party. The party is the leading political force in our country, and membership imposes responsibilities. Our plant Communist Party organization includes some 4,000

people. They are the most advanced and active workers, 25 and over.

"Young men and women are active members of the Young Communist League. Our plant trade union organization, which includes practically all the workers here, also offers opportunities for community activity.

"The vast majority of our staff, with the exception of those hampered by poor health, large families, and the like, volunteer for political, community and cultural activities to a greater or lesser degree. We think this is a considerable achievement.

"Now, who are our social activists? An example is Ivan Savchenko, who serves as a special correspondent for the plant newspaper. He began contributing because of his unwillingness to put up with injustices he came across in his shop. Since then, his subject matter has expanded —he shares with readers his impressions of books he has read and films and plays he has seen. Savchenko is also chairman of the shop Committee for Labor Disputes. This is a rather involved and troublesome trade union assignment. At times he has to fight with the shop management. But he is a principled person, well informed on labor legislation, and he always works for a fair settlement.

"In a word, the staff is a kind of second family, a much larger and more sophisticated one than the family at home, but also richer in the opportunities, the assistance and support it offers."

In conclusion, Popik told me: "We have long-term plans for social development and technical improvement. The plant will grow and so will its people. We look forward to a bright future."

The plant workers take an active part in management. Over 3,000 engineers and shop and office workers contribute to the efforts of the Permanent Production Conference. The conference hears management reports on the plant's major problems and goals and makes recommendations which management puts into practice.

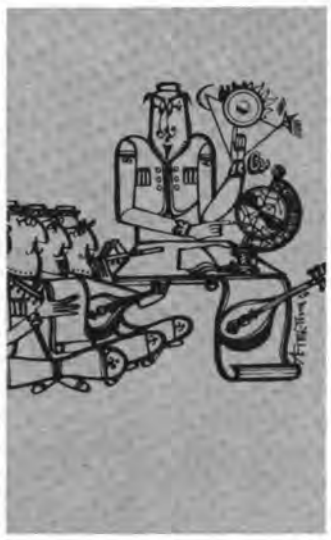
More than 2,000 persons have been elected to People's Control bodies. These volunteer inspection teams make regular checks of plant operation.

In the Regional, City and District Soviets are 100 deputies from the Dzerzhinsky Metallurgical Plant. They are concerned with such matters as city development, housing and community services, construction and trade.

The plant's staff includes people of 37 Soviet nationalities—Ukrainians, Georgians, Jews, Lithuanians, Russians, Uzbeks and others. All of them live and work in harmony. National equality has become a deep-rooted attribute of the Soviet character.

THE PLANT AND THE PEOPLE

Around the Country



ADULT EDUCATION

Mathematics, astronomy, philosophy, rhetoric and music were studied as far back as the twelfth century at the Ghelathi Academy, an ancient scientific and cultural center in Georgia.

A modern people's school has been set up on the site. Leading Georgian scholars lecture at this center for continuing education on philosophy, history, literature, archeology and astronomy.

ELECTRIC VEHICLE

Engineers in Baku, the Azerbaijan Republic, have designed an original electric vehicle: It can do 37 miles an hour and carry three passengers or a load of 1,300 pounds some 135 miles without recharging.

The vehicle performs better than any of its predecessors. Since its engine does not spark, it can be used in oilfields and gasfields.

SOVIET-AMERICAN RECORDING

The French Recording Academy has awarded its first prize to a record of a concert by People's Artist of the USSR Irina Arkhipova. It was made by Melodiya, the Soviet recording firm. Singer Arkhipova was accompanied by American pianist John Wustman.

TROPICS IN MOSCOW

Moscow's Central Botanical Garden will soon feature an aclimatron, a unique structure with an artificial climate. It will resemble a row of truncated pyramids and will house flora from all the climatic zones of our planet. Here the visitor will find tropical jungles with wild impenetrable liana thickets, aquariums with underwater flora, and the vegetation of the savanna. The impression of authenticity will be enhanced by colorful dioramas that continue the artificially created landscapes.

DOLPHIN CENSUS

Scientists have completed a three-month census of dolphins in the Black Sea with the aid of ships and planes. Apparently, since commercial dolphin hunting was banned in 1965, the population has trebled. It now numbers some 800,000. Most of the dolphins inhabit the waters near the Crimean shore. A scientific center is being set up for the study of these interesting animals —it will include a dolphin aquarium and submarine laboratories.

FIGHTING NOISE

A Riga medical team has compiled a map of noise distribution in the Latvian capital. They have also recommended measures to reduce noise pollution, including protective belts of greenery and sound-absorbing structural elements.

SEMIPRECIOUS STONES FROM A VOLCANO

Geologists in the Soviet Far East have come on a new source of decorative stones: volcanic rocks, ranging from 200 pounds to several tons, which contain budlike formations of chalcedony, fluorite and other minerals.

These rocks are the products of volcanic activity in the Maritime Territory some hundred million years ago. When the lava cooled, the quartz it contained formed various semitransparent stones. Admixtures colored them red, violet, cream, green and other shades.

STONE AGE MUSEUM

An original museum of archeological finds is being organized on the ancient Dobronichovka farmstead in Kiev Region. The building is going up around a 12,000-year-old dwelling of the Paleolithic period. The dwelling, which consists of hides draped over mammoth tusks, will be restored.

MOUFLON PRESERVE

A new preserve has been set up in Kazakhstan for flocks of mouflons. Besides protecting this rare animal which is threatened with extinction, there were practical reasons for organizing this specialized preserve. The mouflons are valued by animal breeders who expect to use them to breed new sheep species that will graze round the year in desert areas with rigorous climatic conditions. A considerable part of Kazakhstan is desert.

CARIBBEAN EXPEDITION

An expedition of biologists—part of the international program for the joint investigation of the Caribbean Sea (SICAR)—has obtained information that differs substantially from previous data on this region.

The scientific staff of the *Academician Kurchatov*, which belongs to the Oceanography Institute of the USSR Academy of Sciences, confirmed the theory of geologists that "not so long ago," a mere five to seven million years, the Caribbean was part of the Atlantic rather than the Pacific.

The corroboration of this hypothesis is not only of theoretical but also of practical importance. Among other things, it will affect mineral prospecting.

Working jointly with Soviet biologists in this floating laboratory were scientists from Latin America and Western Europe. Fifteen countries participated in the program.

SOVIET-AMERICAN FILM PRODUCTION

The Leningrad Film Studio and American producer Edward Lewis have signed a contract for the first Soviet-American feature film.

It will be a musical based on Maurice Maeterlinck's *The Blue Bird*. Most of the film will be shot at the Leningrad studio. The screen play was written by Alexei Kapler jointly with American playwright Alfred Hayes. Andrei Petrov of Leningrad and American Alex North will write the music. The ballet corps of the Kirov Theater of Opera and Ballet in Leningrad will perform in the film, as will the Leningrad Symphony Orchestra. It is planned for release in 1975.

YOUTH CAMP ON THE CASPIAN

The Gyandzhlik International Youth Camp on the Caspian coast of the Apsheron Peninsula last year played host to some 5,000 young people from the Soviet Union, the socialist countries, Belgium, France and the United States. It will soon be able to accommodate three times as many vacationers. Under construction are new buildings, a cableway to the sea, indoor and outdoor movie houses and a sports complex with a swimming pool.

SAMOVAR EXHIBITION

A display of samovars, the traditional product of Tula, opened recently in the old Russian city. The 80 samovars include all kinds—copper, iron, silver and nickel-plated; coal and electric. They range in capacity from three ounces to 50 quarts.

Master craftsmen gave their creations a variety of shapes, including balls, cones and cubes.

UPTON SINCLAIR EVENING

An evening to mark the ninety-fifth birth anniversary of American novelist Upton Sinclair was held at the USSR State Library of Foreign Literature.

Sinclair's works are very popular in the USSR. They are issued in enormous editions in the many languages of the Soviet peoples.

SCHOOL CONSTRUCTION

The construction of buildings for three schools of higher education—the Academy of Arts, the Institute of Theatrical Arts and the Conservatory of Music—was started simultaneously in Tbilisi, capital of Georgia.

The architects took into account the character of each of the three educational institutions. The artists will have studios and workshops for painting, graphic arts, sculpture and architecture as well as halls for shows and discussions. Theater students will have auditoriums where annual and diploma-project plays will be staged. The conservatory students will have rooms for piano composition and vocal training. The architects are taking advantage, very successfully, of the landscape: the forest park and adjoining lake, and the natural amphitheater created by the mountains.

FISH PONDS HEATED BY THERMAL STATION

Elektrénai, a young city in Lithuania, is the site of an unusual construction project: a fish farm whose ponds will receive the warm water discharge from a thermal power station. In summer the farm will raise carp, and in winter the handsome mottled or speckled trout, which grows poorly in Lithuania's rivers and lakes because oxygen is scarce under the ice. Special apparatus will maintain the required oxygen content in the ponds.

This complex is planned for an annual yield of 220 tons of fish.

FOSTER PARENT

Alexandra Derevskaya, who lives in the old Ukrainian town of Romna, has brought up 45 girls and boys of various nationalities. Her foster children, who lost their parents in the Second World War, now live and work all over the country. A film titled *Romna Mother*, produced by the Kiev documentary film studio, tells the story of Derevskaya's large family.

DESERT WEALTH

An iodine and bromine deposit has been discovered in the Kara-Kum Desert of Central Asia, which includes a large part of Turkmenia. According to specialists, the deposit has considerable economic importance.

The new discovery corroborated the theory that the Kara-Kum is unusually rich in minerals. Large deposits of natural gas, oil, sulfur, antimony and other valuable raw materials had been found earlier and are now being developed.

YOUNG COSMONAUTS SCHOOL

A school of cosmonautics has been organized for tenth graders at the Young Pioneer palace in Volgograd. The two-year course covers the design of spaceships, space medicine, physical training to adjust to weightlessness, and exercises in space orientation.

The members get practical training during school vacation in the summer headquarters near Volgograd. There they fly in guided training planes and do skydiving.

MINIATURE BOOKS

Engineer Vladimir Razumov of Gorlovka, the Ukraine, collects tiny books. His library recently acquired its thousandth item.

The miniatures include the works of world-famous novelists and poets, as well as dictionaries. One, three-quarters of an inch square, is the smallest book published in the Soviet Union. It contains fragments from Vladimir Mayakovsky's poem "Vladimir Ilyich Lenin."

Another collector's item is a unique manuscript booklet in Old Church Slavonic. Connoisseurs say it was prepared more than three centuries ago.

CHILDREN'S ANTHOLOGY

An unusual anthology titled *Our Picturesque Planet* was published recently in Kharkov. The oldest of the contributing prose writers, poets and artists is 17, the youngest is 3, all prize winners at the annual contest held at the Kharkov Young Pioneer Palace. *Our Picturesque Planet* is populated with fantastic flowers, birds, animals and fairy tale people. It also has landscapes, portraits and scenes from everyday life as children see them.

NEW BLACK SEA PORT

A large port is to be built on the Black Sea, on the Grigoryevsky lagoon between Odessa and Nikolayev. The site is protected from storm winds and has excellent natural conditions for port structures. Local transport is good, and so is the building material situation. Nearby are a railroad and a highway, an electric power station and large reserves of gravel, stone and sand.

The new Black Sea port will be able to handle all types of vessels. It will have highly mechanized loading and unloading facilities. A new town for port personnel and seamen will be built on the shores of the lagoon.

ROCK DRAWINGS

About a hundred groups of rock drawings between 3,000 and 7,000 years old were discovered by archeologists in the Armagan Mountains of the Armenian Republic. They depict animals and plants, religious ceremonies and ritual dances. The level of execution of the drawings is extraordinarily high.

In the opinion of specialists, shepherds used to take their flocks in summer to these mountain sanctuaries, where they worshiped their gods. The drawings are now being studied by archeologists and ethnograpers.

RURAL ARTISTS SHOW

A decorative arts show by rural artists of the Russian Federation, both amateur and professional, was held recently in Moscow. It was preceded by more than 50 district and 70 regional, territorial and republic exhibitions in which more than 5,000 artists participated.

A total of about 1,500 works were shown in the final exhibition in Moscow.

Photographs by Igor Zotin

FAREWELL TO

SCHOOL

THE SCHOOL graduation dance is something one never forgets. Perhaps because it marks the end of a road that had all the signs clearly posted for the young traveler.

Ten years of schooling are over now, final exams have been passed, diplomas handed out amidst applause and flowers, the teachers have given their last admonitions. Ahead is the bumpy road of adulthood, and independence, where some of the directions need interpretation and there are turnings to choose from. The most difficult is the first one: What comes next?

Continued on page 35

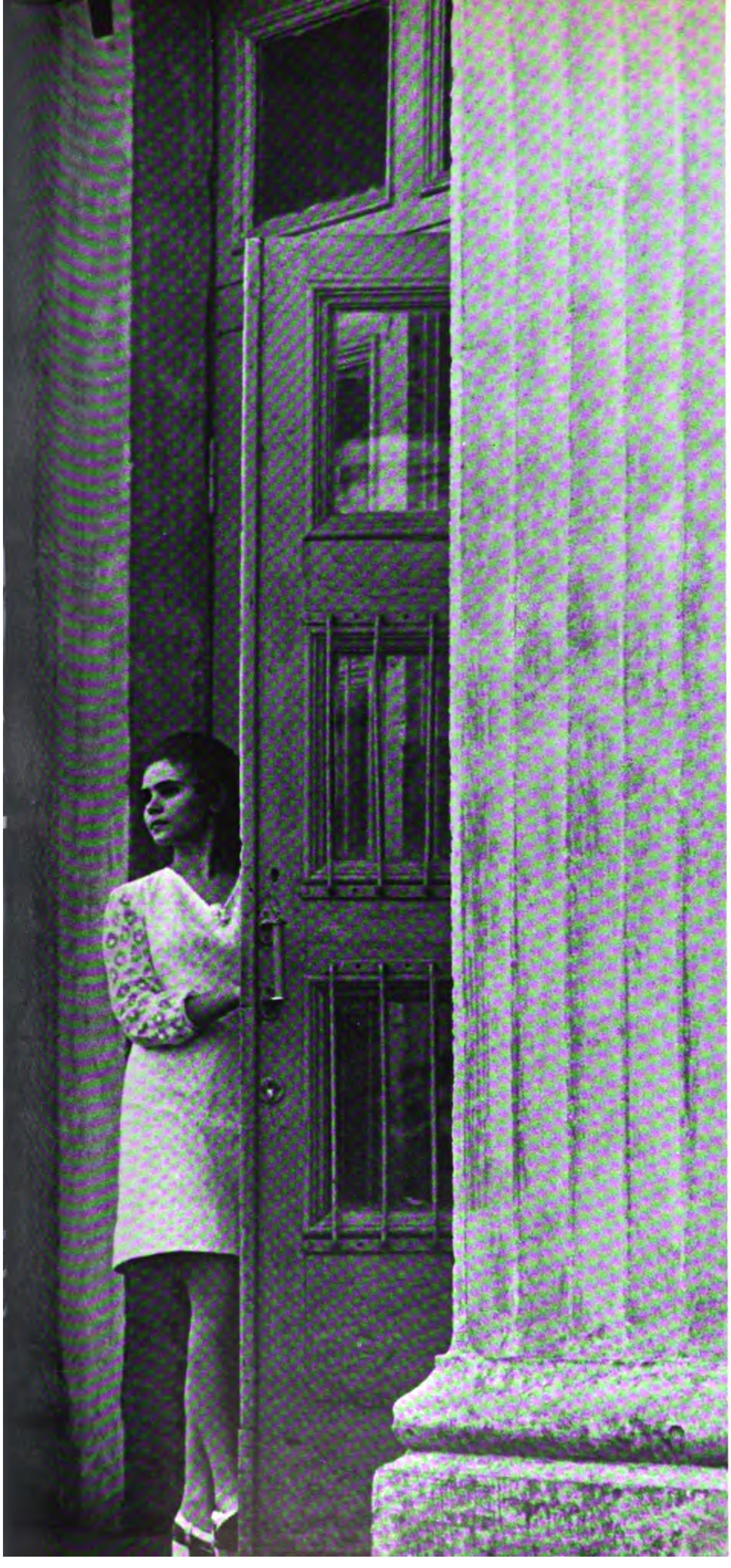
It reads, "Good luck, Class 10A." Top left: The class photo to remember everybody by. Above: Graduates receive their secondary school certificates.

Senior Prom

**A strange mixture of feelings
on this day of days.
Glad to be leaving your childhood,
uncertain of your adulthood.**

What's Next?

Everybody's question: "Are you going to the university?" Above: The mood at the senior prom is pensive. Opposite page: This door has opened into a familiar world for ten years. What's outside?



Continued from page 31

Millions of seniors face that question every year. Many have looked ahead and, while still in high school, begin to prepare for college, perhaps by entering school contests in various subjects, by joining science and other hobby groups at universities and institutes and attending special lectures.

Some have formed groups to go off to youth construction projects in Siberia or the Far East; it is a time for getting their parents used to the idea.

Still others, who plan to stay home, decide to put off for a couple of years applying to an institute. To follow the high school to institute pattern seems too confining, it doesn't allow them to explore life's diversities or to study their complex selves. So they want to work first, learn a trade, acquire some experience, really probe their own inclinations and talents.

There is, finally, that group of young people who will come to a decision only after they graduate. They are carefully studying both Help Wanted ads and higher school entrance examination requirements, seeking the advice of their parents and their peers and sometimes following the example of their close friends. There is nothing irreversible about a wrong choice: Search and change are part of youth. Manpower is needed everywhere, no one has any fear of being left high and dry, without either college or a job.

Anyway, these are all tomorrow's problems. Today is the senior prom.

Diplomas were presented to 74 young people in Moscow's School No. 81, which our photographer visited. There were two graduation classes—10A and 10B. This is an ordinary, not a specialized, school, but in terms of solid preparation, particularly in the exact sciences, it is considered one of the top schools in the capital. At any rate, most past graduates have had no trouble getting into institutes and universities.

Much of the credit for that record, of course, goes to the teachers, and the students and their parents recognize this. The names of some of the faculty are well known to many Muscovites. For one, Natalya Dyomina, the school principal, who is a deputy to the Moscow Soviet and chairman of its Standing Committee for Public Education.

But the teachers insist that the pupils themselves, active young people of an inquiring turn of mind, are largely responsible for the school's reputation. They even took over the complicated—and new—project for vocational guidance: The tenth graders (now already ex-tenth graders) regularly put out a wall newspaper entirely devoted to choices in trades and professions; they set up get-togethers with people in different fields of work and arranged visits to factories, commercial offices, laboratories and the like. The young people dancing and making merry at this ball may not look it, but most of them have given their choice of career very serious consideration.

Right now, though, the school years are uppermost in their minds. And since it's always more pleasant to remember the happy things, what problems and disappointments they had have faded away. And still, there is in the happiness a poignancy, the sadness of parting. It gives this last school dance a very special character.

Larisa Panchenko has a job at the Lenin Library.

Igor Krylov is in the Kostroma military school.

Lyuda Shershukova is a bus terminal contro

GRADUATING CLASS A YEAR LATER

By Stanislav Sergeyev

Some time ago I introduced our readers to this tenth grade class in one of Moscow's 1,202 schools.* At the time these seniors were busy with their final exams. Nearly a year later they brought me up to date.

THEY WERE PREPARING to take eight finals when we first met. For three tense weeks these students crammed geometry theorems and chemical formulas, English verbs and nineteenth century history into their bursting heads. Each won the diploma—a pass into the unknown. Use it wisely, they were told.

Thirty of the graduates (out of 32) knew what they wanted to do: go on to an institute. I asked them why.

First, they said, the opportunities were there for them. All through their senior year announcements were posted on the school bulletin board from various institutes telling them to apply for admission. They saw the same notices in newspapers and heard them on radio and television.

Then, the country needs people with a college background in every field of endeavor. To fill those needs you can't end your education with high school.

A third motivation, as one of the students phrased it, was family obligation. "My parents lived through war and deprivation. They weren't even able to finish grade school. I want to make up for that loss by getting a higher education."

And, finally, it is a question of pride in some cases. "I'm no less a person than anybody else. Everyone's going to an institute. Why shouldn't I?" Perhaps one student is really not as well prepared for an institute as another. Ability varies with the individual. But the opportunity is there. Why not take it?

Institute Applicants

Of the 30 who intended applying to institutes, however, only 24 actually did. What about the other six? Were they frightened off? Not at all. "I wanted to work for a year, to know what it's like to be on my own." "I didn't apply because I'm a little weak in my major. When I get caught up, I'll join the battle!" (That boy's major is drawing. He has definitely decided to become a lithographer.)

But let us return to the others, the majority. Half the class followed through: They applied to the institutes of their choice.

Out of 24 applicants, 10 passed the entrance exams and competed for admission on the basis of the exams and their final school grades—every year there are more applicants for admission to Moscow's 78 higher educational institutions, and there is only so much room.

Five people survived the competition. One got into the Bauman Higher Technical School (the alma mater of Academician Sergei Korolyov, the well-known spaceship designer), two were accepted by a medical institute and the other two entered military engineering schools.

So fourteen failed the entrance exams. One girl, who was applying to a teachers institute, lost her nerve after getting only an average mark on one examination and voluntarily withdrew (although she might have made up for it by her marks in other subjects). A boy withdrew his application from an institute before the exams began and applied to a vocational technical school where high school graduates are admitted without entrance exams. In a year he will learn the trade of radio assembler. The rest simply failed one or another exam. But not all of them gave up. Those who are not accepted as regular full-time institute students can try their luck in the evening divisions. Two were accepted and are now working days and attending classes at night.

What about the exam failures? Why didn't they pass? Was it because of the tough standards of the institute selection committees or was it because the high school had not properly prepared its students for institute admission? I asked the young people themselves and received honest and nearly identical replies: "I have only myself to blame." "Too lazy and not enough ambition." "I didn't take school seriously enough." And here is one disarming answer: "Failing the exams is really a plus. I didn't get

* See SOVIET LIFE No. 10, 1973, p. 20.

Kasorin is a freshman at the n Higher Technical School.

Larisa Balashova is a clerk at the Supreme Court.

Sasha Astakhov is a newspaper apprentice-printer.

where I wanted to go but I think that, it's a good lesson for the future."

They certainly tried to keep up their spirits. It goes without saying that they felt badly, especially those who had passed their exams but couldn't meet the competition. All the same, none of them thought it was a disaster. Of course, they had to go through the unpleasantness of facing their parents and the discomfiture of looking one another in the eye (they still get together; the school ties are strong). But they knew that they can apply to an institute next year.

So it was no tragedy: It was time for another decision, where to go to work.

A Job for Life?

Here again we have to return to the school. Is the curriculum geared to preparing students primarily for college admission? Yes and no. The faculty wants each child to be a whole person, socially useful, educated, honest. There are no orders from above that so many graduates should go to institutes and so many to work. Life itself arranges that. Very few people know instinctively what they want to do; the young especially have to find their way. Some people flounder around a while. But everyone has to do one kind of work or another during the process of self-discovery. The school understands that and builds its curriculum accordingly.

During the work lessons at School No. 524, the girls learned how to use a sewing machine and the young men did mechanical and turning work. They were all taken to factories and state farms in the Moscow area, not for an excursion but for work practice. School No. 524 does not train for any definite trade, as do some Moscow schools with a clearly defined vocational orientation (for instance those which specialize in mathematics). It is broadly oriented in the sense that it guarantees that "our pupils are not completely helpless. With the skills we have given them, they can easily train for any trade."

Once the youngsters went to look for a job they saw for themselves that they were accepted when they showed what they were capable of. Where it was necessary, they were taken on as apprentices.

But how did the 24 graduates find jobs? (In addition to the five winning competitors we must mention two boys who had already reached draft age and are now serving in the armed forces.) Work was sought in a variety of ways: through notices about job openings, parents' suggestions, the recommendation of the school shop teacher, a friend working at a plant. And they all wound up with jobs.

Nine work in factories as electrical fitters, radio assemblers and controllers. Another nine are in research institutes working as laboratory assistants or draftsmen. The girl who thought better about entering the teachers institute is working temporarily (or so I gathered) in one of the largest libraries in the world—the Lenin Library. The future lithographer became a printer on **Izvestia.** One person got a clerical job at the USSR Supreme Court, another is a teacher's assistant in music in a kindergarten, one graduate is a computer operator at the Central Telephone Station. Certainly the 24 represent a wide range of professions.

Is their choice final? Here again there are differences. One of the boys serving in the army had time to finish a driver's course before he was called up. His answer was, "I want to be a driver; I don't intend to switch my line of work." Very decisive by comparison with: "Maybe it's for the best that I wasn't accepted at the institute. I wouldn't have made a good teacher anyway. I'm a lab assistant now but not forever of course! I plan to apply to a radio electronics institute, and I'm taking preparatory courses right now." That girl's attitude is much more serious than it was a year ago.

Eleven of the boys, all, in fact, with the exception of the one who entered the Bauman Higher Technical School, will be called up for two years. They look on military service as a school of experience which will give them confidence when they have to choose careers. One of the boys now in the service writes: "I always thought that in the army I would find dependable, companionable fellows, and I was not mistaken."

The Price of Independence

How did these new workers, schoolchildren yesterday, adjust psychologically to the new ideas and human relationships they found in unfamiliar work collectives? How did their fellow workers receive them? Here are two answers: "I got a warm reception, just as we used to welcome a newcomer to our class in school. There are eight girls in our department, all of them 17 to 20 years old, no more. And they are all my friends now." "I am surrounded by people who are always helpful. I have confidence in them although I've known them only a short while."

The other answers are much the same.

The young people made a place for themselves in the work group. Apparently they think of their jobs as a challenge rather than as a burdensome last resort. Already they have even developed pride and satisfaction in the job. The library assistant says: "When I find the book someone needs and he thanks me, I feel so good I'm ready to bring him the whole bookshelf." The printer: "It gives you a lift to know that you are printing a newspaper that's popular with the public. I bought a copy of **Izvestia** recently and caught myself thinking, 'Part of this is my work.' That's not being conceited, is it?"

These young people feel independent for the first time. Not completely, of course. "I feel like an adult under the watchful eyes of my parents," writes one of the boys. Still, they take their independence seriously. What contributes to that feeling is one prosaic detail—they bring home their own money: the students a stipend, and the workers their wages.

This is how they look at the money: "I'm going to give my whole take-home pay to my mother. She manages the family budget, and I would like to help." "I spent nearly all my first wages on presents for the family." "My money will go into the family fund, except for a small amount I'll keep so I won't have to bother my parents for incidentals."

Yesterday's schoolchildren are by no means used to this strange independence. "My present situation has given me a feeling of weightlessness." This is understandable. The jobholders were suddenly faced with a unique problem: what to do with all that free time—they had no classes to prepare for, no mountains of textbooks to scale. Those with more initiative already have things well in hand. "Now I don't waste my free time, I use it." They have begun to read more and with greater discrimination, they go to the theater more often, take up sports or music. And they still love dancing and having fun with their friends, especially now that their circle of acquaintances has widened.

The last question I put at our reunion was the following: "Aren't you sorry school is over?" I asked this question to focus their attention back to school, if only in the mind's eye. And just as I expected, they could not wait to respond.

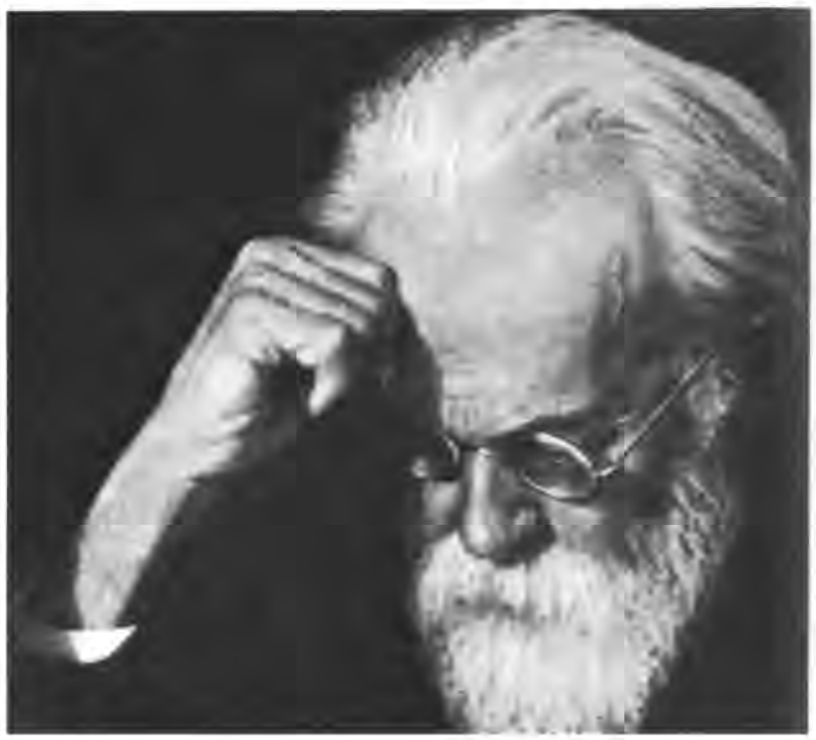
"I felt as if our long holiday would soon be over, I would take my seat again at a school desk and, holding my breath, would watch the teacher searching for another victim."

"I would gladly go to school for another 10 years."

They spoke warmly of their teachers and were unanimous in singing the praises of Nina Zanevskaya, their homeroom and literature teacher.

They did more than reminisce. I learned soon afterward that the whole class went back to school on Teachers Day (a holiday in the Soviet Union). "Each of us," they sang at the senior prom, "has his own road." But they still like to walk the old road together.

VLADIMIR VERNADSKY AND THE MODERN THEORY OF THE BIOSPHERE



The fates of scientific discoveries are as dissimilar as human destinies. Some ideas die soon after they are conceived and are reborn in a new form; others quickly win acceptance; still others meet with misunderstanding and ridicule only to be rediscovered much later as fundamental truths. That is what happened to the concept of the biosphere and the noosphere formulated by the great Russian scientist and seminal thinker Vladimir Vernadsky (1863-1945). Only today, 30 years after the death of its originator and with the world caught up in an ecological crisis, is this concept beginning to come into its own.

By Yulia Shishina

Vernadsky's name is as familiar to scientists as those of Humboldt, Darwin and Galileo. It is associated not only with major discoveries in mineralogy, geology, biology and crystallography—any one of them enough to make him famous—but also with the origin of whole sciences (radiogeology, geochemistry, biogeochemistry), with the rise of scientific schools and, in the USSR, of a multitude of scientific institutions. But unlike other ideas that Vernadsky introduced, the concept of the biosphere, which he considered his most important, was much in advance of his time.

"There is nothing more powerful than unfettered scientific thought."

Vladimir Vernadsky

The problem of man and the biosphere, or man and the environment, is a cardinal one in our day. The term "environment" occurs in practically every periodical, but "biosphere" is being used increasingly in the scientific writings of ecologists. Vernadsky, who is now universally recognized as the founder of the theory of the biosphere, regarded the distinction between man and the environment as dated and erroneous. "I consider philosophers to be mistaken," he wrote, "when they contrast an organism to the environment . . . forgetting that a living organism and living matter live in the biosphere, are inseparable from it and are a function of it, while in turn creating it." Vernadsky also wrote that "the inseparability of a living organism from its environment cannot be questioned by contemporary naturalists."

"Man . . .," he said, "is in a state of unbreakable unity with other living organisms, with that region of our planet in which they exist, the region of life, the biosphere."

The term "biosphere" was first used by the French naturalist Jean Baptiste Lamarck and the Austrian geologist Eduard Suess. It appeared in their writings almost exactly a century ago (1875). However, neither of them used it as meaningfully as Vernadsky subsequently did. What was Vernadsky's theory? Let us turn to his own explanation:

"E. Suess (1831-1914) and the geologists of that time were able to treat the manifestations of life and the face of the Earth as phenomena independent of each other. But today it is clear to us that the face of the Earth is not the result of random phenomena—it corresponds to a sharply defined terrestrial envelope, the biosphere, one of many envelopes with a definite structure characteristic of the earthlike planets, a structure that can conveniently be described as 'organized.' Living organisms are a function of the biosphere, intimately associated with it materially and energetically, and constitute a tremendous geological force that shapes it."

Vernadsky emphasized throughout his writings that the substance

of the biosphere has a specific atomic composition. Most characteristic of the biosphere is the living matter it contains. The total mass of living organisms—or, as scientists say, the biomass of the Earth—was estimated by Vernadsky at approximately 10^{15} tons. Compared with the total mass of the Earth, this is a negligible figure, but it is in this living matter that very active processes of metabolism take place under the influence of cosmic, chiefly solar, energy. Between living and nonliving matter there is also a continuous exchange of materials and energy, which influences the structure of the atmosphere, the hydrosphere and the lithosphere.

Vernadsky thus included in the biosphere part of the lithosphere (about two miles deep), the hydrosphere, living matter and the stratosphere, all united by a common process, the exchange of materials and energy. At the same time he pointed out that the entire cycle of substances in the biosphere is due to the presence of living matter, which he considered a geological force since the Earth's crust is the result of former biospheres.

Vernadsky did not arrive at a scientific generalization of such scope as the theory of the biosphere by chance—he was led to it by his entire background of scientific and personal experience and his extraordinary gifts.

Vladimir Ivanovich Vernadsky was born in St. Petersburg on March 12, 1863. His parents, Ukrainians, gave him a broad education. He earned a degree in physics and mathematics but was also well versed in the humanities. Vernadsky was able, for example, to read 14 languages. Among his teachers were such eminent scientists as Dmitri Mendeleyev and Vasili Dokuchayev, both of whom influenced him markedly. It was Mendeleyev's lectures on the chemical elements on Earth and in the cosmos that kindled Vernadsky's interest in geochemistry. Dokuchayev, by expounding on the effect of living matter on soil formation, gave him the idea for the still nonexistent biogeochemistry.

Vernadsky's scientific interests were wide-ranging. He advanced many fruitful ideas in crystallography and geology, soil science and chemistry, meteoritics and geochemistry, the history of science and the study of natural resources, the organization of scientific research and education. In every field his ideas provided new, unexpected insights; little wonder that he was likened to a one-man academy of sciences. It was in 1915-1916, during World War I, that he tackled the theory he was later to describe as his lifework. By then Vernadsky was 50, a member of the Russian Academy of Sciences with a worldwide reputation, the founder of genetic mineralogy and one of the pioneers of geochemistry. The war, in his view, was a supreme calamity for scientific as well as humanitarian reasons. He was interested more and more in the destiny of the planet as a whole, in its past, present, and future.

One motivating factor was his work in a commission he had founded for the study of Russia's natural productive forces. He headed this commission (with a break) from 1915 to 1929.

"Living matter is the protagonist in the biosphere and cannot be compared with any geological force either in power, or in intensity, or in continuity of action."

Vladimir Vernadsky

Vernadsky's longest manuscript, begun in 1917, was entitled "Living Matter." He was the first to introduce this idea—previously scientists had used "life," with all its many philosophical, religious and literary connotations. The Earth's organic world had always been treated by science as an assemblage of diverse species of animals and plants, whose distinctions formed the bases of numerous "systems of nature." Vernadsky's approach to life was synthetic rather than analytic. He united the "myriads of indivisibles" into a single "living natural body of the planet," which he called "living matter," proposing that it be assessed qualitatively and quantitatively in terms of chemical composition, weight and geochemical energy. The introduction of the term "living matter" in scientific thinking was as significant as the introduction of such fundamental notions as mass, inertia or energy. This made possible a new evaluation of the planetary meaning of life. Life could now be regarded as a functional entity.

The difference between living and nonliving matter seems self-evident. Nevertheless, the twentieth century atomistic approach calls for proof even of the obvious. Vernadsky credited the great Florentine naturalist, physician and poet Francesco Redi with the formulation of the principle that "a living organism can originate only from another living organism." Vernadsky called this the "Redi principle."

Following Redi, two French scientists, first Louis Pasteur and then Pierre Curie, declared that the distinguishing characteristic of life lies in the special state of its space or, as Vernadsky put it, its space-time properties. Vernadsky found these empirical generalizations by naturalists of the past consistent with reality. He saw living matter as a special planetary mechanism consisting of live transformers, distinct from those atomic, ionic and molecular systems that make up the Earth's crust outside the biosphere. These transformers, because of their proximity to outer space, convert the energy of cosmic radiation into effective geochemical energy. The titanic geochemical work of life—"a form of the penetration of the Sun's rays into our planet"—has been going on for millions of years.

"The revolution that has occurred in physics in the twentieth century," Vernadsky wrote in 1951, "confronts scientific thinking with the need to revise basic biological concepts. For the first time, it evidently justifies assigning to the phenomena of life in the cosmos a fitting place in a really scientific conception of the universe."

This unity of living matter, of the biosphere, the planet and the cosmos, this reflection of as yet unknown cosmic laws in the manifestations of life, was basic to Vernadsky's thinking. His work, said one of his disciples, was "characterized by the spirit of cosmic reality." This spirit, as unusual in that time as the heliocentric philosophy of Copernicus had been in the sixteenth century, was not fully appreciated by Vernadsky's contemporaries. Recognition of his ideas came only in the space age. As the eminent American environmentalist Professor Lynton Caldwell said in a tribute to Vernadsky's teachings in the *UNESCO Courier* (January 1973), the notion of the biosphere as a general planetary life-support system arose in the minds of the public as a result of space flights.

"As part of the planetary living matter, we instinctively and unwittingly are vividly aware of the mystery of life, of our existence. I would say that the most profound instance of self-awareness comes when a thinking person endeavors to determine his own place not only on our planet, but in the cosmos."

Vladimir Vernadsky

The theory of living matter served as the foundation on which the theory of the biosphere was erected. Vernadsky's first book on the subject, *Biosphere* (1926)—his best-known work abroad, published in French under the title *La Biosphère*—consisted of two parts: "The Biosphere in the Cosmos" and "The Region of Life." In this book he sketched the basic propositions of his future theory. Living matter and the biosphere were treated as one whole, as an agent disturbing the chemical structure of the planet. They were linked by several mathematical relationships.

Vernadsky began working on the theory of the biosphere intensively in 1935, when he was 70. He was eager to proceed with his plans, conscious that he was working against time.

He set out to complete his book *The Chemical Structure of the Biosphere of the Earth and Its Surroundings,* which he considered his lifework, during World War II, a new historical tragedy of unprecedented scale.

"The book centers on the Earth's biosphere and, naturally, life," says the scientist's friend Professor Boris Lichkov. "The surroundings are treated not within a narrow planetary framework, but far more broadly. Indeed, the scale is staggeringly great. The factual material of the book is undoubtedly tremendous. It is clear that problems of biology are central to it."

This book presents a theory of the biosphere as different from the earlier one as a finished canvas from a rough sketch. For the first time it provides a forceful picture of a new, transforming geological force—human thought and effort.

The book, Vernadsky's last, revealed him as a theoretician of the evolution of living organisms second only to Charles Darwin. Darwin treated the process of evolution in living matter as a phenomenon independent of our planet. Vernadsky, on the other hand, linked the process with the planet on which it takes place. This biogeochemical conception of evolution led him to the conclusion that the changes in species are closely bound up with the entire history of our planet and outer space, that "the evolution of species gradually becomes an evolution of the biosphere."

The processes taking place in living matter differ, in terms of time, from those in inorganic matter. Living organisms are subject to constant transformation, to an evolutionary process. The change in their forms, in their "morphological composition," naturally leads to a change in their chemical composition and geochemical energy. It is an empirical fact that in the course of time the biogeochemical manifestations of living matter in the biosphere become more pronounced,

VERNADSKY

and the influence of living organisms on the environment increases. Indeed, evolution appears to be directed toward this end. Life, according to Vernadsky's conclusion, is therefore capable of building up energy: The energy of life manifestations, far from diminishing, increases.

Vernadsky later came upon similar ideas concerning the direction of the evolutionary process—expressed from different standpoints—in the writings of two American geologists who were contemporaries of Charles Darwin: James Dwight Dana and Joseph Le Conte. They discovered that the process of evolution involves development of the central nervous system and a process of cephalization from the crustaceans to man. The progress in psychic development is irreversible.

This process was reflected in the emergence of Homo sapiens. Vernadsky regarded the human intellect as a new form of biogeochemical energy. He pointed out that modern man's industrial-technological activities were having such an impact on the face of the Earth that they could be considered a "new geological factor."

"The human race," he wrote, "by its billion-year-old forward march with its ever-growing implications, is logically encompassing the entire planet and setting itself apart from other living organisms as an unprecedented geological force.

"What we are, in fact, witnessing," he continued, "is its striking entry into the planet's geological history. Throughout the past few millenniums one species of living matter—civilized humanity—has vastly increased its influence on the biosphere. Under the influence of human thought and effort the biosphere is passing into a new state—the noosphere."*

Karl Marx predicted that in time natural history would become the foundation of human science and would incorporate the science of man to the same degree that the latter incorporates natural history. The two sciences would merge. Vernadsky's theory of the biosphere and the noosphere heralded this new natural science. Human activities are now producing such significant changes in the biosphere and are so markedly affecting the basic relationships in nature that man must be guided in his activities by reason, that is, by a scientific approach, by scientific thinking. It was in this sense that Vernadsky spoke of scientific thinking as a planetary phenomenon.

Vernadsky did not live to our day, with its ecological crisis and polluted planet. But he left us his theory of the evolution of the biosphere, a theory that becomes more essential daily.

Several important conclusions may be drawn from Vernadsky's theory. It is now clear that the biosphere is a single entity for the entire planet, that it is a complex self-regulating system which cannot be destroyed in part without damaging the whole. Furthermore, it is now evident that every living species in the biosphere is needed to maintain its normal existence. From the theory of the biosphere there follows an understanding of the hazards of technological pollution, overheating, reduction of the oxygen supply and depletion of resources.

From Vernadsky's theory that the biosphere constitutes an energy screen between the Earth and outer space, a self-regulating part of the planetary system, scientists are now drawing the conclusion that the efficiency of solar energy utilization can be enhanced by increasing the density of the planet's vegetation and choosing optimal transformers from the plant kingdom. Calculations show that the density of the Earth's vegetation—and, accordingly, its biological productivity—can be increased by one and a half to two times. The theory of the biosphere has provided a frame of reference for all the international conferences on environmental protection and the rational utilization of the Earth's resources. Inevitably, they conclude that the solution of environmental problems requires a new biospheric approach. This scientific and moral-philosophical level is far higher than the level of mass consciousness in what is known as the consumer society, which in many capitalist countries is embarked upon the unlimited production of material goods, regarding this as the supreme goal of technological progress.

The ethics of the biosphere, worked out scientifically by Vernadsky, require that we develop a different set of values. They must be based on the needs of the human spirit, on respect for life, for mankind as a single entity rationally regulating the only environment it has—the biosphere.

*This term, derived from the Greek root *noos*, meaning "the mind," was proposed in 1927 by Vernadsky's disciple Edouard Le Roy.

AN OPTIMISTIC ACCOUNT

A bouquet and thank-you to the doctor from one of her patients. Top: Consultation on a child who has just come from the operating room. This pediatrics research and clinical center was set up 50 years ago. It's the only one of its kind in the world.

By Tamara Chistyakova

FOR THE SERIOUSLY ILL patient a medical research institute means just one thing: It is a place where top-quality medical knowledge is at his service. This is especially true of the Pediatrics Institute of the USSR Academy of Medical Sciences. The departments, clinics and laboratories devoted to children's health involve nearly every branch of modern medicine.

We will be visiting the rooms where illnesses are studied, where new treatment methods are worked out and disorders characteristic of our feverish age are coped with, usually with success. But our first stop has the unexpected name of Healthy Child Department.

The wards are more like nurseries than anything else. Infants in cots are waving little arms and legs. Those big enough to sit up or crawl are amusing themselves in their playpens, the ones able to stand on their

MEDICAL RESEARCH: EMPHASIS—CHILDREN

own feet are intent on making an independent investigation of the world.

Through day by day observation of the growth and health of these babies, their behavior and movements, researchers can study the formation of human personality and the effectiveness of early education. Their conclusions and recommendations help develop methodologies basic to the country's preschool systems.

This department has several laboratories.

Yekaterina Golubeva, Doctor of Science (Medicine), is in the encephalography lab testing an infant. The pencil traces curves that are signalled from various parts of the brain. Study of the central nervous system in infants is of the utmost importance for an understanding of the intricacies of mental development. The child's response to the teacher's words, to music or to a toy is always reflected in the brain's biopotentials. So the expert researcher, as he comes upon one or another abnormality, can recommend individualized procedures for raising the child.

Another laboratory. An eight-month-old baby sits in front of something that looks like a switchboard. He presses a lever and listens to the sound he has called forth: This wonderful toy is fascinating. He presses, listens, presses again. But then by chance he accidentally pushes another lever, and a light flashes on. This is even more fun, and he turns his attention to this phenomenon. The light flashes on and off, on and off.

"What's the point behind this experiment?"

My question was addressed to Nina Mirzoyan, senior scientist, who is studying the emotional behavior of children.

"We have been able to prove," she said, "that by the age of eight months infants already have the capacity to make selections among the signals that come to them from the outside world. Among many external stimuli they deliberately choose the one which gives them the greatest satisfaction. We are establishing, for instance, the optimum levels of quiet and noise for their sleeping and waking hours."

The ability to make choices at an early age, say specialists, is a scientific fact important enough to effect radical changes in methods of education.

Our high-speed age confronts researchers with some very tricky questions; physiological acceleration is one, clearly visible in new generations: Children grow faster, previous standards of height and weight no longer obtain. Is that good or bad? Why, for instance, do 14 per cent of healthy children today have a constant body temperature of slightly higher than 98.6°? Can the nervous and hormonal systems keep up with this early physical development? Is the acceleration accompanied by faster mental and psychological development?

Prevention Is the Watchword

Researchers have proven beyond any question that many adult disorders originate in childhood. An institute group headed up by Dr. Tamara Borisova examined 14,000 schoolchildren in Moscow and Moscow Region. They found that 6.5 per cent have blood pressure higher, and 4.5 per cent lower, than normal readings. Further clinical observation of children with high blood pressure led to the conclusion that the first indications of later hypertension appear at school age. This finding casts doubt on the view, current in recent years, that there is a special juvenile hypertension which children "grow out of."

"No," says Borisova, "this disease, unless it is treated at once, will develop in the adult."

Soviet pediatricians have been told to take a second look at any case of so-called youthful hypertension.

We moved on to a small two-story block—the institute's clinic for infectious diseases. The reception room is quiet, pleasant and full of flowers. Fairy tale characters look down on us from the corridor walls. Professor Sergei Nosov, a leading authority on children's infectious diseases and corresponding member of the USSR Academy of

Medical Sciences, was clinic consultant that day.

"You know, it's hard to believe that these children are really ill," I said to him. "They aren't in bed, they're playing, drawing, reading."

"They aren't ill as that word is generally understood. This clinic, you see, has developed into a scientific—and practical—center of vaccination against infection. Thanks mainly to preventive injections our children grow up healthy. In fact," the professor smiles, "our students have to turn to textbooks for symptoms of smallpox or poliomyelitis or lockjaw; they hardly ever see an actual case.

"However, there are children, like those you see here, with organic peculiarities which rule out inoculation. Our people have evolved ways for vaccinating even these. The next step—we are already working on it—will be nationwide use of protective methods of vaccination in all children's polyclinics. Only then will we consider our task an accomplished fact."

Infectious Diseases

This research center for the theory and practice of pediatrics was set up half a century ago; there is no other like it anywhere else in the world. In addition to research the institute was established for the practical purpose of training specialists for the various republics and regions of the country so that the most progressive methods of treatment would be introduced into the daily practice of pediatrics.

"What has the institute accomplished?"

Director Mitrofan Studenikin, corresponding member of the USSR Academy of Medical Sciences, answers my question.

"In the first place, there has developed a Soviet school of pediatrics, original in concept, method and traditions, a strong and vital school thanks to its close contact with everyday practical experience. We have 30 Doctors and 110 Candidates of Science in medicine—in all the specialties—working with us. Research done here at the institute has been awarded the State Prize, prizes of the USSR Academy of Medical Sciences, diplomas and other honors."

"What problems of pediatrics are you concentrating on?"

Disorders of the newborn, for one thing. Our country values every new life; we seek not only to preserve it but to guarantee the physical and psychological health of the future adult. The department is headed by Professor Yelena Novikova, and she is getting some interesting results.

"With infections no longer a significant problem we are working on allergic illnesses. It is in the early years that allergy may do irreparable damage to the organism.

"The institute is studying the reasons acute forms of some illnesses become chronic. For instance, we can report that the treatment recommended by our specialists for protracted pneumonia in children has halved the incidence of chronic cases.

"Research done by Dr. Yelena Mosyagina has won world recognition. For a long time, with her pupils and coworkers, she has been making very productive studies of the blood with special reference to childhood. And an effective method of treatment for anemia and of chemotherapy for leukemia has been developed in the hemotological clinic headed by the youngest of our professors, Igor Koshel."

"In the early years after it was founded the institute did a great deal of propaganda work in the health field."

"Let me anticipate your question. Yes, we are still propagandizing. A great deal of knowledge is needed to bring up a healthy child. The institute does extensive educational work, using all the mass media."

"And how much actual treatment does it do?"

"Every year 18,000 children in all the republics get free specialized treatment from the institute."

"There are 15 other Institutes of pediatrics in the country. To what extent are they influenced by yours?"

"Our scientists were directly involved in setting up pediatrics institutes in the union republics. Many of my colleagues work with their graduate students regularly and act as consultants and opponents in the preparation and defense of theses. Some of our people, after earning their degrees, leave Moscow for other towns where they lead research groups. There are now 276 Doctors and 1,557 Candidates of Science in medicine in the pediatrics service of the union republics.

"Both by law and in fact the Moscow institute leads the country's pediatric work. Practice and treatment is the responsibility of the Research and Organizational Department, headed by Professor Anna Efimova. She is an authority on tuberculosis and has ploneered a method of subcutaneous vaccination of the newly born against the disease."

An Attack on Allergies

Allergy is one of the newest branches of medicine. In the thirties the Ukrainian academician Alexander Bogomolets read a paper "One Hundred and One Questions on Allergies"—that's how little was then known about the subject. The first director of the Pediatrics Institute was Georgi Speransky, a brilliant clinical worker, later an academician and Hero of Socialist Labor. He began searching for an approach to this new ailment. But because of the war and its aftermath, his work had to be postponed for a long time.

Professor Tatyana Sokolova, who heads the department, showed me around. In one ward lay Kolya, aged 12. Asthmatic bronchitis, a serious case. It hit the boy in a village on his first visit to the country. The cause? Hypersensitivity to pollen.

"And where are you off to?" the professor caught the arm of a little girl with a perky bow on her head. "Show me your arms, child. You haven't lost a single dressing."

"When she was brought to us," the professor told me later, "there wasn't a clear spot on her body, she was all red patches and blisters. She had gone to a friend's on her birthday. There were chocolates and strawberries, lots of them. Then it was discovered she has a food allergy. Now we're checking the whole spectrum of allergens to prevent a recurrence and develop a course of treatment.

"Let me show you our treasure chest," opening the door of a large refrigerator. "This is where we keep all allergens known to science and the curative preparations for them. I often think of a complaint I noticed in an article by a foreign allergy specialist. He wrote that patients were slow to pay their doctors; the expensive diagnoses and medicines often lost him money. We Soviet medics don't have that problem, everything is supplied to us for fighting sickness. And it doesn't cost the patient anything, even when the treatment is expensive."

"I've been wondering what it was in

Dr. Victor Starchov at work in the Healthy Child Department, where the physical, mental and emotional growth of infants is studied day after day. The conclusions of this department with the unusual name are used to develop methods and procedures for the country's preschool institutions.

The Moscow Pediatric Institute of the USSR Academy of Medical Sciences sets the tone and pace for work in the field. It helps organize parallel facilities in the union republics and also provides specialized treatment for some 18,000 children who are referred by doctors all over the Soviet Union.

AN OPTIMISTIC ACCOUNT

particular that attracted you to allergies."

"I can say now that I like my specialty because it is so full of the unpredictable. The clinical picture of one and the same illness presents so many new problems that a lifetime wouldn't be enough to cope with them all. But when the immediate puzzle is actually solved and the little asthmatic, who came here in the grip of allergic strangulation, leaves the hospital cured—that's when I'm really happy. But when I first entered the field, allergology looked to me like an unexplored region; I wanted to find out what was there."

"There are a considerable number of allergological consulting rooms in Moscow now, but what about other places?"

"Here's the answer to your question," said Tatyana Sokolova, smiling, as a group of doctors entered. They were future allergy specialists who had come here to study. For some years now she and her colleagues have been training children's doctors in the latest methods of diagnosing and treating bronchial asthma, skin diseases and various shock phenomena caused by allergies. Pediatricians come in small groups from all over the country for a two-month specialization course and then set up allergy consultation offices where they work. Fifty towns in the USSR now have a trained allergy service. The future will see the service available everywhere, in all polyclinics. So the attack is along a broad front.

"A Murmur"

The Department of Functional Diagnosis is nothing less than a technical arsenal of pediatrics.

Medicine, biology, physics, chemistry, mathematics and many other sciences come together to produce answers without which no surgeon will approach the operating table, no therapist will make a final diagnosis.

Professor Maria Oskolkova, head of the department, examined a boy of eight who had been sent to the rheumatology department with heart disease.

The child lay quietly on the couch. He seemed to be all wound up in electric wires. I was told that they were simultaneously registering the pulse and blood pressure and taking a phonogram (heart sound) and electrocardiograph reading.

Many thousands of children, sick and healthy alike, have passed through this laboratory. Innovative methods of examination have been worked out. For the first time in pediatric practice ultrasound is used for diagnosing kidney and liver disorders. Professor Oskolkova was one of the first in the country to register heart sounds of children. And as we have seen, she uses simultaneous registration of all parameters of cardiac activity.

"Everything's ready," she said, and switched on the apparatus. Lights ran around the oscillograph screen, chemical pencils moved, paper tapes flowed and arrows swayed.

I have never forgotten words I once heard as a child in a doctor's office: "A murmur." The words came back when Professor Oskolkova switched on the phonograph and I heard the rhythmic thuds. A quick strong one—a pause—a weaker one—a pause. That was the boy's heart beating. The lab assistant turned a knob, and the sounds changed. Now there was murmur in the pauses. The apparatus can segregate, and increase the volume of, the section of the sound spectrum that interests the doctor.

In less than 15 minutes the vague description, "a murmur," was transformed into exact quantitative characteristics.

"What's the most important thing for the department, research or practical assistance to doctors?"

"I don't think you can have one without the other," the professor answered. "In studying any problem of functional diagnosis, we improve existing methods and work out new ones. And the examination of patients along planned lines in our clinics and other medical institutions provides valuable material for scientific generalizations and conclusions."

It is hard to believe, looking at the children, that many have recovered from illnesses long considered to be incurable.

From the big open window the grounds of the institute spread out and around. Children are playing in the grass and among the low shrubbery. Little ones in linen hats and aprons—for all the world like a kindergarten. There are older ones, too. A short distance off a tight cluster of boys are arguing about something and laughing. A young mother wheels a baby carriage along a path. And near a flower bed two little girls have only one purpose in life—to catch a butterfly.

These very healthy-looking youngsters were born prematurely. They are being observed at the institute for deviations from the norm in their physiological and psychological development.

Center: Physical therapy. Bottom: Behavioral Science lab.

QUERIES FROM READERS

QUESTION: How do Soviet women combine career and motherhood? Does the Soviet state help them? (Sybil Nigri, Harrisburg, Pennsylvania)

Letters from readers, particularly women, frequently ask the same question. Here is what Rano Khashimova, an Uzbek workingwoman, writes about herself.

ANSWER: I live in Tashkent, the capital of Uzbekistan, and work at the Yulduz Textile Mill.

I gave birth to my fourth son not long ago. Before Bakhri was born, I had 56 days paid leave, and afterward I had another 56 days. The law entitled me to stay home for a full year after giving birth if I wanted to, and my job would be held for me.

But my husband and I decided that I should go back to work after six months and send our Bakhri to nursery school when he was seven months old. We sent all our children to the mill's nursery schools and kindergartens. They are right here on the mill grounds, and all nursing mothers (there are 200 of them working here now) can take off an hour and a half or two hours each day to nurse their infants. It costs the parents 7 to 12 rubles a month, depending on their earnings, but no more than 12, to keep a child at a nursery school or kindergarten. We pay 12 rubles a month for all four of our children.

We are very pleased with the care the children get. The nursery schools and kindergartens are staffed by physicians, nurses and teachers, who supervise the children's diet, recreation and physical training. All our children are growing up healthy and strong, and the older ones (one son has turned 6, the other 7) are also being prepared for school.

When I returned to work after my maternity leave, I had a choice of jobs. I could go back to my old job or get one requiring less physical exertion at the same pay. I gave the matter some thought and decided to transfer temporarily to an easier job. Although the pay is supposed to be a little less, I still get my former higher pay. I'll work here until my baby is a little older.

Since most of the people who work at the mill are women, we have our own clinic. Its doctors check our health at frequent intervals and advise those who are pregnant and nursing about diet, rest and work. All this is free.

A recent decree of our republic provides for free meals and medicines for children until they are one year old. That is an additional convenience and help to mothers. With a doctor's prescription a mother can get any medicine her infant needs free of charge at any pharmacy as well as free baby food at the milk kitchens of children's medical institutions.

Nashim Nikrebekova, chairman of the mill's trade union committee, added this to Khashimova's account:

"All maternal and child care benefits are covered by state social insurance funds. The trade union bodies, women's councils and children's commissions in every institution and enterprise see to it that women and children get all the benefits the law entitles them to.

"This concern of the Soviet state for mothers and children is reflected in the public health statistics of our republic.

"In Uzbekistan, where there was not a single medical establishment before the Revolution, about 2,000 obstetrician-gynecologists, 12,000 midwives and 4,000 pediatricians now look after the health of mothers and children. As a result our infant mortality is one of the lowest in the world."

QUESTION: What occupations are inaccessible to women in the Soviet Union and what are they doing to eliminate the remnants of this "male hegemony?"

ANSWER: There is practically no occupation in our country that discriminates against women, including space exploration. A good example of this is Valentina Tereshkova, who is the first woman cosmonaut in the world. Among our women there are sea captains, plane pilots, managers of large plants and directors of research centers, judges and presidents of republics.

Back in the twenties and thirties, the years of the first five-year plans, women were right beside the men building new cities in the Siberian taiga, developing the Central Asian deserts and making nonstop flights on distant routes. In the years of the Second World War against Hitlerism, women replaced men in every area of the country's economy. They displayed miracles of heroism and sacrifice, not only in the rear but also at the front.

Thus, our entire history is the history of equal participation of men and women in the construction of a new society. It would therefore be rather difficult to find remnants of "male hegemony."

Here are some figures that were published in the newspaper *Moskovskaya Pravda.*

According to the latest census, about two million men in Moscow have a higher or secondary education, while the figure for women is 360,000 more than that. Some 150,000 more women than men have diplomas from technical secondary schools. Twenty thousand Moscow women are Candidates of Science and about 1,500 have a Doctor of Science degree. Women constitute over half the work force in the capital. They hold first place in administrative fields, trade, communications and public services. So far as education and public health are concerned, it is altogether indisputable that women predominate.

And yet, speaking of the "professional" equality of men and women, you should not forget that there is a sphere in which nature itself has predestined the dominant role for women. No occupation should on any account be permitted to harm the health of a woman. Of course, no occupation should be declared "off limits" for women although a whole number of heavy manual jobs were prohibited for women by Soviet labor laws.

QUESTION: What religions are practiced in your country? Can believers in the Soviet Union go to church and perform religious rites?

ANSWER: There are scores of religious denominations in the Soviet Union, the largest being the Russian Orthodox. Among the others are the Old Believers, Armenian Gregorian, Georgian Orthodox, Roman Catholic, Evangelical Lutheran and Evangelical Christian-Baptist as well as Islamism, Judaism and Buddhism, and a number of sects, for example, Seventh-Day Adventist. To ensure freedom of conscience, the church in the USSR is separated from the state and the school from the church. No religion enjoys privileges that would put adherents to other faiths in an unequal position. The Declaration of the Rights of the Peoples of Russia, published a few days after the victory of the October Revolution, proclaimed the abolition of all national and religious privileges and restrictions, and Article 124 of the USSR Constitution stipulates that "freedom of religious worship and freedom of antireligious propaganda are recognized for all citizens."

Thus, every believer can go to a church, mosque, synagogue or other house of worship without hindrance and perform any religious rite. This is guaranteed by the state, which does not interfere in the internal affairs of religious organizations but does ensure their constitutional rights legislatively. For example, Article 143 of the Criminal Code of the Russian Federation provides for up to six months of corrective labor as punishment for "hindering the performance of religious rites so long as they do not disturb public order and are not accompanied by encroachment on citizens' rights." Appropriate articles are included in the penal codes of the other republics as well.

QUESTION: How many newspapers, magazines and books are published in the Soviet Union? In how many languages?

ANSWER: About 8,000 newspapers are published in 57 of the languages of the peoples of the USSR. Their total circulation exceeds 145 million copies. There are over 5,000 magazines. They are published in 45 of the languages of the peoples of the USSR and have a total circulation of over 154 million copies. Twenty-two magazines and nine newspapers are published in foreign languages.

There are newspapers with a countrywide circulation as well as those published and circulated in the republics, territories, regions and districts. The most popular are *Pravda* (10 million circulation), *Izvestia* (8 million) and *Komsomolskaya Pravda* (10 million). *Pravda, Sovetskaya Rossiya, Selskaya Zhizn* and some other newspapers are published by the Central Committee of the Communist Party, *Izvestia* by the Presidium of the USSR Supreme Soviet, *Trud* (over 7 million circulation) by the All-Union Central Council of Trade Unions, and *Komsomolskaya Pravda* (a youth newspaper) by the Central Committee of the Komsomol (Young Communist League). There is a special newspaper for schoolchildren, *Pionerskaya Pravda,* whose circulation comes to almost 10 million. Sports fans have their own newspaper, *Sovetskii Sport.* Among the central newspapers many are industrial or professional publications, such as *Uchitelskaya Gazeta* (for teachers), *Gudok* (for railwaymen), *Sovetskaya Torgovlya* (for people in retail trade), *Ekonomicheskaya Gazeta, Meditsinsky Rabotnik* (medical workers), *Sovetskaya Kultura, Sotsialisticheskaya Industria* and others. In the union and autonomous republics periodicals are issued both in the national languages and in the Russian language.

According to UNESCO data, the Soviet Union holds first place in the world for the publication of books, over 1.5 billion copies a year. In 1972 alone books and pamphlets were published in 65 of the languages of the peoples of the USSR and 42 foreign languages.

Portrait by Orest Kiprensky, 1827.

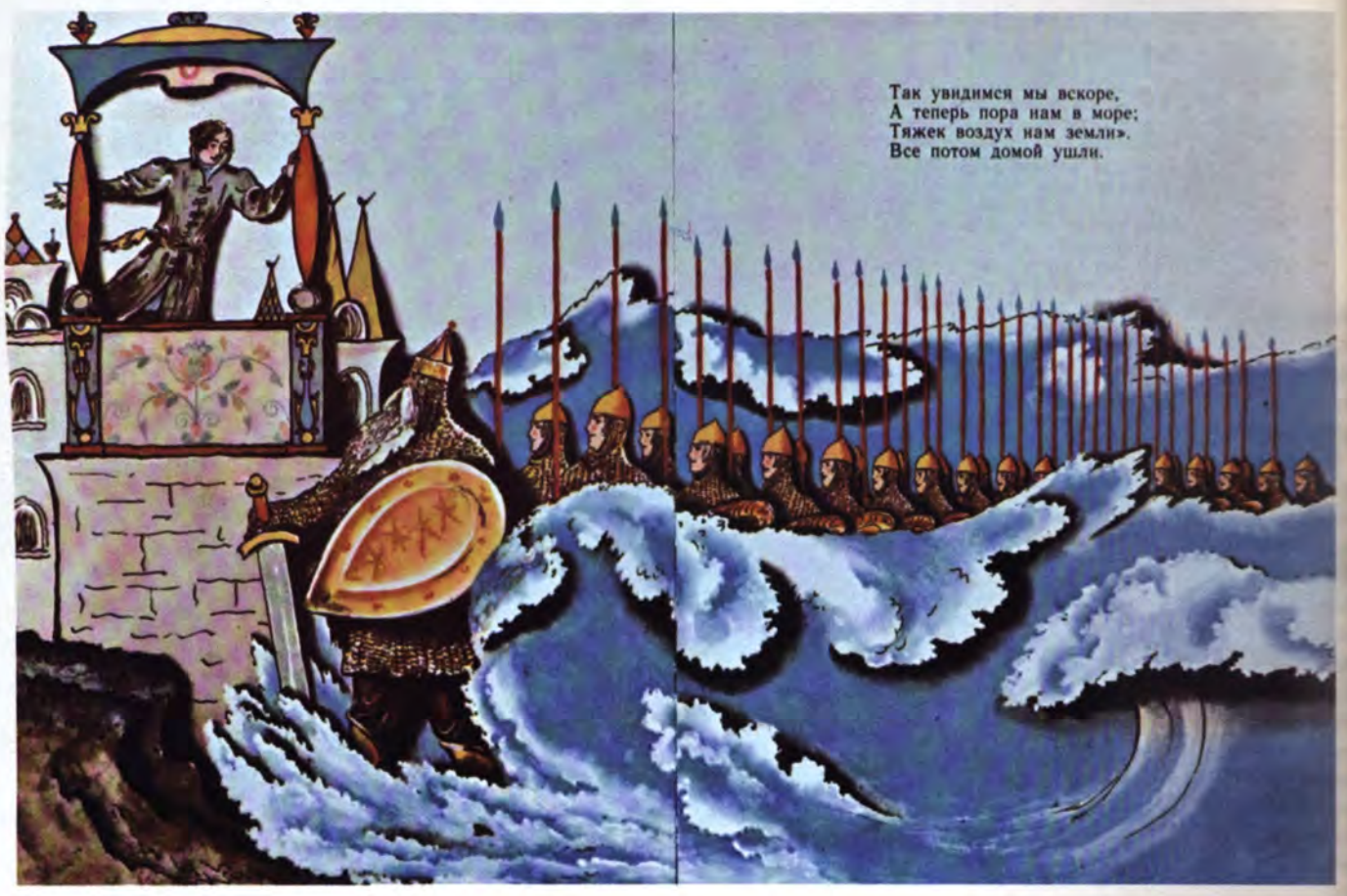
Alexander PUSHKIN: A Tribute

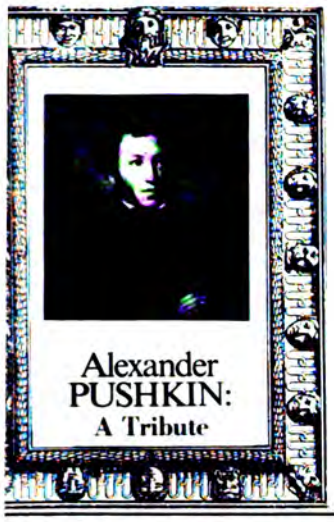
Illustrating Pushkin's World

By Marina Khachaturova

A HISTORY of the illustration of Pushkin's works from the poet's day to the present would by itself make an interesting book. It constitutes a complete branch of Russian art with a wide range of unique problems. In their graphic interpretation of the great poet's works the artists Alexander Benois, Vladimir Favorsky, Pavel Pavlinov, Nikolai Kuzmin, Vladimir Konashevich and Tatyana Mavrina reflect their own time and their individual taste. What they have in common, despite their different artistic styles, is that their turning to Pushkin, whose poetry they all loved, was a landmark in their creative careers.

The revolution in book illustration in Russia at the close of the nineteenth century and the beginning of the twentieth revived this genre and set it new artistic directions. An important role was played by **Alexander Benois (1870-1960)**, a man of many gifts, a painter, graphic artist, stage designer and art historian and critic. He produced a host of works during his long life, repeatedly painting St. Petersburg and its environs, Russia and





nce. The illustrations for Push-'s *The Bronze Horseman* in er color and gouache, which did from 1903 to 1922, are still surpassed.

The turn of the twentieth cen-y marked the emergence of a w appreciation for wood engrav-. **Vladimir Favorsky (1886-64)**, whose woodcuts have be-ne classics, worked out creative utions for such problems as ace, volume and tonal variation. r over a quarter of a century he voted himself to teaching. Any mber of Soviet graphic artists ide themselves on having learned ir craft from him. A master of sign, Favorsky produced many btle, poetic engravings for akespeare's sonnets, Robert rns's poetry and, of course, for works of his literary idol, shkin. His illustrations for shkin's dramas *Boris Godunov* d *Little Tragedies* are distin-ished for their extraordinary hnique and psychological depth. **Pavel Pavlinov (1881-1966)**, friend of Favorsky's, tried vari-s media—etching, dry point, e cut—at the outset of his cre-ive career. But it was wood en-aving that intrigued him all his e. He met Favorsky in his uth. They became close friends, d their quests and even careers ok an almost parallel course: a ssion for engraving, research to methods and theory, and aching. In the twenties Pavlinov ed his hand at illustration. In 22 he did a full set for Push-n's drama *The Mermaid*, a series

lustration for
he Golden Cockerel *by*
atyana Mavrina (left)
d The Tale of the
sar Saltan *by*
ladimir Konashevich (left top).

Illustrations for
Eugene Onegin
by Nikolai Kuzmin
(right, far
left top and bottom,
left top and far
right bottom).

Illustration for The Bronze Horseman *by Alexander Benois and for* Mozart and Salieri *by Vladimir Favorsky (below).*

of engravings interestingly conceived and treated. The frontispiece, reproduced here, Pavlinov called the overture. It speaks of forthcoming events, treating the rural folk tale and actual life symbolically in an austere and well-defined rhythm.

"Only when a peculiar 'selective kinship' occurs between the writer and the illustrator can the visual and literary image fuse miraculously into indissoluble unity, and then the illustration becomes a part of the book in the reader's mind." This credo by the graphic artist **Nikolai Kuzmin** applies completely to himself and his inspired drawings for *Eugene Onegin*, Pushkin's novel in verse. This work, so in harmony with the spirit of the poet's brilliant creation, embodies Kuzmin's qualities as an illustrator: subtlety and precision, lightness, understatement and fidelity to the written word.

Throughout his long life Kuzmin illustrated many works by Russian writers: Mikhail Lermontov, Nikolai Leskov and Yuri Tynyanov. However, the Pushkin theme has a special place in his

By Valentin Nepomnyashchy **Literary Critic**

HOW can I tell you what he was like?

In the nineteenth century he was called "the Sun of Russian poetry," and in the twentieth "the beginning of all beginnings." Scholars considered him the father of the new Russian literature, the creator of the Russian literary language and the founder of Russian realism. Thousands of papers have been written about him. For a century and a half he has been a symbol of faith, a source of inspiration, the prompter of literary trends. . . . To this day he is unmatched.

For 150 years writers, historians, linguists, philosophers, psychologists, scciologists and even experts in cybernetics have been quoting him; paintings and operas have been based on his works. He is the source of most of the themes of modern Russian literature—its genius and conscience. As the great Russian writer Gogol was dying, he spoke of Pushkin. Dostoyevsky and Blok dedicated famous speeches to him.

But this is only a part of what can be said of Alexander Pushkin, the great poet and citizen of nineteenth century Russia.

PUSHKIN was a small man but physically strong, an excellent marksman and hunter. He was a brilliant conversationalist, fond of gaiety and Gypsy songs. Brown-haired and blue-eyed, with a large mouth and dazzling smile, he was not handsome—rather the opposite. Classmates at the Tsarskoye Selo Lyceum * near St. Pe burg, his alma mater until he 18, dubbed him a "cross betw monkey and a tiger" for his l quick temper and agility. F passions and recklessness hand in hand with perceptivi sober, analytical mind and a for philosophy and history. 1825 even the czar was force acknowledge him "the most in gent man in Russia." Pushkin

* Lyceum—in the nineteenth cent privileged educational institution children of the nobility.

career. Kuzmin began illustrating Pushkin more than 40 years ago. He is in his eighties now and has just completed his illustrations for Pushkin's *Epigrams*. They comprise a considerable portion of the poet's body of verse. Published recently, these illustrations once again prove that age is no threat to the artist.

Pushkin, whose folk tales were illustrated earlier and more frequently than his other works, spoke of folklore as "the first games of the human spirit." His own folk tales are akin to Russian folklore.

The illustrations of **Vladimir Konashevich** and Tatyana Mavrina convey Pushkin's feeling about folklore.

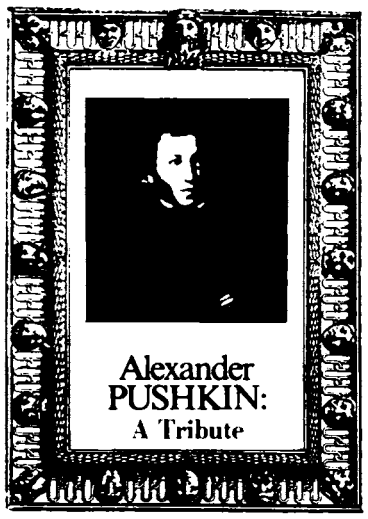
Konashevich illustrated the tales Pushkin wrote from the twenties to the end of his life. The best of his works are those he did in the sixties, on the eve of his death. He did not simply illustrate the text, he made his drawings an integral part of the word. Konashevich's illustrations to Pushkin's folk tales are distinguished for their simultaneous wholeness and complexity, their blending of lyricism, epic and humor. The book's page serves the artist as a kind of theater stage with symbolic flat cardboard dolls as actors. The illustrations are frequently done in spreads, but each tale has its own inimitable model. The bright colors emphasize the symbolism, the folk tale quality. Apart from original illustrations, Vladimir Konashevich also evolved a new type of book design.

Illustration for Boris Godunov *by Vladimir Favorsky, for* Eugene Onegin *by Nikolai Kuzmin (top left), and for* The Mermaid *by Pavel Pavlinov (right).*

Tatyana Mavrina is a gif artist who draws greatly on f art. Pushkin's folk tales played important part in shaping her t ent. She first turned to them 1949, but her works in the sixti and seventies proved real mast pieces.

Mavrina created her own me od of illustrating Pushkin's f tales. Among her most interesti are the illustrations for *T Golden Cockerel*, which she did 1970. The whole book is divid into six parts, in keeping with t composition of the tale. Each p has its own double-page spre depicting the principal event a is done in its own color pattern. addition, there are many sketch in the margins, as well as dra ings leading up to the main spre Basic to Mavrina's drawings is folk pattern and design that de rated Russian peasants' househ articles, and through this medi she colorfully conveys the f spirit and buoyancy of the tale

Today's artists and artists of future will keep turning to Pu kin's creative legacy. As Vissari Belinsky, the noted Russian cri put it in his day, "Pushkin's wo are immortal. They cannot be stroyed by death but will contin developing in society's mind. Ea generation pronounces its jud ment of them, and no matter h correctly that generation has u derstood them, there is alwa something new and more accur for the following generation add. This is a subject that w never be exhausted."



"In the nineteenth century he was called 'the Sun of Russian poetry,' and in the twentieth 'the beginning of all beginnings. . . .' For a century and a half he has been . . . the prompter of literary trends."

brave and often pugnacious. He carried the banner of his personal and literary honor high, and his enemies were no less afraid of his epigrams than of his dueling pistol. He never ignored a person in need and was a passionate lover and loyal friend.

We can outline his life—a theme that has attracted many writers, none of whom have been able to do it justice. We can cite the remarkable origin of this man, descended on his mother's side from an Abyssinian general in the Russian service who was ennobled by Peter the Great, and on his father's side from a Russian boyar family dating back to the thirteenth century.

During his turbulent youth Pushkin was the idol of the reading public. He was also the militant hero of the revolutionary nobles who paid the price of death and convict labor for their uprising in 1825.** He escaped their lot only because he had been exiled several years before by Alexander I for the freedom-loving spirit of his poetry. The new Czar Nicholas I tried to win him by pardon and offers of money and protection, but the poet would not be made a loyal subject.

Pushkin had a large family, and his later years were difficult. Ahead of his times, he was persecuted by the censors and hounded by czarist officials. Only today can we appreciate the scope of his achievement. Surrounded by enmity and contentiousness, in 1837 he became a victim of high society intrigue. On January 27 (February 8, New Style) of that year, to defend his own and his wife's honor, he fought a duel with d'Anthès, an officer of the czar's household cavalry. He was wounded and after hours of agony died on January 29 (February 10, New Style), suppressing his moans of pain to keep from alarming his wife and children. He died at 37, and thousands of people from every walk of life streamed to his house in St. Petersburg. Since then that has been a day of national mourning for Russia.

But can all this give you an idea of the poet?

Practically nothing can.

We know that Homer's *Iliad* only mentions the beauty of the Spartan Queen Helen. There is no description of her: The poet does not try to describe the indescribable.

I have read Homer in editions that are the pride of the Russian school of translation, and I thought I knew his works well. But when I read his famous *Odyssey* in the original, it was as though I had earlier been blind.

Pushkin has been translated into some hundred languages. Many of these translations are by famous national poets and writers. Yet they cannot convey a full idea of the original.

Most artists have a few dominant traits that can be singled out as the essence of their genius. But Pushkin is an exception. His works reveal epic strength, mystical eloquence and passion, wide knowledge, sagacity and sophistication. In addition, he has great humanity, rebelliousness, elegance, mischievous humor and castigating wit, tenderness and slashing wrath, and a deep understanding of Russian folk poetry.

Gogol and Dostoyevsky spoke for all their fellow countrymen when they described Pushkin as the greatest national poet, the model of the Russian man of letters and the Russian citizen and, at the same time, the most human of writers.

He is broader than any concept or system: All the voices of the world merge in him. Possibly this universality is one of his most characteristic and enigmatic qualities.

His contemporaries called him Proteus, the Greek deity who could change his shape at will. Pushkin could become Peter the Great, Don Juan and Tatyana, the heroine of *Eugene Onegin*, could penetrate the mind of a great composer, a murderer ("Mozart and Salieri") or a moneylender ("The Miser Knight"). He was not confined by temporal or national boundaries: Medieval Italy, thirteenth and eighteenth century France, sixteenth century England, the Germany of the knights, Ancient Egypt, Ancient Greece and Rome, the Biblical and evangelical periods were as familiar to him as his own time. Whether he was translating the French poets Voltaire and Chenier, the English Southey and Cornwall, the Polish Mickiewicz or the Portuguese Gonzaga, the Koran, Dante, the Arabian and West Slavonic poets or the old Spanish ballad writers, he seemed to compete with his models in conveying their own spirit. In his translations of Horace and Anacreon you can hear the Latin and Hellenic muses, and Spaniards who read his tragedy *The Stone Guest* will assure you that only a Spaniard could have written it.

Pushkin knows the languages of all nations and all emotions but everywhere remains himself, everywhere speaks with a Russian cadence. What he writes is not simply the truth but, as Gogol said, "even better than the truth."

His words are omnipotent. He has, as the Russian poet Anna Akhmatova put it, a "dizzying brevity" of form and an artlessness of expression that fascinate all lovers of language.

The continuing interest in Pushkin's works is unparalleled. His popularity and lasting power to move his readers have a tantalizing element of mystery.

People speak and write about him as if he were alive. One reason is that he laid the foundation for most of the Russian literary genres and continues to exert a strong influence on contemporary authors. Moreover, the breadth of his reasoning, his ethical purity, his desire to understand the meaning of life —in short, his great humanity— comprise the ideal toward which mankind is striving. He seems alive to us because, as Dostoyevsky said in his speech:

". . . There was never a poet with so universal a responsiveness as Pushkin. The point lies not only in his responsiveness, but in its remarkable depth, in the transformation of his spirit into the spirit of other peoples—a transformation almost complete and therefore miraculous, because nowhere in any poet anywhere has this phenomenon been repeated. This was the case with Pushkin alone, and in this sense, I repeat, he is a unique phenomenon, even a prophetic one, I should say . . . for here his national Russian power is most evident. . . . After all, wherein lies the powerful Russian folk spirit if not in its yearning for the universal and the all-human? . . . Am I talking about economic achievement, about the glory of the sword or science? No, I am talking simply about the fraternity of man. I am saying that among all the nationalities the Russian heart, perhaps more than any other, is predestined to experience this universal and all-human fraternity. I see signs of this in our history, in our gifted men, in Pushkin's artistic genius.

"Pushkin died at the height of his creative power and undoubtedly carried some of his great secrets to the grave. Now we are divulging these secrets without his help."

These words, spoken a century ago, are no less true today: We shall go on divulging the great secrets as we strive toward the perfection of our humanity, whose herald Pushkin's genius was and still is.

** In St. Petersburg's Senate Square in December 1825 a group of Russian revolutionary noblemen, the Decembrists, rose in rebellion against the czarist autocracy.

AMTORG IS 50 YEARS OLD

By Vladimir Bessmertny

Board Chairman of the Amtorg Trading Corporation

IN THE JOINT COMMUNIQUÉ signed by Leonid Brezhnev, General Secretary of the CPSU Central Committee, and President Richard Nixon in June 1973, the two sides note with satisfaction the progress in normalizing and expanding trade and commercial relations between the two countries. They cite the considerable growth in Soviet-American trade and the favorable prospects for further growth. The communiqué points to the need for increasing the volume of trade to two or three billion dollars "in the next three years."

For 50 years now the Amtorg Trading Corp. has been representing Soviet commercial agencies. Soviet-American trade began in 1920. On May 24, 1924, at a ceremony in New York, Amtorg was registered as a joint stock company, the first U.S. corporation empowered to act as middleman for the sale of Soviet goods to the USA and American goods to the USSR.

Amtorg was granted the right to conduct trade operations on Soviet territory and opened a branch, Mosamtorg, in Moscow.

The corporation's role in Soviet-American trade grew rapidly. In 1923-1924 it accounted for 11 per cent of the trade between the two countries, in 1926-1927 the figure rose to 39 per cent, in 1928-1929 to 70 per cent and in 1930 to 86 per cent.

However, the development of commercial ties was hampered largely by the lack of a trade agreement between the two countries.

Therefore Amtorg scored a major success in getting a credit arrangement from the Ford Motor Co., which had not previously granted credit on its exports. In 1924-1925 Amtorg bought more than 8,000 tractors from Ford, 10 per cent of the company's entire tractor output at the time.

A significant Amtorg achievement was a contract with General Electric in 1928 which gave Amtorg six years' credit for the purchase of 26 million dollars' worth of machinery and equipment.

Besides serving as broker in export-import operations, Amtorg kept Soviet foreign trade agencies informed of likely American customers and U.S. firms of marketing possibilities in the USSR.

In the early thirties, during the great economic depression, Soviet orders placed in the USA by Amtorg saved many companies from bankruptcy and created jobs for thousands of Americans. This was when the Soviet Union started building the Dneproges power station and large plants in Kharkov, Chelyabinsk, Volgograd and Gorky.

In 1930 Amtorg bought some 25 per cent of the industrial equipment and over 50 per cent of the farm machinery exported by the USA. In 1933 the Soviet Union accounted for 40 per cent of all U.S. exports of machinery and equipment.

Amtorg also concluded a number of contracts with such U.S. firms as Hewlett-Packard Co., James Max Co., Ford Motor Co. and, later on, Wright Aeronautical, Douglas Aircraft and Glenn Martin Co. for technical assistance in the design and construction of several large industrial projects in the Soviet Union.

The first trade agreement between the USSR and the USA was signed in 1935. In 1937 it was replaced with a new agreement that provided for the normalization of trade and economic relations between the two countries. Amtorg's activities became even more productive after these documents were signed.

It should be noted, however, that for about 25 years the level of Soviet-American trade was far below the possibilities. This despite the fact that our two countries have the world's biggest economic potentials: Their high economic levels and large home markets ensure a diversified export and import structure.

Our countries are interested in benefiting from an international division of labor. American businessmen are aware of the grand scale of the USSR's economic plans.

Last but not least, the two countries lead the world in science and engineering. The broader cooperation in such areas as power engineering, the investigation of outer space and the world ocean, disease control and environmental protection would not only mean huge savings of national resources but would have an impact far beyond the two countries.

Happily, the situation is changing: Soviet-American relations have entered a new stage. No fewer than 300 U.S. businessmen now leave for the USSR each week. The number of Soviet specialists coming to the United States is also increasing. Several U.S. companies and banks—among them Chase Manhattan Bank, Bank of America, Pan American, American Express, Pullman, Occidental Petroleum and General Electric—have opened branches in the Soviet capital.

In the spring of 1973 the biggest agreement in the history of Soviet-American trade was signed. It provides for the cooperation of Occidental Petroleum Corporation in the construction of a large complex of mineral fertilizer factories near the Soviet city of Kuibyshev, as well as for imports of superphosphate acid from the USA and exports of Soviet chemicals to the USA. The agreement runs for 20 years and calls for mutual deliveries totaling some eight billion dollars.

Amtorg now works with almost all Soviet foreign trade agencies and with dozens of major American companies, including General Motors, General Electric, Caterpillar, Dupont de Nemours, International Harvester, International Business Machines, Litton Industries, Mobil Oil, Pullman, Elliott and Lummus.

Soviet-American cooperation in all areas of trade particularly, is growing. Many agreements have been signed and a number of contacts made between American companies and Soviet foreign trade agencies. Fifty-year-old Amtorg is responsible for most of this.

LITHUANIAN CRAFTS

By Jonas Tesezkas

Photographs by Vitautas Lutskus

SEVERAL YEARS AGO one of the most popular magazines in Lithuania, **Svyturus (The Lighthouse)** came up with an idea that was picked up by its many readers—annual contests in ethnic cooking. Such contests were soon being held in every part of that republic. Some 5,000 housewives submitted 15,000 dishes and beverages. The jury was made up of historians, ethnographers and master chefs.

It takes two to lift
this devil's mask.
It was carved of wood
by craftsman
Anicetas Puskorius.

Exquisite handmade articles on sale at the Lithuanian Handicraft Day Bazaar in Vilnius. Top: Birute Puskorene, spinner, and Brones Zimontas, woodcarver, dressed as Petronė and Jonas, traditional carnival characters.

The antics of Valeri Kalinas' wooden choir evoked side-splitting laughter. Center: Povilas Zulonas announces the wood-chopping competition. Far right: Pranas Mazeikis, winner of the best blacksmith award. Below: Spinning the very finest of yarns.

The by-product of these events was a big surprise to everyone. In a short time a network of unusual restaurants appeared throughout Lithuania. In every district cafés and inns featuring the local cuisine and beverages were revived or newly built.

But that wasn't all. In the small town of Varéna, a crafts fair was held at the same time as the cooking contest. Potters sold their black ceramic wares there. I went to that fair, and I can tell you that the art of the Varéna potters, their exquisite taste, left nobody indifferent. When an elderly woman placed red peonies in a black vase, you knew that the vase was created only for red peonies. And the kind of peonies grown in the hothouses of Pranas Giedra by the wife of this patriarch of black pottery. The vase gave you the feel of every movement of the potter's hands, and the flowers placed in it by his wife blazed with color.

They say that in our industrial age everything people need can be manufactured copying the designs of professional artists. As for me, I'll take the crafts any day. Craftsmanship does not merely repeat an object. Everything shaped by the craftsman is born of imagination plus feeling—creativity is not separated from production. It is the kind of endeavor in which the artist and the producer fuse.

The fair in Varéna was the first swallow in a recurring spring. For several years now so-called Handicraft Days have been held all over Lithuania. At these fairs there are no passive onlookers. They spread the creative impulse and the popularity of the traditional crafts. Everyone does what he can and wants to with clay, wood, flax and iron.

Lithuanian crafts date back to antiquity. But never have they been so popular. Fairs, with craft competitions an important element, are held in different cities of the republic, among them Šiauliai (famed for its pottery), Druskininkai (iron work), Panevezys (weavers) and Kretinga (woodcarvers). A Handicraft Day was also held in Vilnius. The competitions were diverse: ceramics thrown and fired, tablecloths woven, figurines fashioned of metal, horseshoes forged.

As for the winners, the best potter proved to be that veteran master of color ceramics, Jonas Paulauskas; the best blacksmith, Pranas Mažeikis from a collective farm in Mazeikiai District; the best weaver, Elena Beinoriene of Klaipeda; the best knitter, Julia Janu[illegible] of

Vilnius; the best spinner, Birute Puškorene from the small town of Kretinga. And the prize of honor went to the best craftsman, Ipolitas Išskurnys, a worker from Vilnius.

On the jury were outstanding Lithuanian professional artists, thus emphasizing the traditional ties that bind the Lithuanian folk and professional arts.

And a final note: Recently a Lithuanian arts and crafts artel was formed. It now has some 6,000 members.

Above, far left: A demonstration of crocheting and knitting, open to participants of all ages.
Far left: A Lithuanian chorus singing old and new songs.
Above and left: Handicraft masters display their wares at an open-air exhibit in the old quarter of Vilnius on Lithuania's 650th anniversary. It was a preview of the now traditional Handicraft Day.

Drawings by Boris Skopin
and Nikolai Koshkin

THE FUTURE BEGINS TODA

What are the current trends in technology? Academician Gersh Budker, director of the Nuclear Physics Institute, Siberian Branch of the USSR Academy of Sciences, and a Lenin Prize winner, replies to questions put to him by the magazine *Nedelya*.

Q: How do you see the future of technological progress and, hence, of world civilization?

A: The trends of the future are obvious in present-day civilization. Technical progress, which began five centuries ago, has been accelerating. Among the results of this are the energy and food crisis and environmental pollution. But technical advances must not be blamed for the problems caused by irrational management. The energy crisis, which has spread to many countries, is the result of just such a lack of controls. No doubt, with planned rational management humanity could have avoided the fuel shortage and environmental pollution while using traditional sources of power—water, wind, the Sun, coal, oil—rather than atomic energy. But this would have meant slowing down technical and, consequently, social progress.

Atomic energy is evidently the only type that can guarantee an unlimited power supply and, therefore, large-scale industrial progress.

Of course, the warnings about contamination of our planet by thoughtless uncontrolled use of atomic energy are well founded. At this point, we don't even know how to dispose of the trillions of cubic feet of carbonic gas released when coal and oil are burned—they are slowly turning the terrestrial atmosphere into a Venusian one. I am sure, however, that the problem of utilizing the waste from atomic power plants will be solved. The energy intensity of atomic fuel is a million times greater than that of conventional fuel, while the amount of waste is a million times less.

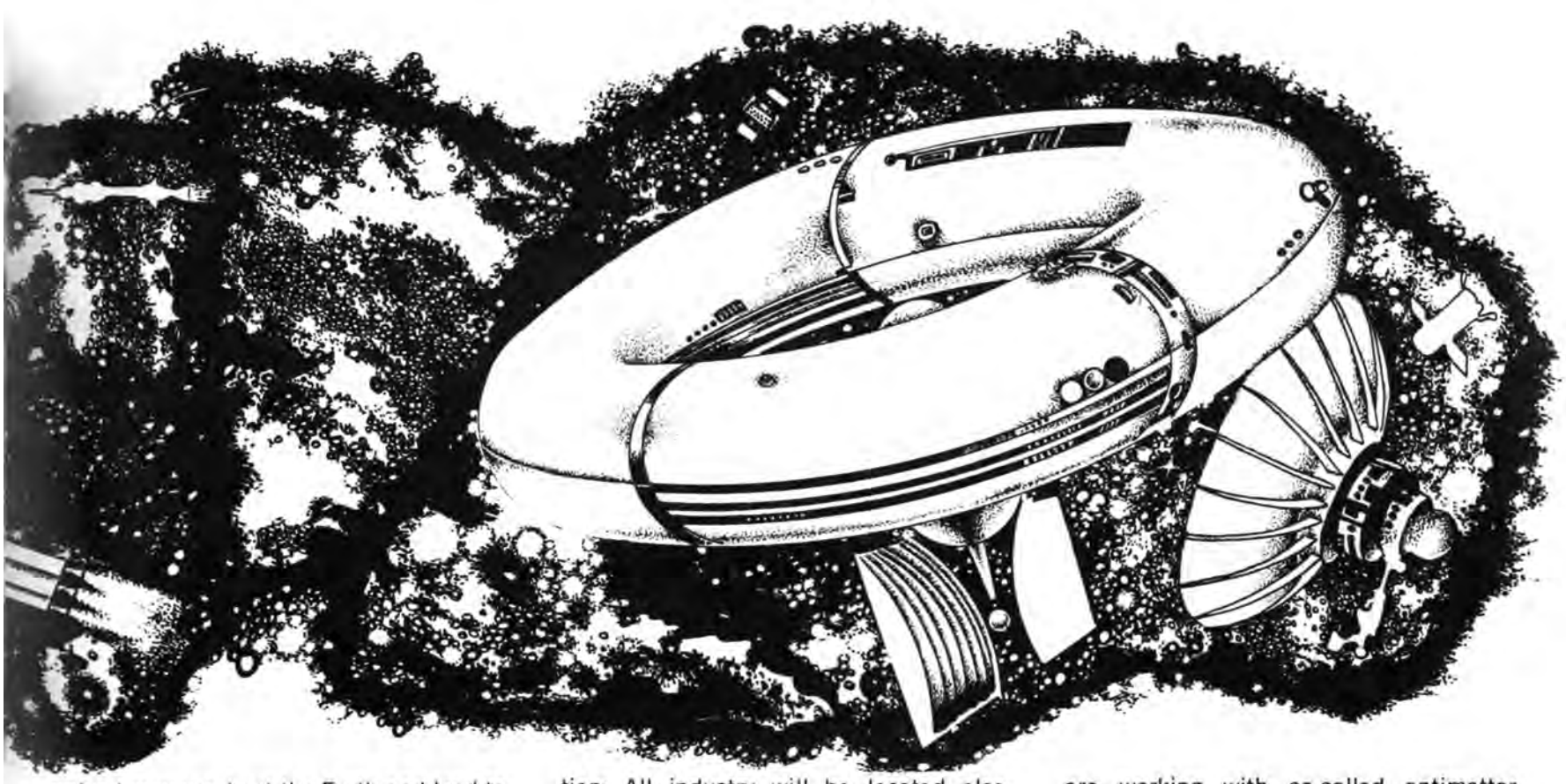
The reserves of fuel required for the nuclear fission process are so plentiful that they will last for hundreds of years. Moreover, there is sufficient thermonuclear fuel (ordinary water) for millions of years at any conceivable rate of progress. When we achieve control of thermonuclear energy, our energy problems will disappear.

For the past 30 years scientists have been trying to produce thermonuclear energy. I think that this goal will be attained in the immediate future. And there are good prospects that, simultaneously, physicists will find out how to convert thermonuclear energy directly into electricity. High-temperature plasma, which is required for nuclear fusion, is an ideal medium for this purpose.

We will then have a practically unlimited source of electrical power, and our potentialities will grow immeasurably.

Q: How do you visualize our planet about 500 years from now?

A: As I see it, the future of the Earth is linked with progress in atomic technology. And not only because the atom is a boundless source of energy and a potent transforming force. Atomic production of any kind requires a huge release of energy. A tremendous amount of energy will be needed for the alchemy of our time—the evolution of new elements. The production of each such element by the atomic method will require a million times more power expenditure than present-day chemical processes. The high temperatures in-



volved may overheat the Earth and lead to grave consequences that are difficult to foresee.

To prevent these consequences, we will undoubtedly start producing atomic energy in outer space or on other planets.

Interplanetary flights will be routine by then, because the availability of atomic energy will automatically solve this problem, too. Imagine a world in which all industrial production takes place on the Moon or Mars or in outer space! If necessary, even farming can be organized on some other planet where it will be under our complete control, freed of its dependence on the weather. Human beings will thrive on Earth, which will assume its primordial look. The cultivated fields and factories will disappear, and the planet will become a place for rest and recreation: All industry will be located elsewhere. In that way, the Earth will be able to hold a much larger number of people.

Q: Can we predict when that will be? Will our children or grandchildren live in this paradise?

A: It's difficult to say, because it's impossible to predict what form technological progress will take. If the complete automation and computerization of production is accompanied by the development of vast new sources of energy, this time will come much earlier than we imagine, especially if we eliminate the threat of war —a prospect that looks more promising today than ever before.

Q: And what about the more distant future?

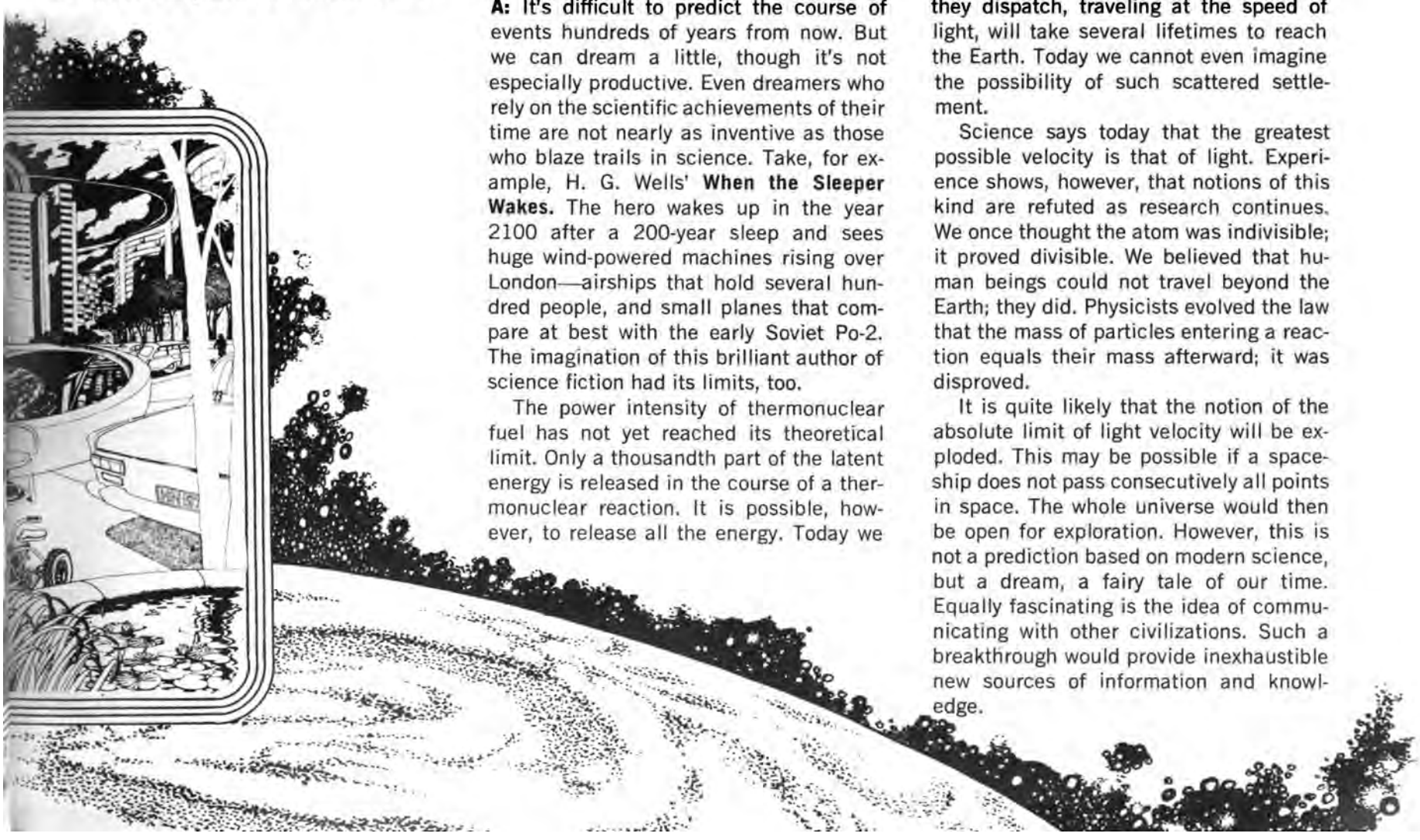
A: It's difficult to predict the course of events hundreds of years from now. But we can dream a little, though it's not especially productive. Even dreamers who rely on the scientific achievements of their time are not nearly as inventive as those who blaze trails in science. Take, for example, H. G. Wells' **When the Sleeper Wakes.** The hero wakes up in the year 2100 after a 200-year sleep and sees huge wind-powered machines rising over London—airships that hold several hundred people, and small planes that compare at best with the early Soviet Po-2. The imagination of this brilliant author of science fiction had its limits, too.

The power intensity of thermonuclear fuel has not yet reached its theoretical limit. Only a thousandth part of the latent energy is released in the course of a thermonuclear reaction. It is possible, however, to release all the energy. Today we are working with so-called antimatter which, entering into a reaction with ordinary matter, releases a thousand times more energy than in nuclear interactions. There is no antimatter on the Earth or near it. When we learn to create and accumulate it in vast amounts, we shall have a highly powerful, concentrated source of energy.

This is especially important for space flights beyond the solar system. Atomic fuel is of practically no use in flights to distant stars, because even light takes eight years to travel to the nearest star and back. Antimatter is the only presently known source of energy that could develop a speed close to the velocity of light, that could make it possible for humans to explore faraway stars. People will then live at such great distances that the signals they dispatch, traveling at the speed of light, will take several lifetimes to reach the Earth. Today we cannot even imagine the possibility of such scattered settlement.

Science says today that the greatest possible velocity is that of light. Experience shows, however, that notions of this kind are refuted as research continues. We once thought the atom was indivisible; it proved divisible. We believed that human beings could not travel beyond the Earth; they did. Physicists evolved the law that the mass of particles entering a reaction equals their mass afterward; it was disproved.

It is quite likely that the notion of the absolute limit of light velocity will be exploded. This may be possible if a spaceship does not pass consecutively all points in space. The whole universe would then be open for exploration. However, this is not a prediction based on modern science, but a dream, a fairy tale of our time. Equally fascinating is the idea of communicating with other civilizations. Such a breakthrough would provide inexhaustible new sources of information and knowledge.



TALE OF THE FISHERMAN AND THE LITTLE FISH

By Alexander Pushkin

AN OLD MAN and his old wife lived near the dark blue ocean in an old mud hut. For thirty-three years they had lived there, and every day the old man would take his net and go fishing, while his wife sat at home spinning.

One day the old man cast his net into the ocean, but when he pulled it up, it was filled only with mud. So he cast his net again, and this time it came up filled only with seaweed. But when he cast his net for the third time, it came up with a fish, not an ordinary fish, but a golden one.

The golden fish asked for mercy, pleading with a human voice:

"Old man, put me back in the ocean, and I will give you a handsome reward. You can have anything that you wish for."

The old man was surprised and frightened. For thirty-three years he'd been fishing, but he had never heard a fish talk. He released the golden fish, speaking to it kindly:

"God be with you, golden fish, I have no need of your reward. Go back to the blue ocean, and swim joyously in freedom."

The old man returned to his wife and told her the marvelous thing that had happened:

"I caught a fish this morning, not an ordinary fish, but a golden one, and the fish spoke to me like a human. She begged me to let her go free, and promised me anything I wished for as my reward. But I did not want any reward so I let her go back to the ocean."

"You're a fool and a blockhead," shouted the old woman, "not daring to take the reward! Why, you could have asked for a washtub, since ours is all battered and broken."

So he went back to the dark blue ocean. The ocean rippled slightly as he shouted to the golden fish. The fish swam up and asked him:

"What do you want, old fellow?"

The old man answered, bowing:

"Have pity, O fish, my princess! My old woman has scolded me soundly. She wants a washtub, a new one. Ours is all battered and broken."

The golden fish answered him:

"Go home and don't worry. God be with you, for you shall have your new washtub."

Then back to his wife went the old man. But she scolded him worse than ever:

"You're a simpleton and a blockhead! Just a washtub for all your begging! You could have asked for a lot more! Get back to the fish, you blockhead. You can at least beg for a cottage."

So he went back to the dark blue ocean, which was more troubled than before, and shouted to the golden fish.

The fish swam up and asked him:

"What do you want, old fellow?"

The old man answered, bowing:

"Have pity, O my fish, my princess! My wife is now scolding more than ever. I am old, she gives me no peace. The old shrew asks for a cottage."

The golden fish gave him her answer:

"Go home, don't worry, God be with you, for you shall have your new cottage."

He went back to his mud hut, but in its place stood a neat cottage with an attic, a brick chimney and a sturdy oak gate. The old woman sat at the window, and when she saw her husband, she abused him worse than ever:

"You simpleton and perfect blockhead! You begged only for a cottage! Back to the fish, bow before her; I don't want to be just a peasant, I want to be a lady of high position."

He went back to the dark blue ocean, and this time the waves were higher as he called to the golden fish. The fish swam up to him, asking:

"What do you want now, old fellow?"

The old man answered her, bowing:

"Have pity, O my fish, my princess! My wife now complains more than ever; I am old, she gives me no peace. She doesn't want to be a plain peasant but a lady of high position."

The golden fish gave him her answer:

"Go home and don't worry. God be with you."

Then back to his wife the old man hurried, and what did he see, but a castle! On the stairway stood his old woman wearing a costly coat of sable, a brocaded headdress, and pearls around her neck. On her hands were golden rings, on her feet she wore crimson shoes. Servants stood before her, and she beat them and pulled their hair. The old man approached her.

"Greetings, madam, lady and mistress! Now perhaps you have everything you want."

But the old woman screamed at the old man and sent him to the stable to serve there.

So a week went by and then another, when the old woman began to complain more than ever. She sent for her husband, saying:

"Go to the fish, bow before her. I don't want to be a fine lady. I want to be a ruler, an empress."

The old man, in terror, entreated:

"Old woman, you must have been eating henbane. You don't know how to walk and how to talk like an empress. You will set the whole empire laughing."

The old woman was angrier than ever, and she struck him on the cheek:

"Peasant, how dare you argue with me, a lady of position? Go back to the sea or I promise, if you do not, you shall be dragged there."

The old man made off for the ocean, and it was darker than ever as he shouted to the golden fish.

The fish swam up to him, asking:

"What is it you want now, old fellow?"

The old man answered her, bowing:

"Have pity, O my fish, my princess! Again my old woman is rebelling. She no longer cares to be a lady of position but wants to be a ruler, an empress."

And the golden fish gave him her answer:

"Go home, don't worry. God be with you. Your old woman shall indeed be an empress."

Then back to his wife went the old man. Lo, before him rose an imperial palace, and in the palace he spied his old woman, an empress, sitting at the table. Her servants, boyars and nobles, were pouring wine from abroad as she ate sweet, frosted gingerbread. Cruel bodyguards carrying axes and pikes surrounded her. When the old man saw them, he was frightened, and bowed at the feet of the woman, saying:

"Hail, mighty Empress, I greet you. Perhaps now your soul is contented."

The old woman never looked at him, just bade the guards drive him from her presence. The boyars and nobles ran up, shoving the old fellow forward. The guards at the doorway all but chopped him up with their axes. The common people mocked him:

"You deserve this, you old good-for-nothing! Perhaps now you'll learn not to go above your station!"

So a week went by, and another one when the old woman began to complain more than ever. She set her courtiers to find the old man and bring him to her. And now the wife screamed at her husband:

"Back to the fish, and bow before her. I don't want to be ruler and empress. I would rather be the sovereign of the sea and live in the ocean so that the golden fish could serve me and do whatever I bid her."

The old man dared not oppose her, dared not utter a word to cross her, so he returned to the dark blue ocean. A great storm was raging, the sea was in a black tempest, swollen with angry billows. He shouted to the golden fish, and the fish swam up to him, asking:

"What do you want now, old fellow?"

The old man answered her, bowing:

"Have pity, O my fish, my princess! Can you deal with my wife, that damned woman? She no longer wants to be empress. She wants to be sovereign of the sea, and live in the ocean, so that you yourself may be her servant and do whatever she bids you."

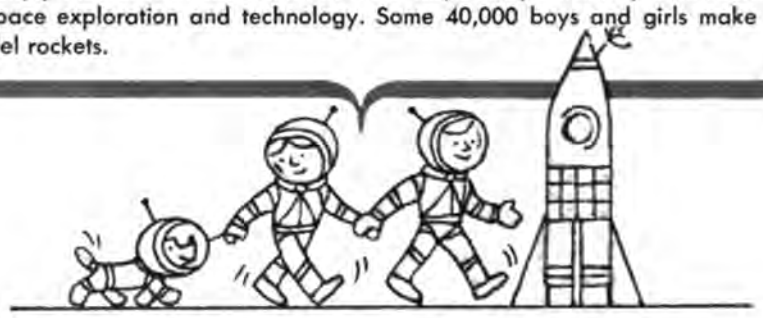
The fish splashed her tail in the water and disappeared to the depths of the ocean. On shore the old man waited in vain for an answer. Then he went back to his old woman. But what did he see? The old mud hut was before him, and there on the doorstep sat his old woman near a washtub all battered and broken.

SOCIETY AND CHILDREN

The Soviet Union has 184,000 10-year schools, attended by some 50 million children.

The country is in the process of completing the transition to compulsory secondary education.

Six hundred and seventy-seven clubs are where young technical hobbyists enjoy themselves most. Children these days are particularly interested in space exploration and technology. Some 40,000 boys and girls make model rockets.



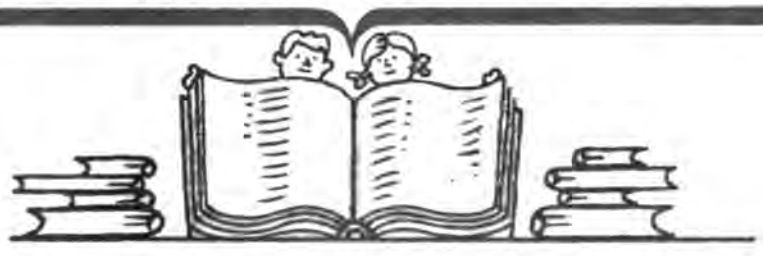
Young nature lovers get together in 380 clubs.

Petrozavodsk, the capital of Karelia, has the only Junior Forestry Academy in the country, set up by the local branch of the USSR Academy of Sciences. Faculty of the Forestry Institute also staff the academy.

There are 174 tour and hiking centers in the various republics. They organize camps for hikers, work out itineraries, assist young geologists and folklorists of school museums. In just the last few years schoolchildren in the Southern Urals alone have made 932 mineral finds.

In the 10-year schools there are 200,000 libraries.

The 34 children's monthly magazines have a total circulation of 17 million. The newspaper *Pionerskaya Pravda* has 10 million readers.



The country's 142 children's theaters entertain an audience of 30 million every year.

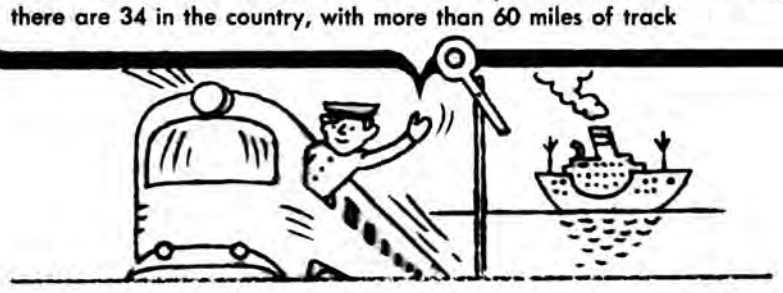
More than 4,000 specialized schools are attended by 800,000 children with aptitudes for music and art.

There are 3,948 Young Pioneer community centers for pursuing hobbies and other recreational activities.

Two million boys and girls are students at 3,580 children's sports schools. Some 2.5 million boys take part in countrywide hockey matches for the Golden Puck Prize.

There are over 150 children's boat and sailing clubs.

In 1935 the first Soviet children's railway was built in Tbilisi. Today there are 34 in the country, with more than 60 miles of track



Artek is one of the many children's camps in the famous resort area on the Black Sea. It is known not only to Soviet children but to children abroad as well. Some 300,000 boys and girls have spent their vacations at this Crimean health camp.

Orlyonok (Eaglet) is another children's health camp on the Black Sea. It accommodates 3,000 children in summer and 1,200 in winter. During the latter season the children attend school there.

Every summer more than 19 million children spend their vacations at Young Pioneer and hiking camps.

FOCUS ON THE HANDICAPPED CHILD

By Maya Gordeyeva

THE AMERICANS came from 10 different states, various universities, state and federal departments of education, the Johnson Foundation and the Council for Exceptional Children. For many this was a first visit to our country, a first personal contact with Soviet researchers and a firsthand view of what the Soviet Union is doing for handicapped children. They were able to see what facilities are available to bring them into the mainstream of life, give them an education and equip them for jobs and careers.

Handicapped children (and adults), like all other Soviet citizens, pay nothing for their education, from nursery through professional school, or their medical care, no matter how expensive.

Local medicopedogogical boards staffed by psychoneurologists, pediatricians, ophthalmologists, otorhinolaryngologists, logopedists and educators approach each case individually. They keep a record of the child's progress and review it regularly to see if changes are indicated.

Schools and kindergartens especially equipped for handicapped children have been set up to meet local needs, and special teaching methods have been devised for all categories of the handicapped.

If a child must stay at home or in a hospital for a lengthy period but is capable of learning, he receives individual instruction from a team of visiting teachers.

This first USA-USSR Seminar on the Education of the Handicapped was a lively and rewarding exchange for all parties concerned.

As *Dr. Nicholas Anastasiow, Director of Child Study* at *Indiana University,* noted: "The seminars were outstanding, particularly in the exchange of ideas. A broad spectrum was presented of what is happening in special education in the USSR."

Dr. Betty Caldwell, Director, Center for Early Development and Education, University of Arkansas, said that over-all there was "a good balance between formal talks and actually seeing programs—always so much more than just hearing them talked about."

In goals for handicapped children, the American educators felt they had much in common with their Soviet counterparts. But in practical methods of caring for and educating blind, mentally retarded, deaf or crippled children and in helping them adjust to the "larger life," they found that Soviet specialists had developed different concepts and even different conclusions over the decades.

Two Different Approaches

While agreeing in principal that severely handicapped children need to be educated in special classes or schools (preferably boarding schools), American researchers seem to be moving away from this concept, as *Dr. Jack Matthews, Chairman, Department of Speech, University of Pittsburgh,* pointed out, "trying to take care of more handicapped youngsters, especially those with speech disorders and the mildly mentally retarded, within a normal classroom." It was too early to say if this concept was correct, but another five years, he believed, would settle the issue in America.

Soviet defectologists, meanwhile, had moved in the opposite direction. After comprehensive testing, their research was swinging away from superficial treatment of even "minor" speech disorders.

The core of the matter, the cause of most handicaps, was also being explained differently in the two countries. American educators and researchers were mostly looking for it, as *Dr. Frank Wilderson, Associate Dean, College of Education, University of Minnesota,* noted, "in the environment." Soviet scientists see it "as originating mostly as a result of a biochemical or genetic defect."

In view of this, Soviet schools and kindergartens make early attempts, Dr. Wilderson pointed out, to screen youngsters who are likely to have or who already have difficulties in mastering the curriculum. Early detection is taken more seriously by the Russians, he believed, than by the Americans.

That is why youngsters are very carefully examined and observed in the Soviet Union "to make sure they are going to be able to cope with the curriculum." The facilities and staff are available to give children early special training if they need it.

"So early identification and early specialization in terms of where a handicapped child is going to receive an education has become a principle widely accepted by Soviet professionals, parents and the community at large and is quite a workable solution."

"A Tremendous Aspect of Child Development . . ."

When authorities in the United States refer to speech problems or defects, they are thinking largely in terms of the formation of sound as such. Some U.S. delegates, Dr. Matthews among them, were surprised to find that in the Soviet Union the concept of speech covers a much broader area than merely sound production and includes writing, spelling and reading.

Perhaps *Ida Wilderson,* a child development specialist, best expressed it for the delegation:

"We were very excited by the emphasis on speech development here, the way all youngsters are trained at an early age to speak distinctly and with expression. This is a tremendous aspect of child development, because one way to overcome emotional stress and develop self-confidence is to be able to hold your own in a group. We also were tremendously impressed by how the teachers are able to achieve this—the supportive, warm, loving way the youngsters are encouraged by their peers. I believe this is a very valuable part of the curriculum."

The Soviet concept of "concentric circles" could easily be adapted in the United States, some delegates thought, the notion that in working with children who have a speech problem, it is important to select the most relevant sounds first and then gradually build up to the others. This concept, Dr. Matthews pointed out, occurred to many researchers in America "but has not been worked out so far in an adaptable, systematic fashion."

Preschool Special Education

The earliest possible expert instruction for the handicapped child is a basic principle of Soviet defectology. This is especially important for the severely impaired. The enrollment of a young blind, deaf, crippled or deaf-blind child at a special nursery or kindergarten fits in neatly with the nationally financed preschool network.

American researchers watch the teletactor feedback device used in teaching deaf-blind children. Far left: A deaf-blind youngster finger spelling to find out what question he is being asked. Right: Professor Alexander Mescheryakov introduces four graduate students of the Zagorsk school for the deaf-blind. Right center: Ida Wilderson was "very excited by the emphasis on speech development." Far right: Dr. Jean Hebeler and William Geer at

The first USA-USSR Seminar on the Education of the Handicapped introduced the American participants to an aspect of Soviet education that was practically nonexistent 50 years ago. SOVIET LIFE reporter Maya Gordeyeva attended many of the sessions. The following is based on her interviews with some of the Americans who were there.

The handicapped child does not become an "exception" when he begins attending the special state-subsidized day-care or weekly boarding school type of institution (the latter is preferable), and a regular bond between the teaching staff and the parents is established for many years to come.

Perhaps because this kind of preschool education is still a relatively new thing in the United States, there was a sense of suspense and excitement when the visitors trooped into the neat and spacious playroom, well stocked with toys, of the youngest group at Moscow Kindergarten No. 669 for almost 100 totally deaf children.

What they saw was a cross between a game, a lesson and a contest, with the children and their young and enthusiastic teacher completely involved. During the 30 minutes it lasted, the six two-and-a-half-year-olds showed an expert mastery of finger spelling, a knowledge of many letters of the alphabet and an ability to combine them into words and pronounce them, so that they were able to communicate with each other and the teacher through lip reading and the spoken word. It was wonderful to see how completely at ease they were—bright, cheerful and engaging. They had no hearing aids of any kind.

The American educators were also somewhat surprised to find that Soviet methodology was not oriented toward using hearing aids too soon. Sound, or what could be brought of it to the deaf child through amplification, was only gradually introduced here to each youngster individually by the kindergarten doctor.

They were also surprised that finger spelling was taught at such an early age.

Dr. Caldwell stressed that while Soviet defectologists taught the parents to help the child at home, they were thoroughly convinced of the value of early formal training of handicapped children, particularly the deaf, at preschool centers.

"Warm, Understanding, Patient"

The American educators had a good deal to say about the quality of Soviet defectology and education in general.

"I was very much impressed by the education and the sincerity of the teacher in the classroom and the general happiness of the children," said Dr. Matthews. "It comes right through, and you just can't miss it. The teachers were warm, understanding, patient and concerned with the youngsters."

Dr. John Melcher, Director, Bureau of Handicapped Children, State Department of Public Instruction, Madison, Wisconsin, was impressed not only with the dedication of the staff and the cleanliness of the schools but with "the creative programing" and the "consistency of scientific principles and practices." He would have "liked to hire the Russian teachers in his program" and believed "they had a good theoretical base."

Dr. Edwin Martin, Associate Commissioner, Bureau of Education for the Handicapped, Department of Health, Education and Welfare, thought that "not only was the quality of the teaching excellent, but the staffing ratio was much more favorable than you can find in many places in the United States." He also believed the employment of counselors to assist the teacher was a very good thing because it gives the handicapped children more individual attention. In some schools the ratio is almost two helpers to each child.

Overcoming Multiple Handicaps

It is generally recognized that there is not a more difficult area of defectology than teaching the deaf and blind, children with impairment of two major sensory areas.

American researchers were especially interested in this field because in the United States some seven or eight years ago, as a result of a rubella epidemic, a large group of women gave birth to severely handicapped children at about the same time.

Soviet defectologists are, of course, familiar with the experience of the deaf-blind American Helen Keller, who broke through the double barrier of silence and darkness.

Soviet defectology has scored similar victories since then and produced Olga Skorokhodova, a writer, poet and scientist with similar handicaps. Set up only a little over 10 years ago, the school in Zagorsk,* which the U.S. educators were taken through, has become a regular research center, a brain trust of a kind, for aiding such severely afflicted youngsters.

"All Possible Facets of Life"

The ultimate orientation of all types of instruction for handicapped children, as for normal children, is a vocation, a career.

The prime movers here are the USSR Society for the Blind and the USSR Society for the Deaf. The enterprises of these two societies are so profitable that they are able to finance the building of more schools and supply sophisticated equipment for handicapped people all over the country.

Dr. Wilderson commented on some of the psychological aspects. "Getting handicapped individuals into all possible facets of life—the working fields, the arts and so forth—through their own organization makes them self-sufficient and also provides a place where they can come if they have difficulties. It is also a place where they can gain additional strength so that they can go out and deal with a society that has a different set of capabilities. I was very much impressed by their results."

Dr. Matthews was full of praise for the repertory theater for the deaf in Moscow, one of the highlights of the tour. The production was staged by deaf professionally trained actors. "For us it was not a professional experience," he said, "but a genuinely esthetic one."

Other delegates commented on a vocational center for the handicapped in Leningrad, where deaf artists sketched from live models and a ballet teacher taught dancing to deaf students who performed adequately in spite of the fact that they did not actually hear the music and responded only to the vibrations they felt from the air and the floor.

"In both countries," Dr. Martin pointed out, "there are many bright and innovative people who are working on common problems. I'd like to see more mutual exchanges so that we can continue to benefit from them."

* For more details about the school in Zagorsk see SOVIET LIFE No. 6, 1973, p. 38-40.

By Alexander Tropkin

IT'S THE TYPICAL SCENE in any Soviet school—the bell is ringing, the corridors are awash with the high voices of children, first graders are headed pell-mell for the lunchroom. The usual school clamor but with this difference: That's English you're hearing, and not only during recess but also in the classroom.

Beginning with the second grade (the fifth in the regular school), students here study English as part of a special program. In the lower grades they spell out English words in chorus after their teacher; in the fifth they begin to study—in English—geography, history and Russian literature. When they reach the senior (ninth and tenth) grades, they study American and English literature in the original and do technical and literary translations.

Except for its concentration on the English language, Moscow School No. 4, in one of the new residential districts, is like any other Soviet school. And in the dozens of these specialized schools in the capital and other cities, as in all the schools, classrooms and corridors are filled with wall newspapers, posters and showcases. Honor certificates and sports prizes abound. The most striking—and crowded—showcase belongs to the school's popular international club, named for John Reed, the American journalist who wrote the famous **Ten Days That Shook the World.** In the 12 years since it was founded, Interclub (its everyday name) has had hundreds of members.

Interclub faithfuls have a special interest in the United States, Canada and Great Britain. People from these countries are the school's most frequent visitors.

"Our club has 50 members, but anybody can attend meetings," the president, tenth grader Sasha Savelyev, told me. "We get together twice a month to hear reports by students (in English, of course) on current events in the United States and Canada. Talks on young people and st[illegible] A and reviews

SITS A SOVIET SCHOOL

of the latest books by American authors get the best turnout.

"We dramatize—and stage—American novels and excerpts from American plays in our school theater. Quite often we play host to tourists and journalists from the USA. Recently Mrs. Humphrey, wife of the American Senator, paid us a visit. Come to one of our meetings, and you'll see what it's like."

I accepted Sasha's invitation and went to a meeting of Interclub. The auditorium was packed, the teachers had special seats. My friend Sasha introduced the guest speaker, Kenneth Cassie, a young American teacher from New Jersey.

Guest, however, was not quite the right word for Kenneth. He had been working at the school for almost two months, studying the methodology of Soviet teachers and acquainting them with his own. The students liked him immediately (he taught them American literature) and called him Kenneth Mikhailovich.

His talk, in English, was on art in the United States. Questions followed, but after replying to some of them, he threw up his hands in despair, crying,

"I'm not a walking encyclopedia!"

A concert was given in Kenneth's honor. The children danced the Russian **Barynya,** sang American folk songs, read their translations from the Russian of some of the English poets, and one curly-headed youngster even recited a soliloquy from **Hamlet.**

After the concert I asked Cassie what he thought of the meeting.

"Oh, this is one of the nicest days of my life," he said. "The children gave a fine performance. And their English is so good!"

His comments invited a serious talk on education so that when we were alone in the auditorium, I asked what he thought of the Soviet school system, Soviet teachers and students, as well as the conditions provided him for his work.

"Of course my impressions are limited to Moscow and Leningrad," he said. "But what I've managed to see has gone beyond my expectations." He thought the Soviet school system had many good points, one was its centralization. The fact that all schools offer a single program and identical textbooks helps to equalize the level of school experience and achievement in city and rural areas alike. The same can be said for the instructors' practice teaching and their basic methodology.

Kenneth spoke with enthusiasm about the businesslike and friendly atmosphere in the classrooms and said that the teachers understood children, made every effort to. In general he found that Soviet and American schoolchildren had much in common. "They are just as inquisitive and lively." He also had the impression that in the Soviet Union children stay young longer. He did not mean in a childish way. Perhaps it had something to do with a secure future. They have excellent conditions for self-development. The parents don't have to worry about opportunities for their children, he said. Many of the students go on to study at higher educational institutions where tuition is free. Those who want to start jobs right away are offered a choice.

Kenneth was struck with the children's rich background, especially their knowledge of American literature. In the tenth grade they read Ben Franklin, Theodore Dreiser, Jack London and Ernest Hemingway in the original. Their translations of Longfellow and Frost, he said, showed genuine talent. The children seemed to be especially interested in the modern writers and poets of the USA, the reason he spent more time on them in his lectures.

"Though my trip is not over yet," he said, "I'm already thinking of the next one." He wants to visit other cities and make a more detailed study of the experience of his Soviet colleagues. He has all the books he needs, is free to sit in on any class and gets every help from the teachers and the school administration, but two months, he says ruefully, is such a little time.

Junior Water Skiers

By Zinovi Kovtun

Interest in water skiing is booming in the Soviet Union, especially for the younger set, ages 12 to 17. Last year 50 boys and girls from all over the country gathered in Dnepropetrovsk for the first national junior championship. A few years ago this city built a water sports complex on the Dnieper with a rowing canal, open-air basin and skiing canals.

"No other sport does so much for over-all physical development and gives such esthetic pleasure."

Yuri Gagarin, world's first

THIS YEAR the USSR Water Skiing Federation will mark its tenth anniversary. The world's first cosmonaut Yuri Gagarin, who headed the federation, said: "No other sport does so much for over-all physical development and gives such esthetic pleasure."

Much has been done in these 10 years: Aquatic stadiums have been built and annual championships set up; the results keep improving; and water skiing is now taught at children's sports schools throughout the country.

Last year the first national junior championship was held in the Ukrainian city of Dnepropetrovsk. Several years ago the City Soviet built a sports complex on the Dnieper. It consists of a rowing canal, an outdoor basin and three water skiing canals: for slalom, figure skiing and jumping.

Young water skiers between the ages of 12 and 17 gathered from all over the country for the championship. Byelorussia's Alexander Yeremeyev and Alexander Tamashpolsky of the Ukraine fought it out for the national crown. Both are 17 and the junior champions of their republics.

Tamashpolsky ceded an insignificant edge in points to Yeremeyev in the slalom to place second. He hoped to catch up with his rival in the figure event. An unfortunate fall in the second attempt widened the gap, but Tamashpolsky tried hard for a prize-winning place in the over-all. A victorious ski jump (121 feet 4 inches) topped his personal showing of a month before the meet by almost 33 feet.

Yeremeyev took first place in the over-all with 3,722 points, with Tamashpolsky in the second spot. The winner in the slalom for girls was 16-year-old Olga Stalnova of Minsk. In the figure event, however, she ceded first place to Olga Zorina from the Volga town of Rybinsk. But in jumping Stalnova was first again with 73 feet 8 inches, meeting the standards for the Master of Sports rating. She piled up a total of 2,762 points to take first place in the over-all

A group of young athletes in bright training suits surrounded a little girl who had finished her performance: 12-year-old Natasha Lukyanova, the youngest on the Moscow team. She had just qualified for the rating of candidate for Master of Sports in figure skiing. After congratulating Natasha, the youngsters argued excitedly about her performance.

I took advantage of the gathering to ask them who they were and where they came from.

"I'm from a small town in the central part of Sverdlovsk Region called Verkh-Neivinsk," Mikhail Pyatkin told me. "The summers there are so short that we go in for winter sports mostly. But that doesn't discourage the water skiers. In winter we do alpine skiing, and as soon as its gets warm enough, we switch.

"Our local factory set up its own water sports center on a beautiful lake in the Urals. The trade union committee paid for the motorboats, skis and other equipment. Everyone who wants to can train in our water skiing club."

"I've been interested in both gymnastics and water skiing for a long time," said Olga Stalnova. "I took gymnastics as an extracurricular activity in school, but whenever I went out to the Minsk Reservoir—the city's most popular recreation spot—I would watch the skiers gliding over the waves. Finally, when I was 14, I caught the bug myself and decided to join the water skiing club. Coach Victor Novozhilov accepted me in his section.

"There was nothing to stop me from taking up the sport: I was doing well in my studies, so that my parents weren't against it, and it didn't cost me a single kopeck."

"There was never any question in my mind," said Tamashpolsky, who is from the city of Nikolayev in the Ukraine. "My father is a yachtsman and I used to spend a lot of time at the water sports center, where all the young people gather. Some went in for swimming, others rowed, but the moment I saw the water skis I knew they were for me."

"My parents aren't particularly interested in sports," joined in Tamashpolsky's rival Yeremeyev. "My father is a smith, and Mother is a faience painter.

"After two years of training, I placed second in the slalom at the 1970 international meet in Riga.

"Our Byelorussian water skiers train from early spring to late autumn at the Minsk Reservoir. To extend the season, we go to the Black Sea, and in the winter to the mountains for training in alpine skiing. All expenses are paid by the sports society. The members of our team are still in school, and only those who do well in their studies are permitted to train. I'm a strong believer that sports should not interfere with school. Actually, they develop will power and collective spirit, help in your studies, make life more interesting and beautiful."

I asked the young people whether they could name some of the world's leading water skiers.

"Of course," said Natasha Lukyanova. "Liz Allen of the U.S., Janet Stuart-Wood . . ."

"Soviet ski jumping champion Anatoli Radushinsky, all-round water skier Vladimir Filin, Tatyana Rozhkova, Dennis Ralphs, Mike Suyderhoud," continued 12-year-old Seryozha Ostroumov from Kiev.

In their excitement I could sense the eagerness for new starts.

NEXT ISSUE

More than two million foreign tourists—90,000 of them from the United States—visited the Soviet Union in 1973. Thousands of Americans have been to Moscow and Leningrad, the Ukraine and the Black Sea coast, Siberia and Central Asia. One of the most exciting of the hundreds of tours organized by Intourist, the official Soviet agency, is the trip through Uzbekistan, the largest of the Central Asian republics. This is where the most ancient cities of the East are located—Tashkent, Samarkand, Bukhara and Khiva. Those who see the old monuments for the first time can't believe their beauty, especially the ones built in fourteenth and fifteenth century Samarkand. This year Intourist has added Armenia, Azerbaijan and Georgia to its growing list of trips. A group of articles will give the reader an idea of the tourist scene and the reactions of several Americans who have visited our country.

The "lungs" of the earth . . . a vital source of the world's food supply . . . indispensable for transportation . . . a tremendous source of energy . . . these are some of the characteristics properly attributed to the ocean. But our prime concern these days is not how to use the ocean but how to save it. Industrial and domestic wastes are dumped in its waters, which now contain mercury, pesticides and oil in concentrations way beyond permissible limits. Unless something is done to stop the dumping, there will surely be disastrous changes in the ocean's ecological system. Leonid Brekhovskikh, Soviet physicist, member of the USSR Academy of Sciences and editor in chief of the journal *Okeanologia*, is the author of an article reviewing the Soviet Union's past contribution to ocean studies and its plans for future work. There is also an article on Soviet-American cooperation in studying the world ocean.

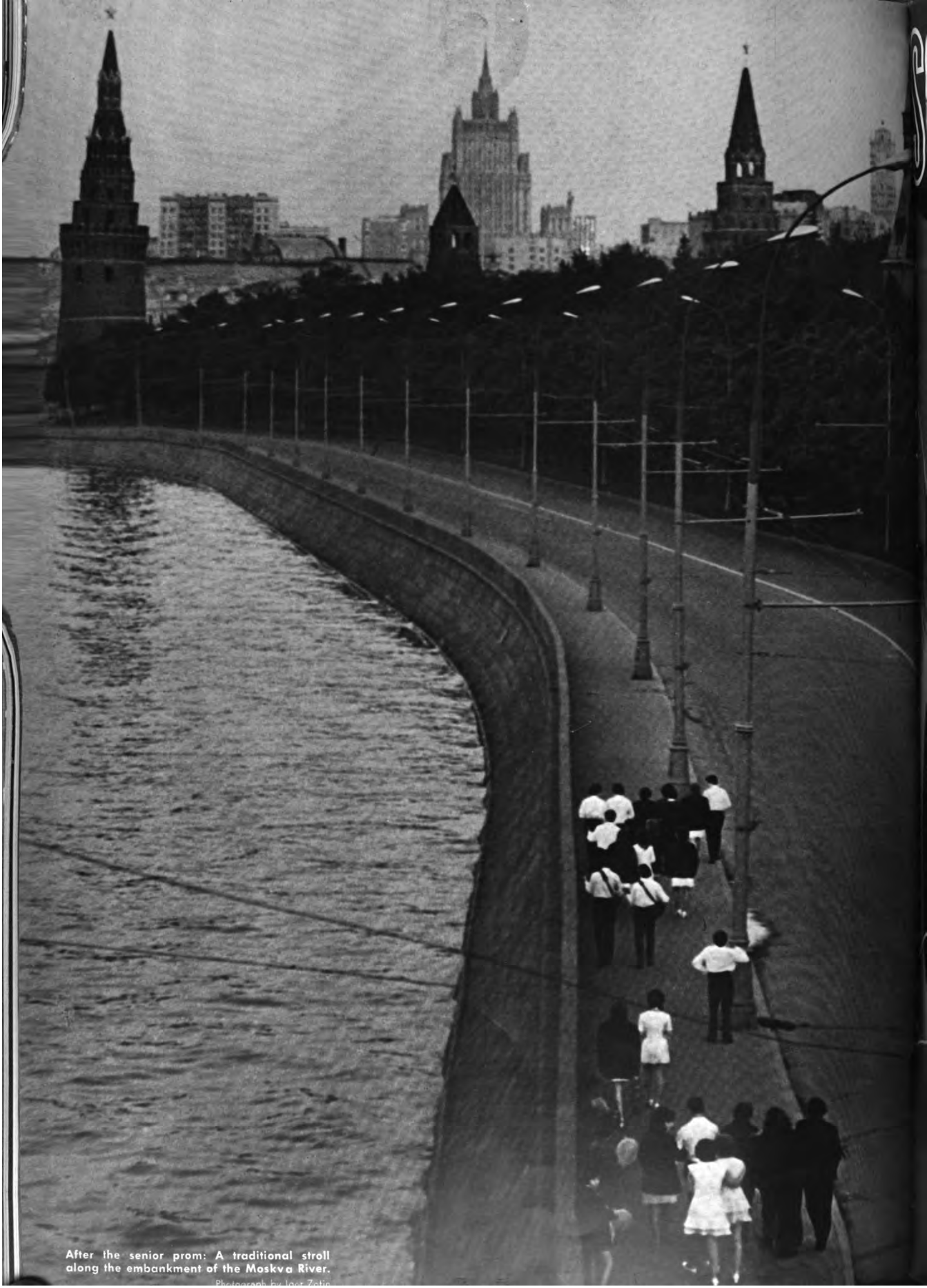
Nikolai Amosov has received the Lenin Prize for his pioneering work in thoracic surgery. He founded and heads the Cybernetics Institute of the Ukrainian Academy of Sciences, is a deputy to the USSR Supreme Soviet, a writer (one of his novels is a best seller) and the subject of a documentary film. A well-illustrated article describes this very unusual man.

Chinghiz Aitmatov, a Kirghiz by nationality, is one of the country's most interesting writers. His books have been translated into many languages and made into films. An interview deals with national features in art.

An article about the workers of LOMO, the Leningrad optical-mechanical plant, one about international cooperation in fighting fires at sea, one about world Sambo champion David Rudman and his young pupils, "difficult juveniles," plus all the regular feature items will complete the issue.

COMING SOON

Biological center near Moscow



After the senior prom: A traditional stroll along the embankment of the Moskva River.

Photograph by Igor Zotin

SOVIET LIFE

THE INDIVIDUAL AND SOCIETY

WELCOME TO THE USSR

EXPLORING THE OCEAN BED

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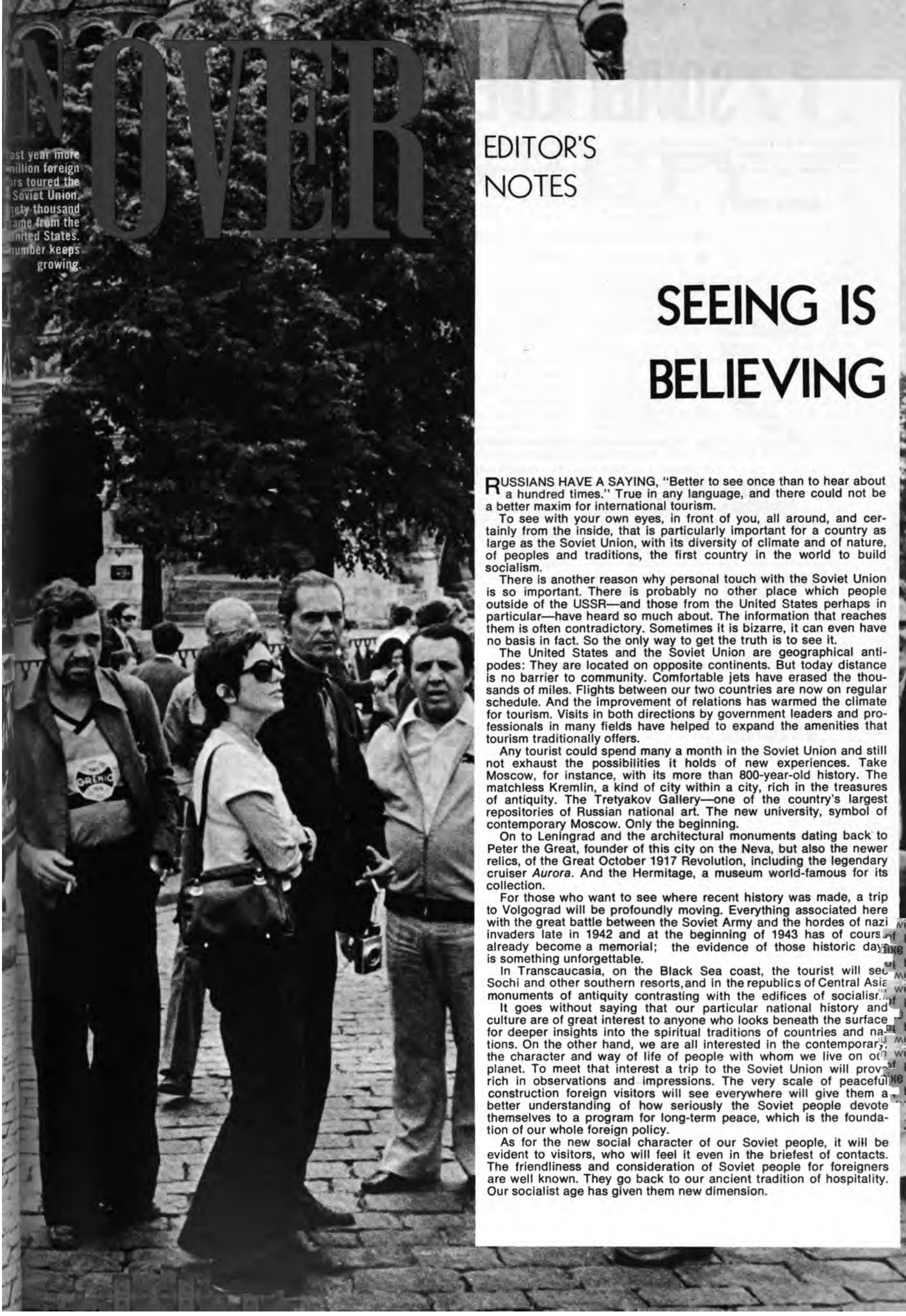

EDITOR'S NOTES

SEEING IS BELIEVING

RUSSIANS HAVE A SAYING, "Better to see once than to hear about a hundred times." True in any language, and there could not be a better maxim for international tourism.

To see with your own eyes, in front of you, all around, and certainly from the inside, that is particularly important for a country as large as the Soviet Union, with its diversity of climate and of nature, of peoples and traditions, the first country in the world to build socialism.

There is another reason why personal touch with the Soviet Union is so important. There is probably no other place which people outside of the USSR—and those from the United States perhaps in particular—have heard so much about. The information that reaches them is often contradictory. Sometimes it is bizarre, it can even have no basis in fact. So the only way to get the truth is to see it.

The United States and the Soviet Union are geographical antipodes: They are located on opposite continents. But today distance is no barrier to community. Comfortable jets have erased the thousands of miles. Flights between our two countries are now on regular schedule. And the improvement of relations has warmed the climate for tourism. Visits in both directions by government leaders and professionals in many fields have helped to expand the amenities that tourism traditionally offers.

Any tourist could spend many a month in the Soviet Union and still not exhaust the possibilities it holds of new experiences. Take Moscow, for instance, with its more than 800-year-old history. The matchless Kremlin, a kind of city within a city, rich in the treasures of antiquity. The Tretyakov Gallery—one of the country's largest repositories of Russian national art. The new university, symbol of contemporary Moscow. Only the beginning.

On to Leningrad and the architectural monuments dating back to Peter the Great, founder of this city on the Neva, but also the newer relics, of the Great October 1917 Revolution, including the legendary cruiser *Aurora.* And the Hermitage, a museum world-famous for its collection.

For those who want to see where recent history was made, a trip to Volgograd will be profoundly moving. Everything associated here with the great battle between the Soviet Army and the hordes of nazi invaders late in 1942 and at the beginning of 1943 has of course already become a memorial; the evidence of those historic days is something unforgettable.

In Transcaucasia, on the Black Sea coast, the tourist will see Sochi and other southern resorts, and in the republics of Central Asia monuments of antiquity contrasting with the edifices of socialism.

It goes without saying that our particular national history and culture are of great interest to anyone who looks beneath the surface for deeper insights into the spiritual traditions of countries and nations. On the other hand, we are all interested in the contemporary, the character and way of life of people with whom we live on our planet. To meet that interest a trip to the Soviet Union will prove rich in observations and impressions. The very scale of peaceful construction foreign visitors will see everywhere will give them a better understanding of how seriously the Soviet people devote themselves to a program for long-term peace, which is the foundation of our whole foreign policy.

As for the new social character of our Soviet people, it will be evident to visitors, who will feel it even in the briefest of contacts. The friendliness and consideration of Soviet people for foreigners are well known. They go back to our ancient tradition of hospitality. Our socialist age has given them new dimension.

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SOVIET LIFE

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LETTERS TO THE EDITOR

I had my dream come true December '73. I went to Moscow and Leningrad. I still can't get over it and I hope to go again. Russia is my dream and I visit it every month reading your magazine.

Mrs. Drenning
Holmes, Pennsylvania

I teach a course on Russian history in junior high and find the magazine quite helpful in introducing students to the people. In this troubled world I think this is a step toward understanding.

Beverly Higdon
Dalton, California

SOVIET LIFE is the most magnificent magazine published in the United States both from the points of information about the Soviet Union as well as for the splendid layout and its beautiful photography.

L. Feinstein
New York, New York

We enjoy the magazine very much, especially your recent articles on Leningrad. We also appreciate your articles on natural history and Soviet science in general, and I am especially interested in your occasional notes and articles on Soviet geology and paleontology in particular. Some of the color photography and published reproductions are beautiful, as well as outstanding—congratulations on a good job.

Joseph J. Stjean
Carrboro, North Carolina

I enjoyed the magazine very much in its every aspect, but have particularly enjoyed articles about the railway Aeroflot, and the tremendous progress Russia is making in developing the new lands—Siberia. Keep up the good work.

I hope in the near future you will have a full article on the Hotel Russia since I was most fascinated by my stay there. In fact, why not an article on Russia's fine hotels, including the old but gallant Astoria in Leningrad.

E. J. Bois
Falmouth, Maine

The photography in your magazine is beautiful—the country, the people, the arts—this I especially enjoy. I enjoy reading about your new cities, Shevchenko, city in the desert. How I would like to see it. Sorry I can't oblige you with some criticism, but I just can't come up with any. The only way you could improve SOVIET LIFE would be to make it 128 pages. The USSR cares for, and about, the worker, and that really comes on strong with me.

Permanent Subscriber

I appreciate the information your magazine has sent to me.

My students have enjoyed your magazine SOVIET LIFE. I think it has opened their somewhat closed-mindedness about the Soviet Union.

John R. Chapman
Clewiston, Florida

THE INDIVIDUAL AND SOCIETY

By Grigori Alexeyev

THE PEOPLE of the Soviet Union—250 million of more than 100 nationalities—live in a socialist society in complete equality. The rights of all citizens are guaranteed, with no privileged sections or groups since all Soviet people belong to the same social category. Their main source of income is remuneration for their labor.

The relations between large and small national groups, between workers and farmers, between people doing manual and intellectual jobs, between managers and the rank-and-file are based on comradely cooperation. This is a new society, a society history has not known before, in which there is no social basis for political discord.

Although it had its origin in an economically backward country, the Soviet Union has developed into one of the world's greatest industrial powers in a very brief period. In industrial production it today holds first place in Europe and second in the world, after the USA, and in a number of major branches of the economy, even first place. The enthusiasm of millions of working people with confidence in the policy of the Communist Party and the Soviet Government made the feat possible.

It is a confidence that takes its strength from the manner in which the problem of the individual and society has been solved, from the fact that there are no underprivileged in socialist society and that this society's concern for people is real, and from the fact that Soviet power's policy with regard to the individual's interests is in keeping with humanity's eternal striving for justice, for the ideals of democracy and progress.

Equality under socialism encompasses the entire complex of the requirements of people, their demands on society. This is unquestionably the most influential factor. It inspires people, bolsters their self-dignity, gives them confidence. Soviet citizens are firmly convinced that their society really helps them attain the level of development they are capable of.

The economic foundation of socialist democracy is the public ownership of the means of production. In the Soviet Union, the land, the factories and plants, transport facilities and the banks belong to the entire people—there are no private companies. All citizens are thus equal owners of the national wealth. In this economic democracy lies the key to the individual's freedoms and rights. Among other things, the socialist economy makes it possible to create substantial public consumption funds (this year they amount to 82.5 billion rubles). This is the portion of the national income that covers pensions, student grants, maternity benefits, paid leaves; finances education, medical services, sports and other recreational facilities.

A socialized, planned economy is a guarantee against unemployment and crises. For more than 40 years now, from the very early thirties, there has been no unemployment. Socialist industrialization of the country, extensive technical modernization of all branches of the economy and the rapid development of scientific research have made the very essence of work more creative and really interesting, affording broad scope for the worker's initiative and inventiveness.

Full employment guarantees Soviet citizens a steady family income. They can view the future calmly and plan ahead for long periods of time. They know that if they want to continue their education or change their trade or profession, the facilities and jobs are readily available. Socialism gives the individual not an abstract principle, not a declaration, but concrete facilities for personal fulfillment. This holds for each member of society. Everyone is guaranteed a free education and medical services. Like the guarantee to work, these are real bulwarks of security.

The same holds for the average citizen's opportunities to take part in the country's political and public life and in the management of production. There are absolutely no restrictions in this respect. The individual's sense of responsibility, merit and talent are the only criteria taken into account in nominating candidates to the Soviets or in choosing citizens for other positions of political trust.

The Soviets, the central and local bodies of state power, are a political school where millions of people receive training in state administration. Along with the USSR Supreme Soviet (the country's parliament, which consists of two equal chambers: the Soviet of the Union and the Soviet of Nationalities totaling 1,517 deputies), there are also 15 Supreme Soviets of the union republics, 20 Supreme Soviets of the autonomous republics and 50,000 local Soviets with 2.2 million deputies. In addition about 25 million activists work on various committees of the local Soviets.

Socialism is the first system that makes the large arena of political activity accessible to the workers and peasants. The following figures were cited at the Twenty-fourth Congress of the Communist Party of the Soviet Union (1971): More than 80 per cent of the present secretaries of the Central Committees of the Communist Parties of the union republics and the territorial and regional committees, 80 per cent of the chairpeople of the councils of ministers and of the territorial and regional executive committees, and nearly 70 per cent of the ministers and chairmen of the state committees of the USSR began their careers as workers or peasants. More than half the directors of the largest industrial enterprises in the country were once workers.

Workers and farmers comprise the main force in our country's mass inspection system—People's Control. Its committees, groups and posts are elected and enjoy considerable powers. Inspecting the activity of different institutions, particularly the economic ones, the people's inspector not only exposes shortcomings or violations of socialist legality, but makes constructive proposals on how to remedy deficiencies and improve organization. The participation of workers and farmers in running the state and managing production develops initiative and encourages political activity.

There are a number of independent public organizations functioning actively in the country. The most influential are the trade unions with about 100 million members and the All-Union Leninist Young Communist League, the Komsomol, with 33 million members. Among the others are special interest societies and hobby clubs, ranging from scientific societies to stamp collecting and sports clubs. Here people can share their experience and know-how with others and benefit from worthwhile undertakings in a very practical way.

Feeling the strong support of society, people naturally strive for civic self-perfection. They gradually acquire the characteristics of the collectivist, the internationalist, the conscious builder of the future—features of the historically new community that has evolved under socialism—the Soviet people. It manifests itself in people's attitude toward work, education, community activity and spiritual development. It manifests itself in their friendly relations with their fellow countrymen of other nationalities, in their respect for other peoples, in their indomitable will for universal peace.

Vladimir Lenin, the founder of the Soviet state, wrote:

> . . . . *only* socialism will be the beginning of a rapid, genuine, truly mass forward movement, embracing first the *majority* and then the whole of the population, in all spheres of public and private life.*

This scientific forecast has come true.

We have built a developed socialist society and are now working on the creation of the material and technical base of communism. Specialists have outlined the contours of the country's long-term development up to the years of 1990-2000. These are big plans based on tendencies already manifested in our present life, shoots of the future that have already begun to sprout.

Conditions for the all-round, harmonious development of the individual will improve year by year. The productivity of labor will rise sharply during the scientific and technological revolution. This will make it possible to further reduce the workweek and increase the amount of free time. The intellectual level of the labor of the worker and farmer has begun to approach that of the engineer. The functions of the state apparatus will to an increasing degree pass over into the hands of public self-government bodies.

Somebody might say that this is a utopian dream, but at one time present-day reality also seemed utopian. Our plans are based on the objective laws governing the development of society, laws evolved from the theory of scientific communism. They guarantee the success of new social transformations.

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*Vladimir Lenin, *Collected Works*, English edition (Moscow: Progress Publishers, 1964), vol. 25, p. 472.

VALUABLE CONTRIBUTIO TO PLANETOLOGY

Interview with Roald Sagdayev

Unmanned Soviet space probes have obtained considerable new data on the Moon, Venus and Mars. Another step in the exploration of outer space was made by the Mars 4, Mars 5, Mars 6 and Mars 7 probes launched in July and August of 1973. They continued the exploration begun by Mars 2 and Mars 3 in 1971. The aim of this program is a complex exploration of the "red planet."
Below Academician Roald Sagdeyev, director of the Space Research Institute, USSR Academy of Sciences, comments on the most recent space experiment in an interview with *Pravda*.

Q : How important is Mars research for an understanding of the solar system?
A : Space technology gives us the opportunity of finding experimental answers for such fundamental problems as the origin of the solar system and of life within it. The study of various bodies of the solar system and of their specific features allows us to reconstruct the various stages of its history and serves as a key to understanding such processes as the appearance of gas and water envelopes, differentiation of the planet body into phases, formation of the surface and interaction with the environment.

Some 10 years ago astronomers, drawing on ground observation data, traditionally qualified the planet Venus as the Earth's twin. However, the flights of spacecraft and, first and foremost, of Soviet probes of the Venera series, showed striking differences in the physical conditions on that planet's surface from those on the Earth. Mars, on the contrary, in many respects turned out to be much closer to the Earth than had been assumed.

We found that not so long ago Mars was quite active geologically, and that activity may still be going on. The appearance of many formations on the planet's surface strengthens our reasons for assuming the presence of large water streams in the past. And water, we know, is among the main factors determining the nature of surface evolution and probably plays the decisive role in the creation of conditions for the appearance of life.

The Mars missions of a number of Soviet and American space probes have already disclosed many important characteristics, both of the planet per se and of the surrounding space medium.

This exploratory stage advanced new problems in the further investigation of the terrain; its nature is a direct result of the geological activity of the planet and the processes taking place on its surface. Still unresolved is the problem of the water content of the atmosphere and surface of Mars. It is still a mystery what accounts for differences in the reflective capacity of so-called Martian seas and continents and the seasonal changes in these differences. No less important are experiments in near-planet space.

Q: What new data on the specific features of the atmosphere and surface of Mars have been obtained from experiments performed during the orbit of its artificial satellite?
A: The orbital station carried a number of instruments for a comprehensive investigation of the atmosphere and surface of the planet by astrophysical methods. The optic axes of all instruments were oriented to "see" the planet when the station (period of revolution 24 hours and 53 minutes) entered the zone of minimum distance from it. This allowed for very detailed investigations.

Data on the surface relief, temperature, heat conductivity, structure and composition of the ground, on the chemical composition of the lower atmosphere and structure of its upper layers were obtained by the new experiment and are now being processed. A similar (though smaller for the volume of radioed information) astrophysical instrument complex operated on Mars 3, and the comparison of results obtained from them is of great interest.

By means of optical instruments, altitude differences of several kilometers were detected on the flight routes of the Mars 5 probe.

The temperature of the uppermost ground layer (several centimeters thick) was measured by the intensity of the planet's thermal radiation. The heat conductivity of the ground is determined by the degree of diurnal temperature changes, and this heat conductivity depends directly on the ground structure.

A photometer sensitive to the lines of water vapor absorption showed that in some areas of Mars the water vapor content in the atmosphere might reach 60 microns of precipitated water. This is several times more than the maximum volume of water vapor discovered in 1972 by a similar instrument on the Mars 3 probe. Substantial humidity fluctuations of the atmosphere along the flight route (at least by five times) may point to a varying rate of water emanation from the interior in different parts of the planet. An ultraviolet photometer was the first to detect traces of different atmospheric zones on Mars.

The outermost part of the Martian atmosphere consists of atomic hydrogen which disperses solar radiation. An ultraviolet photometer which recorded atmospheric glare showed that the temperature of Mars' hydrogen corona, stretching to an altitude of approximately 20,000 kilometers, came to about 350° centigrade.

Q: Researchers are very much interested in the magnetic field on Mars. What new information has been obtained about that?
A: In 1972 the magnetometers of the Mars 2 and Mars 3 space probes detected in the close environs of the planet a magnetic field of the order of 30 gammas. This is several times more than the interplanetary field transported by "solar wind" (streams of charged particles emanating from the Sun). New data obtained from the planet's orbit confirm the presence of such a large field and extend our knowledge of its dimensional characteristics, particularly the magnitude of the field on the side of the planet opposite the Sun, which is particularly significant.

So the hypothesis about the planet's own magnetic field being several hundred times weaker than the Earth's field has been confirmed. New data on the magnetic field will increase our knowledge of the interior structure of Mars and of the process by which the field is generated.

Q: Will you comment on the results of photographing Mars?
A: In the first half of February, the Mars 4 probe photographed Mars on its fly-by trajectory, while the Mars 5 probe photographed it from the orbit of an artificial satellite. The photography was carried out by two television cameras. In addition, images of a wider terrain along the orbital circuit were produced by electro-optical scanners,

The photographic path lay in the Southern Hemisphere and stretched for several thousand kilometers from west to east, covering many areas having different types of surface structure. They especially help in analyzing the terrain of the site on which the Mars 6 vehicle landed.

Q: During the descent of the Mars 6 instrument pack in the planet's atmosphere, a world historic first, a number of direct measurements were made. How did the descent proceed and what are the results of these measurements?
A: The Mars 6 automatic interplanetary probe reached the environs of Mars on March 12, 1974. At the approach to the planet (48,000 kilometers) the instrument pack was released into the rendezvous trajectory on signal from a special mechanism. The probe itself continued its flight along a path about 1,600 kilometers from the planet's surface. The instrument pack entered the atmosphere of Mars, and aerodynamic braking was started. When certain overloads were reached, the parachute system was put into operation.

The entire stretch, from entry into the atmosphere and aerodynamic braking

to the parachuting, to about five minutes.

To investigate the atmosphere, the instrument pack carried overload sensors and equipment for measuring pressure, temperature and chemical composition. According to preliminary estimates the pressure at the surface at the landing site comes to about six millibars (as against 1,000 millibars on the Earth).

Because of the low density of the Martian atmosphere (it is about a hundre

his photograph was transmitted by the Mars 5 probe. The crater right of center is 15 miles in diameter. A smaller one is e on its swell. There are numerous radial hollows on an inside slope of the big crater. Seven probes, the last launched n August 1973, are part of a complex program to explore Mars.

s less dense than that e Earth), research with nstrument pack is ex- ely difficult. This is why irst successful effort to sure Martian conditions valuable.

should like to add in lusion that the flight oviet interplanetary ro- researchers has un- tionably extended our vledge of the nature of and made an impor- contribution to the de- pment of planetology.

Courtesy of *Pravda*

IS THERE LIFE ON MARS?

By Boris Konovalov

IZVESTIA Science Correspondent

THE MYSTERY of whether or not there is life on Mars has intrigued us ever since the "discovery" of the famous Martian canals. While we now know for a fact that the so-called canals have nothing to do with the activity of intelligent beings, the possibility of the existence of some exotic microorganisms still remains. Terrestrial microbes placed in a chamber simulating Martian temperature and atmosphere have survived the experiment and adapted.

The fact that Mars has no protective ozone layer and that ultraviolet light injurious to all living things easily reaches its surface does not negate the possibility of some form of life. It is common knowledge that varieties of bacteria live even in atomic reactors. The microorganisms may have developed a protective shield against ultraviolet radiation.

As for the absence of oxygen, we know of families of bacteria that need no oxygen to maintain life.

While we know that life is impossible without water and that water vapor is present in the atmosphere of Mars in very scant quantities, we are not certain that Mars was always waterless.

Some of the photographs sent back to Earth by the American space probe Mariner 9 and the Soviet satellite Mars 5 clearly show formations that bear a striking resemblance to dry river beds. Perhaps conditions on Mars were once entirely different.

There are hypotheses that the climate on Mars changes sharply after every 100,000-year period, that the north polar cap melts, the ice turns into streams, and the moisture so evaporated rises to make the atmosphere denser. Martian organisms that were dormant all this time come to life. But when the favorable period ends, they hibernate again.

This would mean that life on Mars can maintain itself in one way or another. The question is how it originated. And about that there are hypotheses galore. Here is what two of the experts think.

Lev Mukhin, Candidate of Science (Physics and Mathematics) and assistant head of the planets department at the Institute of Space Research of the USSR Academy of Sciences:

"Life on Mars could arise by evolution. Since we cannot reconstruct with any precision the exact conditions on our own planet billions of years ago, what can we say of Mars? It is quite likely that some time in the past it had a denser atmosphere, with more abundant moisture. It could have had large bodies of water. And life might well have arisen as a result of a natural evolutionary process.

"It has now been proved that meteorites may contain organic compounds. Those in one of the meteorites found in Australia were definitely established to be of nonterrestrial origin. Why then could not similar organic compounds exist on Mars? Their gradual growth in complexity might lead to the emergence of life."

Pyotr Kropotkin, corresponding member of the USSR Academy of Sciences, prominent Soviet geologist:

"In my opinion life on Mars could well have its own, purely Martian, origin. As distinct from many other geologists, I am an adherent of the theory that hydrocarbons, oil and gas deposits originated deep in the earth. Complex organic compounds occur extensively in nature, and only they could be the original basis of life. We know bacteria that, unlike all the others, live by decomposing petroleum. At the water-petroleum interface specific bacteria develop that derive their vital energy from breaking down oil hydrocarbons in water.

"Bearing this in mind, we may say that on Mars, too, with practically no oxygen, there might be all the conditions required for the appearance of life and even for the existence of the kinds of living entities which use deep-sited organic compounds as food.

"But if life on Mars ever existed or has been preserved to our time in some form, it means that in principle it can be found.

"The most promising areas are probably the hot points found on the surface of Mars by artificial Earth satellites. It might be that volcanic heat is erupting there, or perhaps permafrost is thawing, or warm water is welling up from great depths.

"How to look for life is a complicated question. Most scientists believe that we must first simply look for organic compounds in soil samples.

"Direct search for microorganisms has also been suggested. If we were to take a sample of Martian soil and place it in a nutrient medium, the microorganisms would probably begin multiplying. Traces of their activity might be detected from, say, changes in the transparency of the medium or from gas emitted.

"Detection of extraterrestrial life forms would be of tremendous significance for mankind. Studies of other forms of life, the biochemistry of extraterrestrial organisms, the mechanisms of their development and the processes that help to transmit genetic information would, of course, be of enormous interest, particularly to biologists. Thus far we have only one example of life. The question naturally arises: Is it so very perfect? Perhaps there are nature-tested principles of more flexible, enduring and lasting living systems? And possibly Mars holds the answer to the riddle."

Courtesy of the magazine *Nedelya*

Kremlin Palace of Congresses.

Photograph by Nikolai Rakhmanov

MILLIONS OF TOURISTS

By Georgi Zubkov
Deputy Chairman of the Board,
Intourist Travel Agency

WE ARE LIVING in the age of mass-scale travel. For centuries people left it to the daring few—men like the legendary Odysseus and Columbus—to do the traveling for them beyond their own borders. Now millions think nothing of a vacation jaunt across a continent or ocean. Some 220 million people traveled to foreign countries in 1973!

Without underestimating the commercial value of the rapidly growing interest in the Soviet Union, we see of first importance, in tourist ties with other countries, the opportunity to broaden cultural exchange, a chance for people of different countries to get to know each other.

Last year more than two million foreign visitors came to the Soviet Union, 90,000 of them from the United States. The number of American tourists keeps increasing.

Intourist, the official Soviet travel agency, has business contacts with 700 tourist and shipping agencies all over the world, including 100 in the United States. Such firms as American Express, General Tours and American Travel Abroad are old partners of Intourist.

This year Intourist offers foreign visitors more than a hundred different tours. In addition to such traditional ones as Moscow-Leningrad, the Ukraine and the Black Sea coast, trips to Siberia and Central Asia are attracting growing numbers of Americans.

The scope of its construction projects, as well as its natural exotic beauty, draws people to Siberia. Last year thousands of tourists from the USA visited such scientific and industrial centers as Novosibirsk, Irkutsk and Bratsk; they saw Baikal, one of the most beautiful lakes in the world; some even hunted deer and bears.

The ancient cities of Central Asia—Tashkent, Samarkand, Bukhara and Khiva—fascinate American tourists. Tashkent especially. Almost completely destroyed by the terrible quake of 1966, it has risen from the ruins thanks to the efforts of all the Soviet republics. Its modern architecture has not blurred Tashkent's national character, but blends with it, making the city more interesting than ever.

This year Intourist once again offers American tourists a wide choice of intriguing places: the Georgian capital Tbilisi; Yerevan, capital of Armenia; Baku, on the shores of the Caspian, the Azerbaijan capital; Ulyanovsk, Volgograd, Novgorod, Suzdal, Vladimir and Yaroslavl.

The traditional arts festivals Intourist offers are always gala events: This year in Moscow Russian Winter (January) and Moscow Stars (May), White Nights in Leningrad (June) and Golden Autumn in Sochi (September) will be joined by Kiev Spring in Kiev (May and June) and Transcaucasian Melodies in Yerevan (September).

Travel for special groups is also expanding. Tours have been organized for scientists and engineers to see places and meet people in their own fields. Many international scientific congresses are held in the USSR. This year Moscow will host the Moscow Theriological Congress, the Twelfth International Grassland Congress, the Tenth International Congress of Soil Science, the Sixth International Symposium of the Chemistry of Cement, among others. A large number of international exhibitions are also scheduled for the Soviet capital in 1974.

The Soviet Union has already topped many countries in this kind of specialized travel, one of the indications of foreign specialists' heightened interest in Soviet science and engineering. Another is that the study of Russian is on the increase. To meet the many requests of foreigners, including Americans, Intourist regularly conducts seminars on the Russian language in Moscow, Leningrad and Sochi.

Intourist offers 16 car and bus itineraries covering some 6,000 miles. Travelers can use their own cars or hire them or go by bus provided by foreign travel agencies or Sovietbus. Our gasoline prices are considerably lower than in many other countries. There are motels and camp sites everywhere with accommodations to meet a variety of tastes and pocketbooks. Also available are cruises on the Volga and the Dnieper, on the Baltic and the Black seas, vacationing in the famous resorts of the Caucasus and the Crimea and special hunting trips to Siberia for deer or bears.

Many American tourists visit the Soviet Union in the off season at a very considerable saving, as much as 25 per cent for group tours and 15 per cent for individuals.

Intourist recently worked out a series of tours with a specific schedule; listed is the date of arrival and departure, the time period and program in each city, the kind of transportation, in a word, everything a person would want to know before deciding on a USSR tour.

To keep travel agencies in the USA informed of the USSR's tourist possibilities, Intourist arranges regular seminars for the agencies and for American airlines people. But, of course, even more important is the travel personnel's own experiences in Soviet cities, what they have seen, their appraisals of hotel accommodations.

Travel is on the upswing, and flights between the USSR and the USA have been expanded to meet the greater demand. Aeroflot and Pan American service arrangements have been augmented by two new runs: Moscow-Washington (Aeroflot) and New York-Leningrad (Pan American). In addition, since last year two Soviet passenger ships have been offering regular service between Leningrad and New York.

Tourism, like trade, is a barometer of the political climate. Cold war discourages travel; détente stimulates new interest in neighboring and distant countries. Now the world is in a hopeful period, and that is reflected in the large number of applications for tours in the USSR. Everyone who comes to our country with an open mind and heart leaves here convinced that the Soviet people are eager for peace, that they are all for mutual exchange of science and culture and every opportunity for international cooperation. The more people come to these conclusions from personal experience, the greater will be the trust among nations. What Leonid Brezhnev said expresses our sentiments: "We are for expanded tourist exchanges. We are for broad public contacts, for meetings between youth, people of related professions, for travel by groups or on an individual basis."

The tourist season this year promises to be very busy. Intourist will do everything it can to ensure our American guests comfort and pleasure. Our job will be made easier by the traditional hospitality of Soviet people. Foreign tourists will meet them on the streets, in the cafés, in the hotels and in their homes, in factories and institutes, on collective farms, on trains and planes. This atmosphere of interest and good will in our country is Intourist's stock in trade. That is why, not only on our own behalf but for the 250-million-strong Soviet people, we say to our guests: WELCOME TO THE SOVIET UNION!

UZBEKISTAN TOUR

By Anatoli Zaichenko

Among the hundreds of trips in the Soviet Union offered by Intourist, the official travel agency, the Uzbekistan tour is one of the most fascinating.

Uzbekistan is the biggest of the Soviet Central Asian republics. Territorially (172,700 square miles) it is one and a half times larger than Italy. More than half the population of Central Asia—12.9 million—lives in Uzbekistan.

Correspondent Anatoli Zaichenko gives his impressions of the tour.

TASHKENT

YOU BEGIN your travels through Uzbekistan with Tashkent (the Uzbek for Stone City), capital of the republic. Founded over 2,000 years ago at the crossroads of caravan routes joining Europe and Asia, Tashkent grew into a big trade center.

The 57 years since the Socialist Revolution are no more than a moment in the history of this ancient people, and yet, during this relatively brief period, Uzbekistan has been transformed from a backward outpost of the czarist empire into a flourishing socialist republic.

The 1900 miles between Moscow and Tashkent is covered by Aeroflot's TU jets in a little over three hours.

A monument to the Uzbek poet and thinker Alisher Navoi has been erected in the heart of the capital. Navoi Avenue, one of the city's most beautiful thoroughfares, begins here. It goes past the shady park on the bank of the old Ankhor Canal to the central square named after Lenin. Present-day Tashkent is a very modern city with a touch of the exotic.

The Koran forbids visual representation of man or animal. Where the great artists of the Occident were able to draw men and gods and with these images search for beauty, truth and the meaning of life, the unknown craftsmen of the Orient expressed their love of beauty in unsurpassed ornamental patterns. So that houses are decorated with lovely geometric forms.

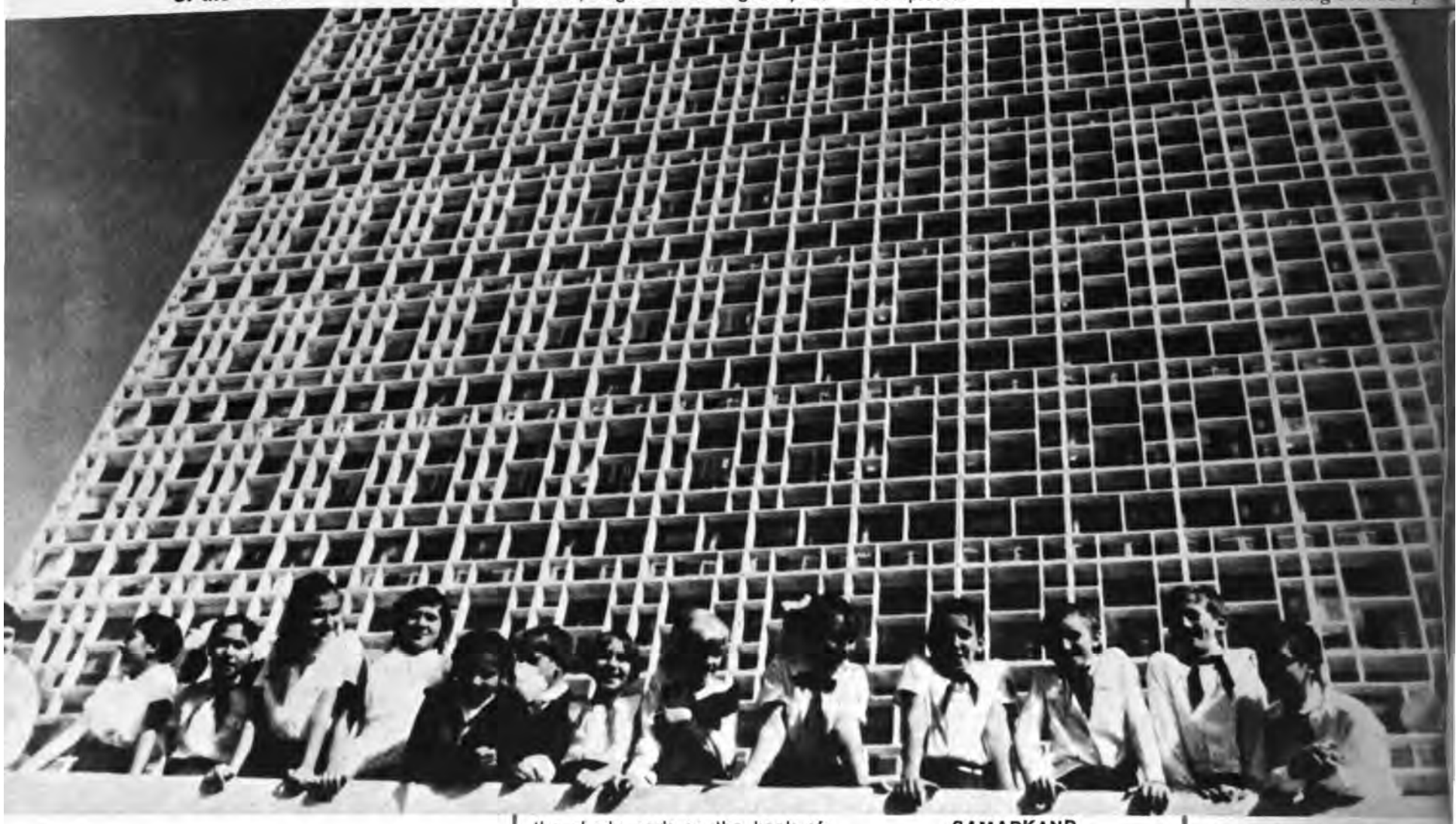
The entire city is nestled in greenery and dotted with fountains. The fountain display on Lenin Square is not only decorative, it cools the city's central square.

"The city must be as beautiful as age-old parks, forests and seas. . . . We must not reconcile ourselves to it as to a necessity, not hate it as something that shortens life, but enter it as we would our home, abounding in friends, books and work. . . . We should see to it that the city invites us to work, think and rest." This was written in the twenties by Konstantin Paustovsky.

Tashkent's architects were guided by the social principle implicit in the statement of this eminent Soviet writer when they designed the new city after the tragic earthquake of 1966.

According to Tashkent's 25-year general development plan, adopted by the government of the Uzbek Republic on May 4, 1966, the city is to have the highest possible ratio of greenery and water to people. The grounds of the parks and gardens will be 50 times larger than before and comprise some 64,000 acres. There will be 320 square feet of greenery per resident. In 1980, when the Tashkent Canal is completed, the Uzbek capital's "air conditioning" will have been completed.

When Tashkent was destro by an earthquake in 1966, the whole country helped t Uzbek people rebuild it. The new construction ble the modern and the tradi Below: Young Pioneer pala



Tashkent, the Uzbek capital, is a very modern city with a touch of the exotic. It was founded more than two thousand years ago, a contemporary of ancient Babylon, Greece and Rome.

SAMARKAND

The city is a monument of ancient Oriental architecture lovingly protected by the Uzbek people. It is a 45-minute flight from Tashkent to Samarkand—just enough time to learn something about this city from your guidebook.

"Paradise of the ancient Orient," "Precious pearl of the Oriental Moslem world," "Shining spot on the globe" is how the old manuscripts described Samarkand.

More than 2,500 years old, Samarkand was contemporaneous with Babylon, Athens and Rome. Its development was hastened by its location on important trade routes joining ancient China, India and other countries of the East with Iran, Turkey, Transcaucasia, Russia and the Mediterranean countries. The silks, satins and rag paper of Samarkand were known throughout the Orient. Characteristically enough, an enormous sundial

Top right: The Lenin Mus Center right: Ceremonies at the unveiling of a monu to Uzbekistan's famous classical poet Alisher Navoi. Lower right: One of Tashkent University's build

МУЗЕЙ
ЛЕНИНА
ЛЕНИН
МУЗЕЙ

and an aqueduct like the one in Rome were built here.

Unmatched architectural monuments have come down to us from those times. Viewing them, Alexander the Great is said to have exclaimed, "Everything I have heard about the beauty of Samarkand is true, except that it is even more beautiful than I imagined."

On three sides of the flagstone-paved Registan Square stand three madrasahs with cupolas, portals, minarets and arcades, all decorated with unfading glazed brick, majolica, mosaic work, carved marble and gilt.

The ruins of the famous Bibi-Khanum Mosque are still there. It was about its portal and its azure dome, only partly intact, that a contemporary wrote: "The dome would have been unique if the sky itself had not been a replica, and its arch would have been matchless if the Milky Way had not been its twin." Farther on is the Shah-i-Zinda ensemble of mausoleums and mosques, and the area where the ancient

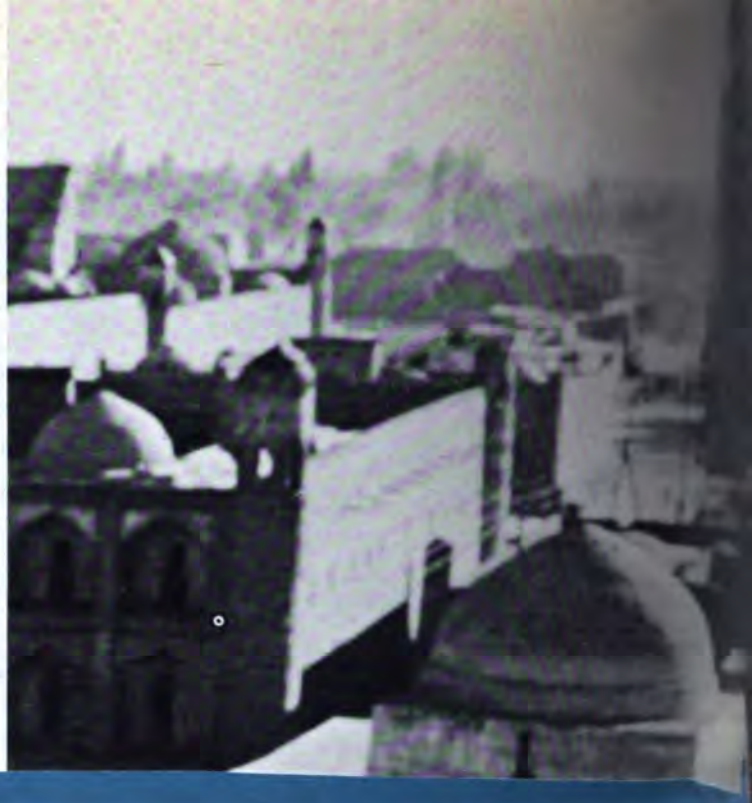
along the Central Asia-Center pipeline.

When you stroll along the lanes of old Bukhara, time seems to stand still. Architectural monuments of every historical period since the ninth century have remained intact here.

During the rule of the Samanids, Bukhara became a big cultural center of the Moslem East. Science and art flourished. Priceless manuscripts were collected by the libraries. Bukhara was the residence of the poet Rudagi, the historian Muhammed Narshakhi, the great philosopher and physician Ibn Sina, known in Europe as Avicenna.

In Bukhara I chanced to be present during the gay and exotic festival of *Kovun Saili* (Melon Festival).

The noisy Oriental bazaar abounded in piles of watermelons and muskmelons, grapes, apples, pears, peaches—a veritable kingdom of fruit, a hymn of abundance. Even the heralds were decked out in melons of all kinds.



superphosphate, silk, canned goods and Uzbek wines.

BUKHARA

The Bukhara guidebook shows the Kalyan Minaret on its cover. This minaret is as much a symbol of Bukhara as the serrated Kremlin walls are of Moscow. It is the highest building in the city (154 feet). Next to it, on the cover, are gas storage tanks—a symbol of the new, socialist Bukhara. Blue stands out strong in the rainbow of Uzbekistan's natural resources. Discovered in 1956, the Gazli gas deposit is one of the biggest in the Soviet Union and provides cheap fuel for the industrial plants and apartment houses of Central Asia, the Urals and other parts of the country. In 1976 Central Asia's blue light will begin to burn in the houses of Paris. By that time the transcontinental pipeline to Europe will have been completed. A multikilometer gas river will flow from Gazli to France

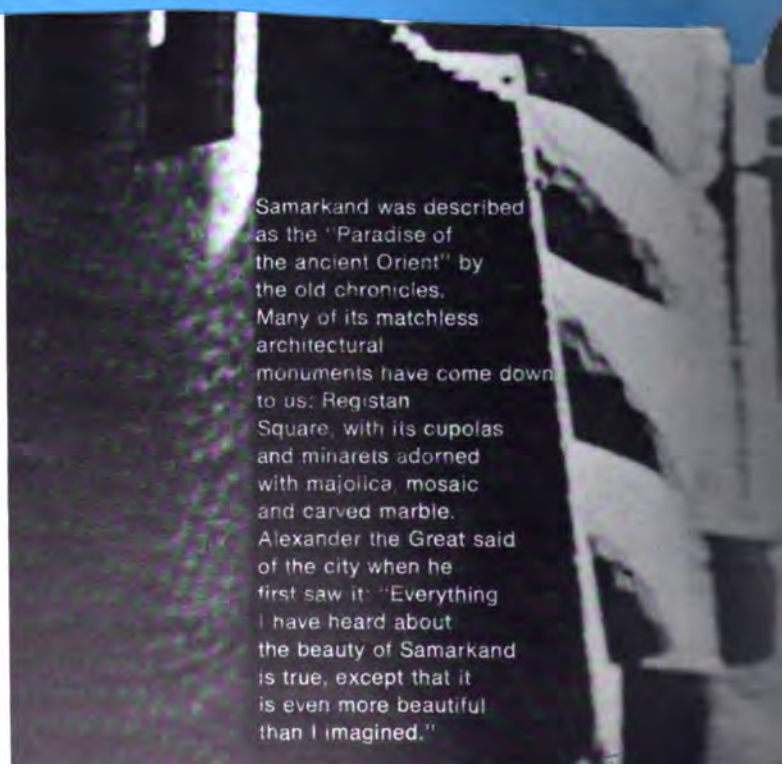
partaking of this cereal into a ritual.

The culmination of the festival was the *shurinaki,* or mass tasting of melons.

Uzbekistan is rich in bounties of the soil, monuments of old and, above all, its people.

The American philosopher Ralph Waldo Emerson said that the real proof of the degree of civilization lay not in statistical data, not in the size of cities, not in crops, but in man, who expresses the land. Uzbekistan can be proud of its people who have achieved so much in every field of endeavor.

My visit to the ancient and new cities of Uzbekistan showed me that this country's atmosphere was infused with a faith in humanity and hope for the future, and that the Uzbek saying, "A guest is more precious than a father," is no conventional courtesy, but an expression of the very character of this ancient people.



Samarkand was described as the "Paradise of the ancient Orient" by the old chronicles. Many of its matchless architectural monuments have come down to us: Registan Square, with its cupolas and minarets adorned with majolica, mosaic and carved marble. Alexander the Great said of the city when he first saw it: "Everything I have heard about the beauty of Samarkand is true, except that it is even more beautiful than I imagined."

Uzbekistan has 24 theaters, more than 4,000 movie houses, 26 museums, 5,870 libraries, over 3,500 clubs and 1,600 people's universities, compared with one theater, three museums and 25 film projection units in prerevolutionary times. The mortality rate for Uzbeks was higher than for any other people in the Russian Empire. Average life expectancy was no more than 34 years, and there were only three doctors per 10,000 of the population. Today 30,000 doctors look after the health of the Uzbek people. Average life expectancy has risen to 72 years, while the mortality rate of adults has dropped by five times and that of children by 10 times.

Active tourist exchange, broad public contacts, meetings between young people and people working in related fields, travel in groups and on an individual basis all contribute to the improvement of mutual understanding.

Historical monuments, exotic places, the everyday life of Soviet people and their scientific and cultural achievements are incorporated in the travel programs offered by Intourist to our guests.

Baku: On Sea Boulevard.

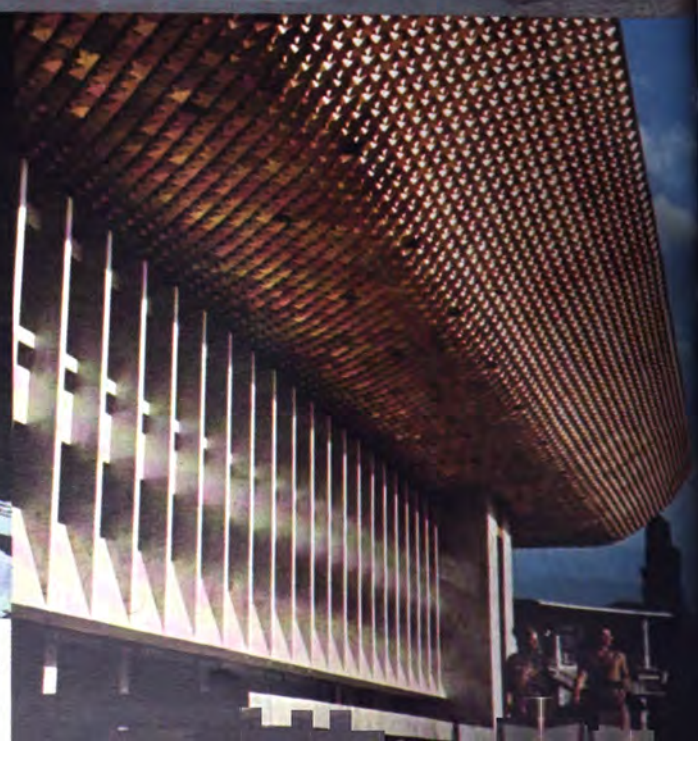
Kiev: Statue of Bogdan Khmelnitsky. Sofia Cathedral in the background.

Riga: Youth art studio on the Old City's streets.

Riga: Memorial Museum on the square named after the Red Latvian Riflemen.

...ilisi: Statue of ...e city founder ...khtang Gorgasal...

Vilnius: Winter ...ene on a corner ... the Old City.



Alma-Ata: The Lenin Palace of Fine Arts.

Intourist guide Irina Vasilyeva welcomes American tourists at the airport.

Intourist Guide

By Pyotr Novikov
Photographs by Igor Zotin

TOURS OF THE USSR, as you might expect, usually begin with Moscow. So it was with the January trip this year of Washington, D.C., government workers.

It all began at the Sheremetyevo Airport, where they were welcomed by people from Intourist, in particular their guide, Irina Vasilyeva. After greetings and the brief formalities the visitors boarded a bus for the center of Moscow. On the way they tried to size up their guide—after all she was the first Soviet citizen they could expect to know in more than a casual way. Most tourists, Irina thinks, now come to the USSR with some knowledge of the country; they have done some reading or know people who have been here.

Irina believes that when a guide first meets a party of tourists, she asks herself as many questions as they do. Just what are they like and what are they interested in? How will we get along? Will their tour meet their expectations?

The bus pulled up at the brightly lit northern lobby of the Hotel Rossiya, and Irina, like an anxious mother of a big family, saw her charges comfortably taken care of.

As always on arrival at a new place there are a great many things that have to be done all at the same time, including such individual arrangements as a doctor's: He wanted to see a colleague in one of the Moscow hospitals, and his time had to be planned to get the visit in.

After everybody had been settled and fed, Irina sat down to catch her breath in one of the numerous lounges of the Rossiya and found time to give me this interview.

"When is the day over for you?" I asked.

She smiled. "This is the kind of job you take home with you; you keep going over the details of the next day's excursions. You get so used to being with a group that it's something of a wrench when their tour is over. We go everywhere with them: to ballet performances, museums, the technical and scientific exhibitions. Why don't you come along tomorrow—we're going on a bus tour of Moscow?"

We set off at 9:30 the next morning. Our first stop was at Alexandrovsky Garden and the Tomb of the Unknown Soldier. Here Irina spoke mainly about the Great Patriotic War of the Soviet people, the struggle against fascism and the 20 million lives that were lost.

The next stop was Gorky Street, at the Moscow City Soviet of Working People's Deputies. The group listened attentively to Irina's sketch of the governmental structure of the USSR and the elections to the Soviets of Working People's Deputies.

The bus drove leisurely down the streets of the city. Many of the group snapped pictures through the windows, pointing out to one another everything that excited their interest. One of them knew Russian and got a thrill out of reading the signs on the buildings.

"This is Restaurant Prague, right, Irina?" he asked. She nodded.

"And this is Ulitsa Kalinin. Yes, Irina?"

"Prospect or avenue," she corrected him with a smile.

Mrs. Emily Horecky, who works at the Library of Congress, had some questions about libraries in the Soviet Union (we were riding past the Lenin Library). In the Pirogov district, where many of the capital's medical institutions are located, talk in the bus turned to health services. All the tourists knew that day to day medical care here is free; they learned from Irina that the state also paid for the patient's stay in a hospital, including surgery and medicine.

On Lenin Hills, where Moscow State University, named after M.V. Lomonosov, rises majestically against the sky, Mrs. Daisie Johnson, a teacher in the District of Columbia school system for a long time, wanted to know what the Soviet Union did about problem children and whether all children had to go to kindergarten. To both questions Irina answered that parents dealt with the problem and made the decisions.

That evening, while the group was getting dressed for the theater,

Irina had a free half-hour, so we met to continue our interview.

"A guide must have a higher education. But even that and the three-month special course for guide-translators is not enough," she said. "Take me. I'm a graduate of the Maurice Thorez State Teacher Training Institute of Foreign Languages here in Moscow. I got my practical training with Intourist in my fourth year. I liked the work so much that I took the course and here I am."

She went on: "You can't be satisfied with what you know if you want to do a super job as a guide. So we study economics, literature, current politics, ancient and modern art. And since life never marks time, a guide can never say: 'Now I'm an educated person and I don't need to study any more.'

"Once I was asked how many students were enrolled annually in our higher educational institutions. I didn't know. That evening I hunted down the information. I enjoy being asked such questions. It means that our visitors are really interested in our country, in my Moscow.

"I'm always glad to welcome visitors and to do what I can to make them feel at home. I think of myself not only as a guide but as a representative of my country, and I do everything possible to win friends for us.

"In the past 10 years tourists have changed a great deal. In the early sixties people asked in all seriousness whether I could show them the notorious 'iron curtain.' They really thought it was a wall that fenced Moscow off from the world outside. Now nobody asks such silly questions. Let's hope they never will again.

"Our job is to help people know each other and promote mutual understanding among peoples and countries. I'm pleased," said Irina, "to know people need me—'my' Americans at work and my family at home."

The family is her husband Alexander (head of one of the departments of Central Television) and their nine-year-old son Konstantin.

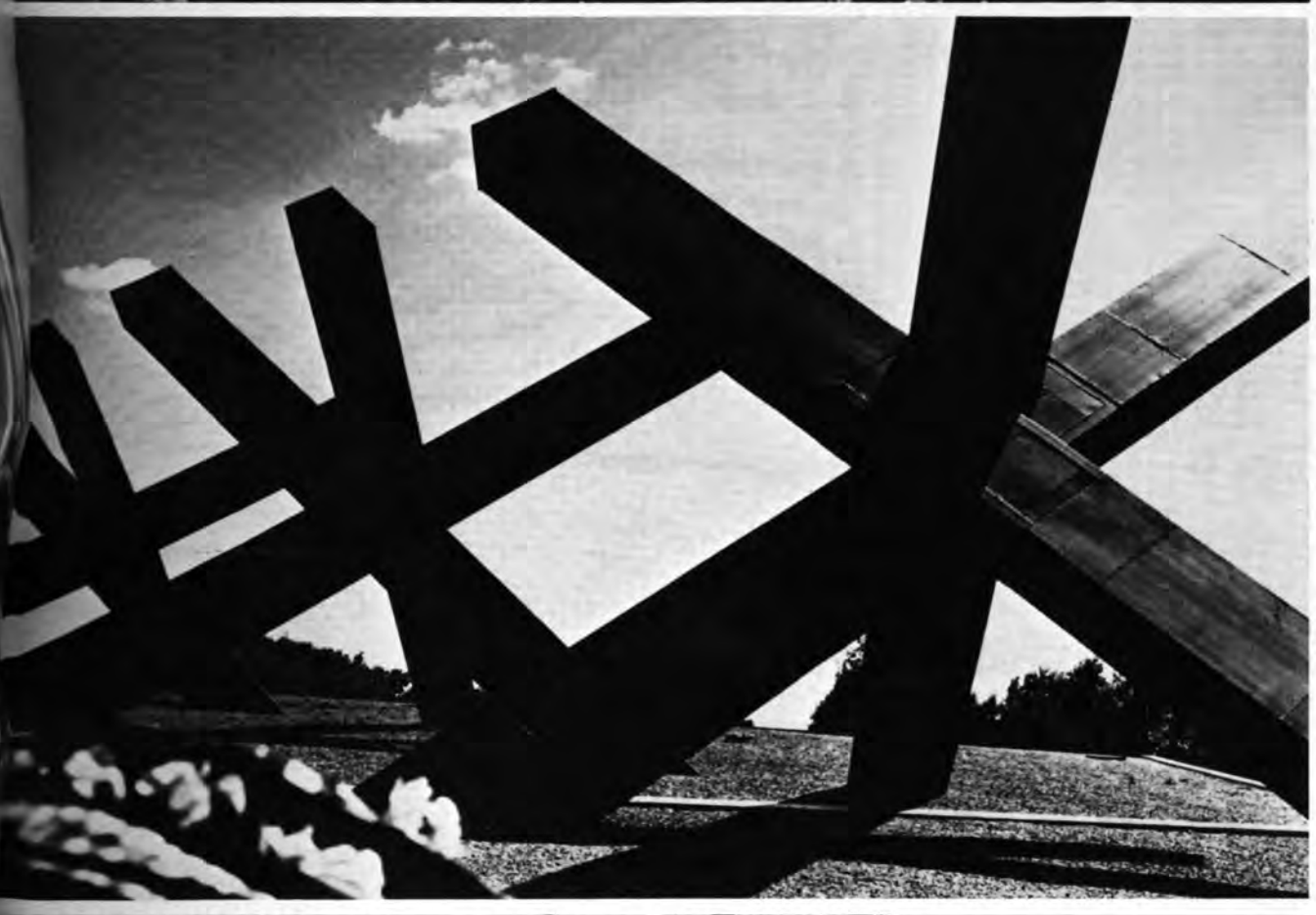
"Of course, my husband grumbles once in a while when I have to leave town with a group. But he does understand that my work gives me great satisfaction and that I wouldn't want to give it up.

"We have good times together. On Sundays we go picnicking in the woods outside of Moscow. That's a tradition with us. I got a semiracer bike from 'my men' on my birthday, and now the three of us go cycling together. They've had bikes for a long time. The one drawback is that I don't have too much free time in the summer."

Summer is the peak of the tourist season, and the guide's busiest time. Irina's vacation sometimes has to be postponed to the fall or spring. While their boy was small, that was no problem for the Vasilyevs, they would all go to the seashore during the off season. Now their son is in school and has only the summer off. But so far they have managed: Irina's colleagues switch vacations with her, and the family can go to the seashore together. They prefer going off by themselves, living in tents and not in resort hotels. They like cooking meals over campfires and hiking—nature in the rough.

"Now you know everything about the typical Moscow guide," smiled Irina. "Let's round up my American friends—they have an evening in the theater waiting."

The Bolshoi Theater is the home of the world-famous ballet company. It holds more than 2,000 people, but there is never an empty seat when its ballet or opera company performs.



Far left: The Armory is one of the most interesting museums in Moscow. It holds a collection of czarist coronation robes going back to the fourteenth century—fabrics embroidered in gold and silver and set with pearls. Tiaras and crowns of gold and precious stones, inlaid thrones and gifts presented by foreign ambassadors to the czars, the royal carriages, bejeweled saddles and saddle cloths are all on exhibit.

Left: The monument erected to the defenders of Moscow. It stands not far from the city, where the nazi army was stopped.

The Czar Bell, cast in 1733-35, weighs 200 tons. It is 20 feet high and more than 21 feet in diameter. The 11-ton fragment standing next to it was split off during a big fire in 1737. The bell's surface is decorated with the images of Czar Alexei and Czarina Anna, five icons and two inscriptions telling the bell's history.

Maclyn Burg (seated at left), head of the oral history division of the Dwight D. Eisenhower Library, and Mrs. Burg (at right) were guests last summer of Soviet history professor Robert Ivanov (with glasses) and his wife. Besides meeting with his Soviet counterparts and lecturing, Professor Burg joined his wife for sightseeing and shopping expeditions. Right: Mrs. Burg at the hairdresser's. Below: At a Moscow souvenir shop.

HISTORIANS EXCHANGES VISITS

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It was not altogether by accident that two Civil War historians, one American, the other Soviet, living thousands of miles from each other, met last year and became friends.

Maclyn Burg, like Robert Ivanov, a college professor, heads the oral history division of the Dwight D. Eisenhower Library. He found out that Ivanov would be visiting Abilene, Kansas, to collect material on the history of the Republican Party in preparation for a book on Eisenhower. The Burgs invited him to their home. It was quickly discovered that the guest and his host had even more in common: Nearly the same age, both had fought the Nazis in World War II.

Burg and the library director, John Wickman, helped Ivanov search out his material. After the Soviet historian left for home, the Burgs decided to spend some time in the Soviet Union. Through the International Research and Exchanges Board a two-week stay in Moscow was arranged, the invitation was gladly extended by Professor Ivanov, and the Burgs were off to the USSR.

This was no tourist trip or courtesy visit. Burg especially wanted to see how this new branch of his own discipline was organized in the Soviet Union.

Although it was summer, the vacation season, when the Burgs made their visit, the American historian had a chance to meet his Soviet counterparts, Nikolai Sivachov, dean of the history department at Moscow University, among others. At the Institute of World History of the USSR Academy of Sciences, he lectured on the development of oral history in the United States. The report aroused considerable audience interest: Oral history is a new area of research in the USSR, as it is in the United States. Professor Burg has written an article on the subject for the Soviet journal *Modern and Current History*.

The Ivanovs showed their guests around Moscow. They were especially interested, when they reached the Soviet Army Museum, to see the exhibits on Soviet-American collaboration during World War II. Professor Burg laid a wreath at the memorial to the defenders of Moscow, which stands on the road leading from Sheremetyevo Airport to the capital.

A tourist bus was a good way to cover Moscow, but they also wandered through the streets, mingling with Muscovites and talking to people. One happy meeting was on a tourist bus. The driver had been a private first class, Professor Burg a corporal, pretty much the same rank.

"We had no trouble understanding each other despite the language barrier," the professor said,

Wherever they went, the American guests kept saying, they met with the friendliest feelings for Americans and they heard, over and over again, words of hope for cooperation between the two countries.

We may not always see eye to eye on things, said Professor Burg, but for American and Soviet historians to meet and exchange ideas and opinions will always be of mutual benefit and interest.

The working population of the Soviet Union now numbers 66 million and is growing. This is because, along with the large-scale mechanization and automation of industry and agriculture, production is being increased in accordance with the country's long-term economic development plan. In his report to the Twenty-fourth Congress of the Communist Party of the Soviet Union in 1971 Leonid Brezhnev noted: "The working class is the most numerous in our society. . . . Workers comprise more than 55 per cent of the employed population. But the place occupied by the working class in socialist society is determined not only by its numerical strength, which can change depending on economic development and the rate of the scientific and technical revolution. The working class has been and remains the main productive force of society." The Soviet people are now in the fourth and decisive year of the Ninth Five-Year Plan. As before, workers' collectives are at the head of the great peaceful projects under way. Four out of every ten members of the Communist Party of the Soviet Union are workers. Workers, both party members and nonmembers, are widely represented in the Soviets and government bodies and in the inspection system: the People's Control. The trade unions, whose members are almost exclusively workers, are among the most influential mass organizations in the country. The leading role of the working class guarantees the advance of the Soviet socialist society toward its historic goal—communism.

FOUR OPTICAL WORKERS

LOMO in Leningrad makes 200 kinds of optical items sold at home and in 90 foreign countries.

Meet four of the workers. Left to right: turner Vladimir Skolnov, optical mechanic Alexander Bespalov, glass grinder Alexei Shcherbakov and radio fitter Valentin Petukhov.

Valentin Petukhov assembles video tape recorders and is an expert in his line.

He started at the LOMO Plant about 20 years ago as an apprentice radio fitter. Petukhov is not only a skilled worker but a fine instructor.

Teaching the young people his trade is, of course, his main objective. But he does more: He encourages them to develop latent abilities. For example, Petukhov decided that one of his charges, Valentin Ivanov, had an aptitude for designing. "You should study. Go on with your education at an institute," he kept telling the young worker, who finally took his advice. Ivanov is now an engineer and heads the department where Petukhov works. The two men are good friends.

Another example: An apprentice of Petukhov's, Andrei Mikhailov, once brought some of his drawings to the shop. Petukhov, himself an amateur artist, told him, "We'd hate to lose you, but I think you should seriously consider studying art." Mikhailov had doubts about his talent, but Petukhov kept at him until he enrolled at an art school. He is now a professional artist and specializes in restoration.

As in Ivanov's case, Mikhailov became a close friend of Petukhov's. The two often meet to talk art. Both are also music lovers and go to concerts together.

Petukhov is a member of the Communist Party of the Soviet Union. His fine reputation as a worker and mentor of young workers prompted his fellow Communists to elect him to the plant party committee, and, as a result, he is very much involved in solving production problems and advancing the plant's technological development. He told us:

"Our benchworkers and engineers, both party members and nonmembers, are active promoters of technological progress. Every fourth worker here is an inventor or rationalizer. Another characteristic of our plant personnel is their interest in continuing education. Our people's university, where lectures are given evenings and on days off, has four departments—literature, law, music and art criticism. The student body is made up of people of all generations."

Valentin Petukhov at the home of his artist friend Vladimir Slezin. It was Petukhov who encouraged young Andrei Mikhailov to begin studying art seriously. He is now a professional restorer.

Photographs by Vsevolod Tarasevich

Veteran optical mechanic Alexander Bespalov puts the finishing touches on each item, giving it maximum precision.

His life reflects the entire history of a major branch of Soviet instrument making—optics. He came to work at the plant in 1928 and has been there ever since.

"At the beginning of the First Five-Year Plan period, in 1929, our plant was assigned to manufacture optical instruments," Bespalov recalled. "The difficulties seemed insurmountable: We didn't have the proper equipment, and the workers had no experience. We really started from scratch. The state allocated money for the purchase of equipment, and people began training at the Rabfak—the Workers School. I was one of them. I was also one of the first to be given the job of assembling an experimental model of a sophisticated new instrument. I was very nervous but did the job with more precision than I knew I had. Soon we began serial production of these instruments. Since then I've assembled dozens of new models."

Bespalov is a close friend of Professor Georgi Pogorev, a former coworker of his who became a scientist. For a number of years Pogorev has been working on theoretical problems in the field of optical instrument making. The scientist frequently drops into the shop's experimental section where new instruments are created and, together with Bespalov, pores over blueprints and models.

Bespalov was part of a team of scientists, engineers and workers that won the State Prize—one of the country's most honored awards—for the design of a new type of microscope.

He is highly regarded, not only for his professional achievements, but for his community activity, including membership in the Leningrad Peace Committee. There are committees like it in all big Soviet cities, working for peace and international friendship.

Workers are important contributors to the Permanent Production Conferences, which are held periodically to discuss plant problems. Here chief engineer Robert Kachernikov (left) and Alexander Bespalov go over a point after a conference.

Vladimir Skolnov, astrophysical shop. plant for seven year He decided to bec and worked hard to trade. When one of ers retired, Skolnov at his lathe.

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More than half the people at this optical equipmen plant are under 2 so the Komsomol plays a large role in their work social activities. At the shop Komsomol committee. Left: Vladimir Skolnov.

Vladimir Skolnov, 28, is a turner in the astrophysical shop. He has been at the plant for seven years now.

He decided to become a skilled turner and worked hard to master this complex trade. When one of the shop's best turners retired, Skolnov was offered the job at his lathe.

People say he has "golden hands." Year after year he is on the list of workers honored with the title "Best in the Trade."

"Why do you work so hard to be at the top?"

He laughed: "I suppose I'm made that way. It's natural for me."

"What are your plans?"

"To be even better at my trade, be a virtuoso. And learn more about precision instrument making that way."

"Do you want to become an engineer in the field?"

"Nothing that definite yet. I need the knowledge for my job as turner, because machinery keeps getting more sophisticated. So that I won't be overwhelmed or turned into an appendage of my machine, a button-pressing robot, I should not only know my turner's job but a good deal besides."

Skolnov is a member of the plant Young Communist League committee. His particular responsibility is the living conditions and recreation of the young workers.

More than half the people at this optical equipment plant are under 25, so the Komsomol plays a large role in their work and social activities. At the shop Komsomol committee. Left: Vladimir Skolnov.

Alexei Shcherbakov is a glass grinder who came to the plant after completing his army service. Here he learned a trade and met his future wife. The plant gave the young couple an apartment.

For seven years in a row Shcherbakov's photograph has been displayed with those of other leading workers on the plant's bulletin board.

He is a trade union activist and chairman of the shop trade union committee. Shcherbakov told us:

"Our plant has its own health resorts on the Black Sea and a vacation hotel on the Karelian Isthmus. A large number of the accommodations at these resorts are provided free or at a third of the actual cost. Our plant also has its own stadium in Leningrad with a soccer field, gymnasiums and swimming pools. The use of all sports facilities is free. Our trade union organizations see to it that rest and recreation facilities are well run and available to as many workers as possible. We do all we can to draw people into different kinds of sports and devote special attention to tourism. Since automated work tends to be monotonous, we try to make people's rest and recreation as diversified and interesting as possible.

"The economic reform has increased the plant's profits. This means more money is available for housing construction and other such needs. The plant has been completing 150 apartment units a year for its personnel, and the rent is very modest—including utilities, it comes to not more than four or five per cent of family income."

A sympathetic and helpful man, Alexei Shcherbakov has for the past several years been elected to head the shop trade union committee. Right: The Shcherbakovs take a walk on the Neva Embankment.

The rounded and harmonious growth of the individual is the highest goal of Soviet society. Many of the requirements for that we already have. Every Soviet citizen is guaranteed a free education and a job in his chosen field. Books and a variety cultural facilities are available to all. Some 20,000 clubs make it possible for people to develop their artistic interests. There are special facilities for younger generation: 150 children's theaters and 5,600 children's clubs. In these and in numerous studios and circles youngsters try their hands and minds at everything from poetry to scientific research. Clubs for both adults and children are free, maintained by the state or the trade unions. All the Soviet republics have network of art, music and ballet schools for gifted youngsters. Tuition is free, as it is in all schools. Many great musicians, artists, dancers have come from the families of factory and office workers during the years of Soviet power. That in itself testifies to the value of the Soviet Union's educational and cultural policy. The people have access to literature, the theater, music, the fine arts. They live in a cultural environment in which all the individual's potentials can emerge.

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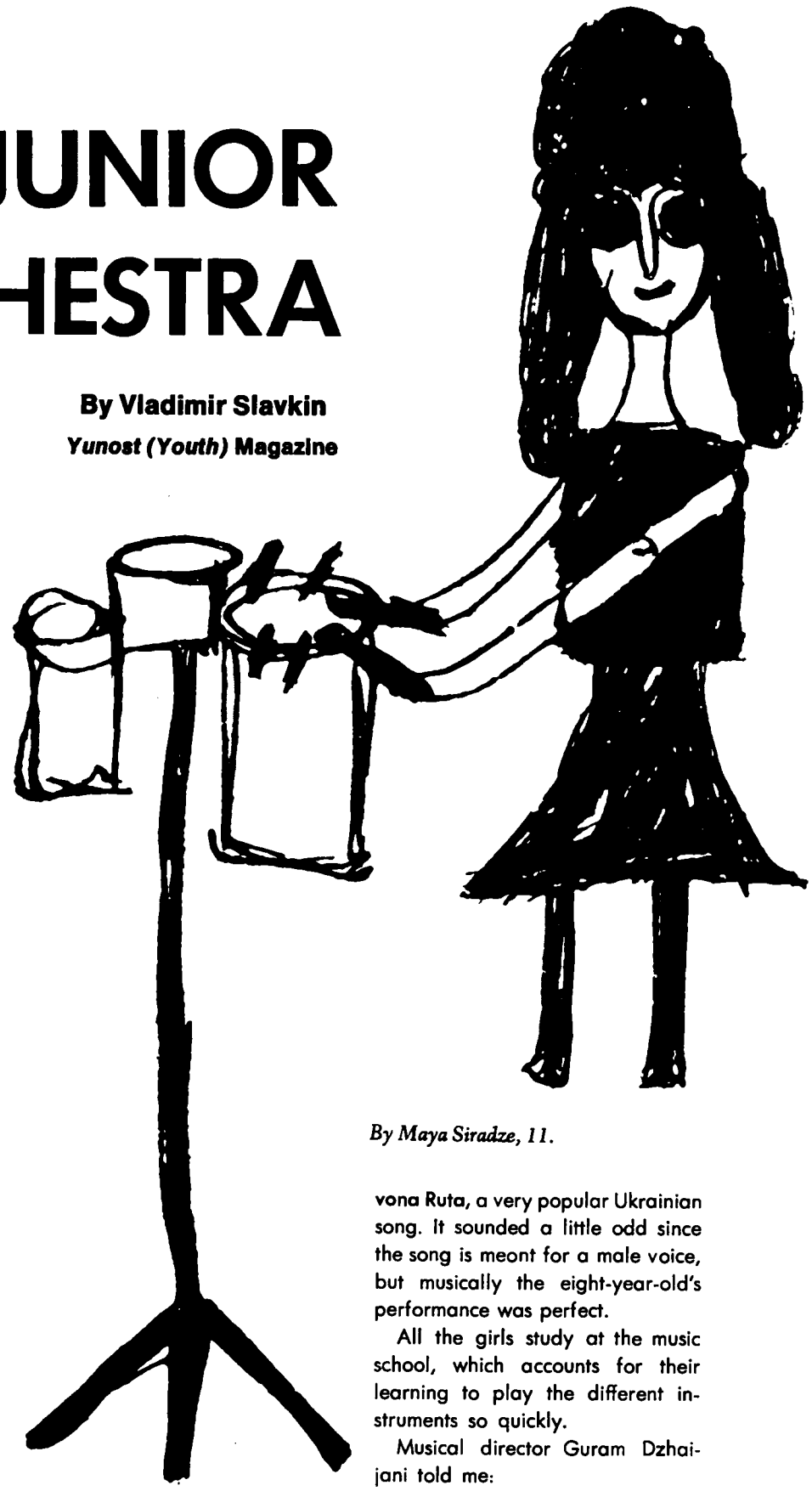
JUNIOR ORCHESTRA

By Vladimir Slavkin
***Yunost (Youth)* Magazine**



By Maya Siradze, 11.

I ASKED Rafael Kazaryan, who is director of the vocal and instrumental ensemble Mziuri (Sunny), how the orchestra got started.

"We got the idea of forming an ensemble of the little girls at the Young Pioneer palace in Tbilisi in May 1971. In June, after selecting the ones who had an ear for music and who had already sung with the choral group, we took them to the summer camp where our Pioneer amateur performing groups usually spend their vacations. When we started distributing instruments, they all wanted to play the drum. But we had only one set of percussion instruments, and here was the girl for them—Liya Khorbaladze. She has rhythm in her bones."

"Liya, why did you choose the drum out of all the musical instruments?" I asked her.

"I like it," she said.

"But why? Can you tell me why?" Liya thought hard but all she could say was, "I just like it!"

I went back to Kazaryan:

"Tell me, why such young instrumentalists?"

"Well, once at a concert intermission the Octobrists—they're seven- and eight-year-olds—climbed onto the stage and started playing with the instruments. I was there and saw them. They were having such a wonderful time, I thought, why not teach them how to really play these instruments? I had directed different ensembles but never one so young."

"A little girls' orchestra is a wonderful idea, but there is one boy, isn't there? Niko Nadirashvili. How come?"

"Oh, that's another story. A funny one. Niko was a soloist in our folk dance ensemble at the Young Pioneer palace. We invited his girl partner to join our Mziuri that left Niko alone. He missed his friend, he wouldn't dance with anybody else and he walked around a picture of misery. So we decided to let him join the girls' ensemble and worked up a special number for him. He plays *salamuri*, the Georgian pipe, like a master. In a class by himself!"

By now the ensemble has a repertoire of 30 songs, mostly Young Pioneer and Georgian folk songs for children. And though the musical instruments are, in size, also for children, they are not toys. Each member of the orchestra can play several of them, and each child sings. They all try to sound like Vakhtang Kikabidze. "Buba! Buba!" the girls exclaimed when I asked them who their favorite actor was. That's the nickname of the popular singer and film actor. During a break in the rehearsal Ketino Pirtskhalava, who performs with a huge kitten doll, sang for me **Chervona Ruta**, a very popular Ukrainian song. It sounded a little odd since the song is meont for a male voice, but musically the eight-year-old's performance was perfect.

All the girls study at the music school, which accounts for their learning to play the different instruments so quickly.

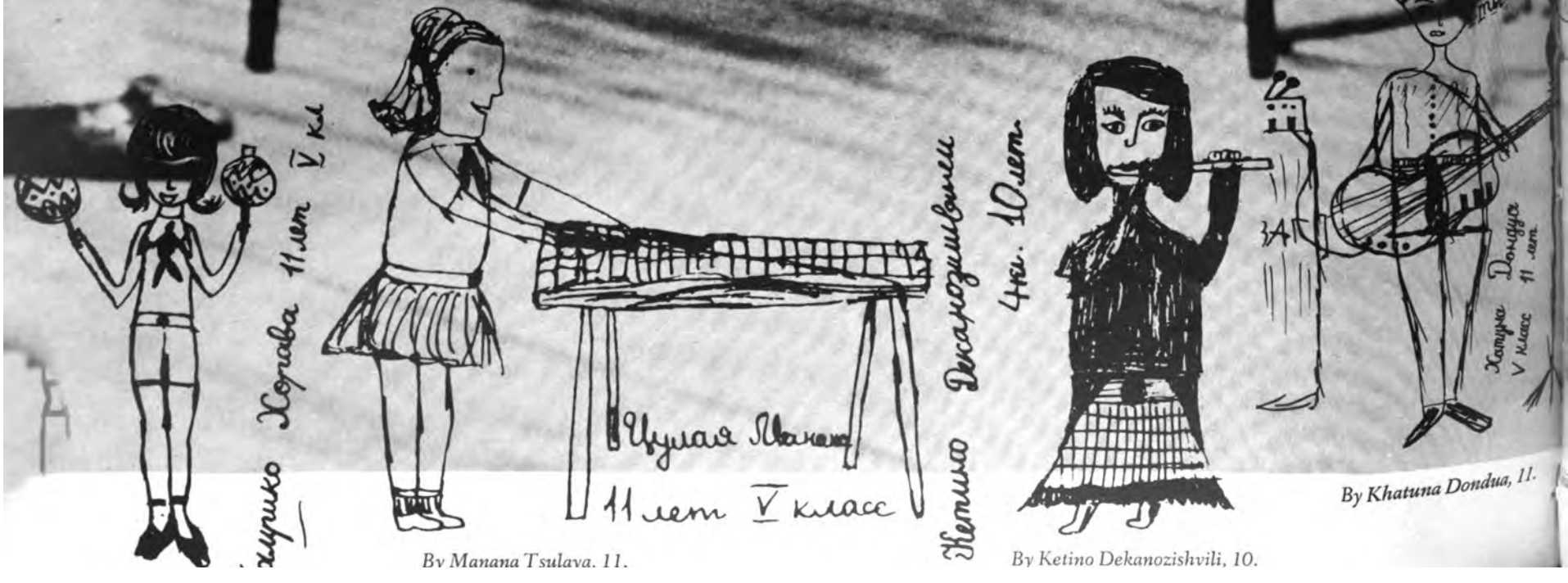
Musical director Guram Dzhaijani told me:

"We use letters for notes to make the teaching easier, and we don't give the difficult instruments to the very little ones. They start off with percussion to get them used to the ensemble. Little Tamriko Omanidze, who is only six, plays the triangle."

"We know," says Kazaryan, "that in a year or two our children will have to move on to something more adult. We're preparing for that time now, getting a new group ready to take over the ensemble."

I took a last look at these children clowning and dancing around while they waited for the practice session to resume. It was hard to imagine them anything like adults, but I reminded myself of how serious they were during the rehearsal. How exciting it will be to see them perform in another few years.

EXPLORING MUSIC AND ART



By Manana Tsulaya, 11.

By Ketino Dekanozishvili, 10.

By Khatuna Dondua, 11.

Кобиашвили Нина
10 лет. 4 класс.

Nina Kobiashvili, 10.

Мая Чинвинидзе
9 лет. IV класс.

By Maya Chikvinidze, 9.

Пиричалава Кетино
3 кл. 8 лет

By Nino Datukishvili, 10.

Нино Датукишвили
10 лет V класс.

Думбадзе Нина

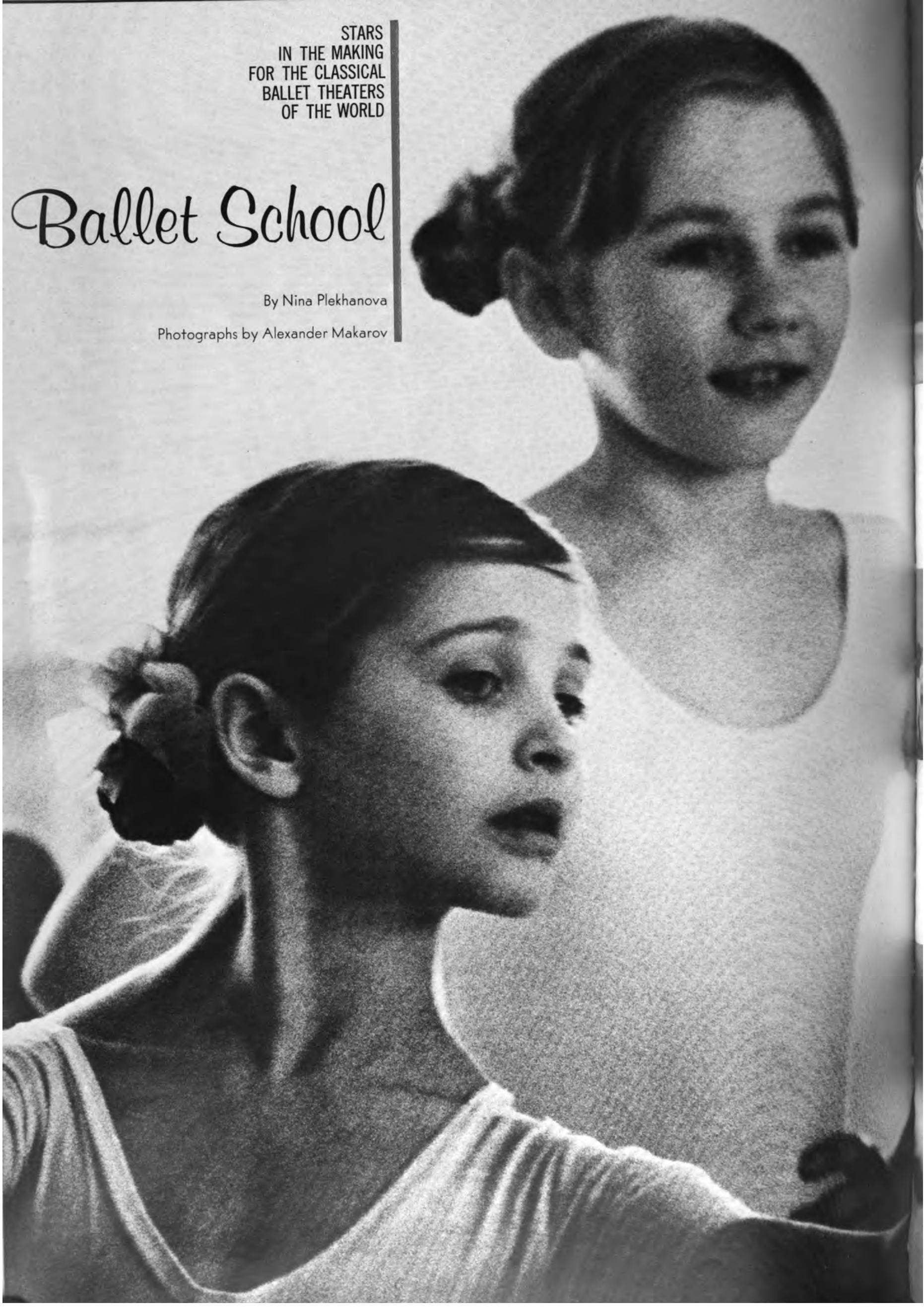
By Nina Dumbadze, 13.

STARS
IN THE MAKING
FOR THE CLASSICAL
BALLET THEATERS
OF THE WORLD

Ballet School

By Nina Plekhanova

Photographs by Alexander Makarov



The repertoire of the first graders includes scenes from such folk dances as "In New Boots" and "Gulliver in Lilliput," but the technique these juniors are taught is strictly classical. The emphasis is on good bearing.

Students in the higher grades are encouraged to work out their own styles, but the school day still begins with exercise at the bar. Teacher Ninel Silvanovich says, "What we really teach are self-discipline and diligence."

LAST SUMMER Nadezhda Pavlova, a 17-year-old student at the Perm Ballet School, won the Bolshoi Theater's Grand Prix at the International Ballet Competition in Moscow.

Those who had the good fortune to be there will not easily forget her performance. Ballet teachers, jury members and Moscow's exacting audience saw a ballerina who seemed to have been created by nature itself. They watched an astonishing fusion of youth's spontaneity and technical mastery give birth to an artistic miracle.

It was sensational, but at the same time almost predictable, for the miracle had been fashioned by the painstaking effort of the student and her teachers.

The Perm Ballet School was founded in the austere January days of 1945, when our country was still waging a bitter war against Hitlerite Germany. Soon after the fascists attacked the Soviet Union, the Leningrad Ballet School and the ballet company of the Leningrad Academic Opera and Ballet Theater were evacuated to the Urals. Yekaterina Geidenreikh, a ballerina of the theater, established a choreographic studio in Perm. Its teachers and, more than anyone, Geidenreikh herself laid the foundation of classical dance training in the new school, inculcating in

their charges a passion for this difficult vocation and building the discipline of daily, unremitting practice. The tireless struggle for the purity and nobility of classical form took deep root here.

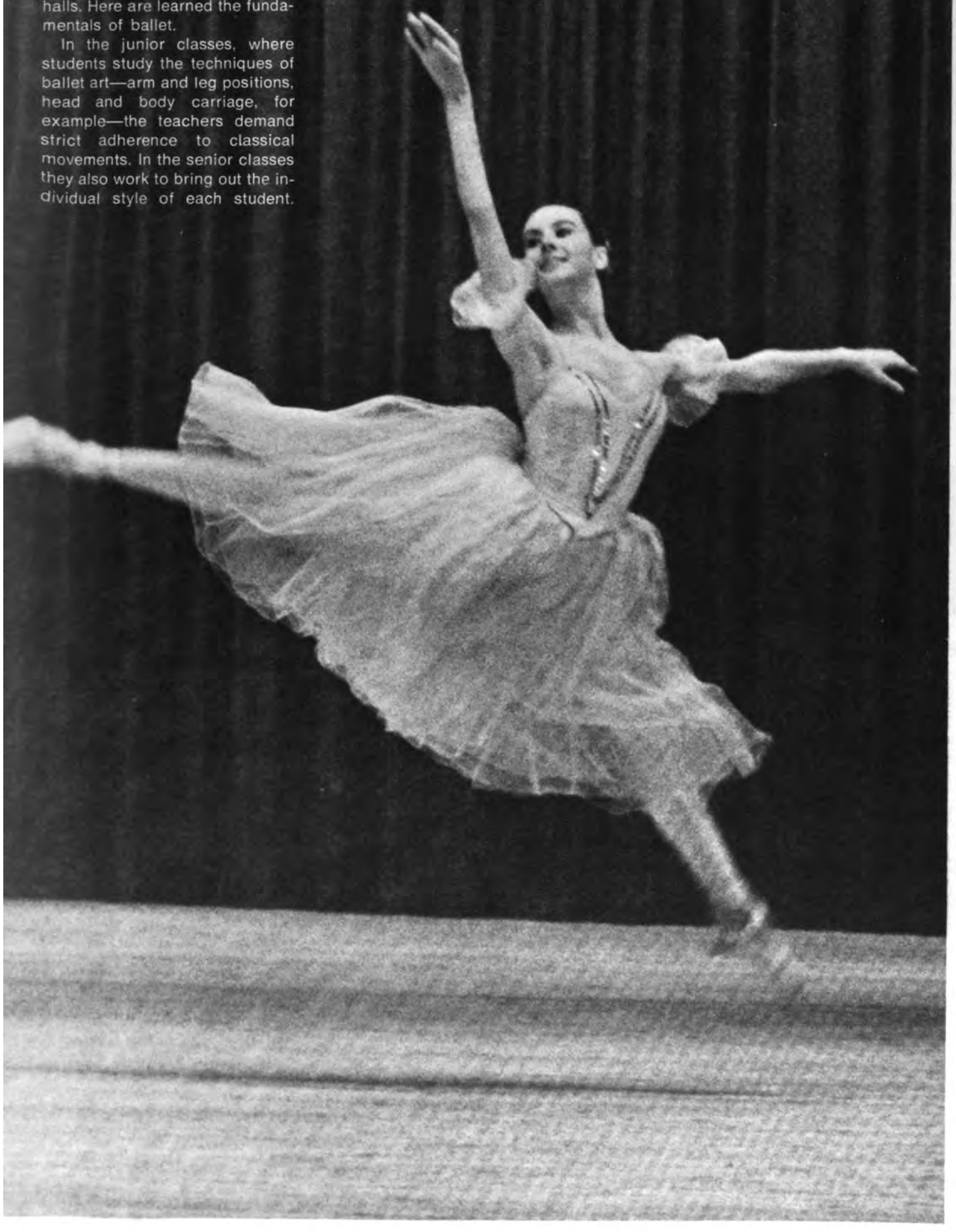
Today Perm Ballet School graduates perform on Soviet stages and abroad. Medals, prizes, diplomas, an enthusiastic press, the thunder of applause and the heady tributes of flowers—this is what the admiring public sees. Behind the scene are years of daily exhausting work.

The school day begins, as in most such institutions, with exercise at the bar in huge mirrored halls. Here are learned the fundamentals of ballet.

In the junior classes, where students study the techniques of ballet art—arm and leg positions, head and body carriage, for example—the teachers demand strict adherence to classical movements. In the senior classes they also work to bring out the individual style of each student.

The purpose here is to give future ballet artists an opportunity to find their own stage character, to develop independence, to help them bring out their own personality.

The students train for classical productions. They perform in Tchaikovsky's *Swan Lake* and *The Nutcracker*, Glazunov's *Raymonda*, Minkus' *Don Quixote* and Asafiev's *The Fountain of Bakhchisarai*. In Prokofiev's *Stone Flower*, for instance, a second grade pupil dances with the local theater's prima ballerina in the role of the Mistress of the



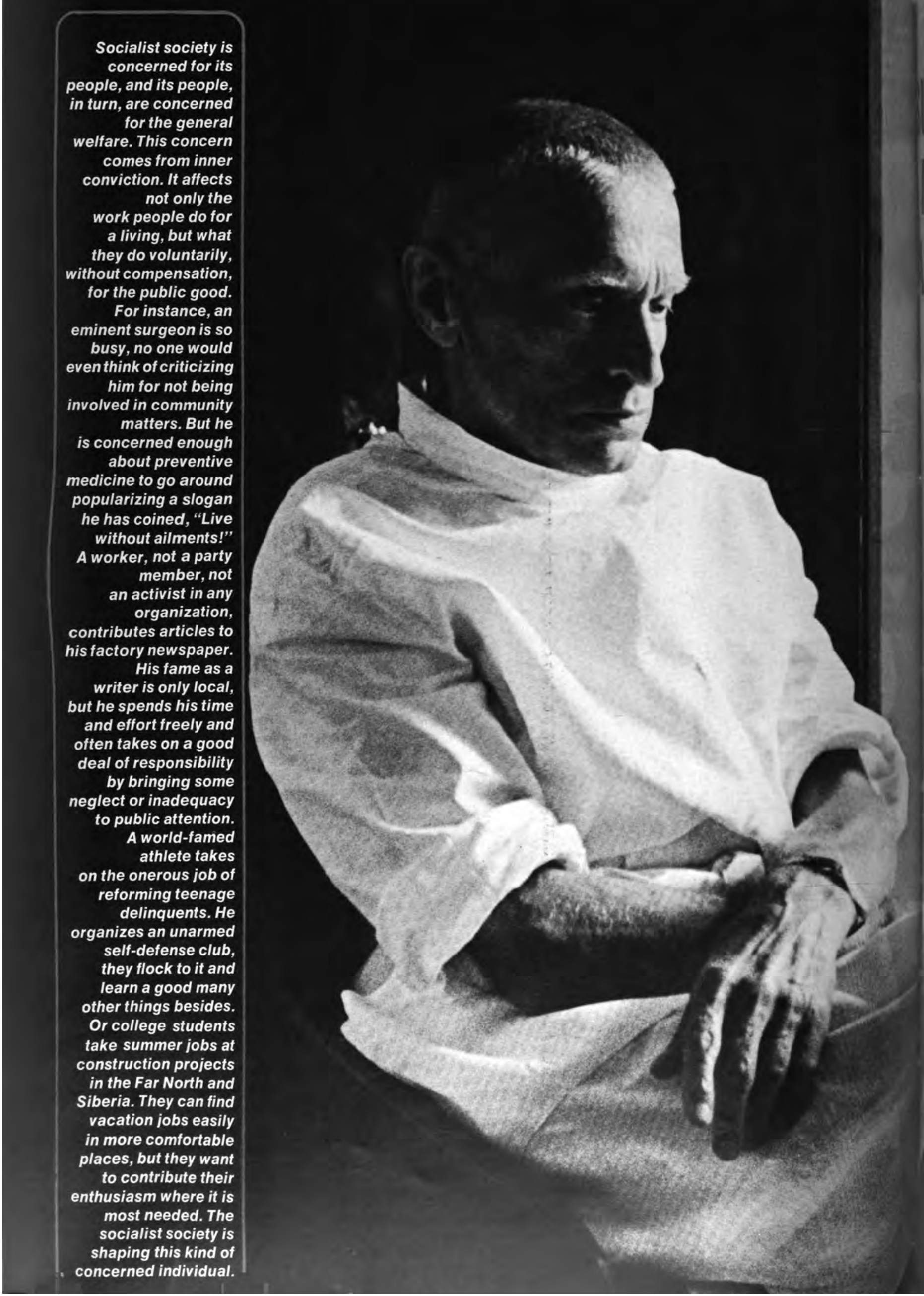
Nadezhda Pavlova was already an outstanding ballerina at 15. Her performance of the difficult pas de deux in

Copper Mountain, while Delibes' *Coppélia* is staged entirely by the students, with about a hundred pupils from different grades in the cast.

The school building has tall windows and many classrooms. Some of the rooms are for the same subjects all pupils study in ordinary secondary schools; others, with their floor-to-ceiling mirrors and bars, are exclusively for the dance. The school also has special classrooms for music, fine arts, the history of art, as well as for stagecraft and the art of makeup and hairdressing.

In addition to its purely academic facilities the school has a big auditorium, a fine library, a large dining hall, lounges for rest and recreation, even a museum of its own. It would be more accurate to call this a ballet boarding school because 185 of the 220 students are from different cities in the Soviet Union. They live in a comfortable house right near the school, with everything needed for homework and for rest. Because the school takes 10- to 12-year-old youngsters, some of the staff members act as house mothers after school hours.

Full maintenance is provided by the state, everything from money for the purchase of clothing to a voucher for a vacation resort. Meals, of course, are free. Beginning with the sixth grade, the children are entitled to stipends. The school administration covers all expenses for textbooks, manuals, aids, as well as for tickets to the theater, circus or movies, and travel expenses when the dancers are on tour.



Socialist society is concerned for its people, and its people, in turn, are concerned for the general welfare. This concern comes from inner conviction. It affects not only the work people do for a living, but what they do voluntarily, without compensation, for the public good. For instance, an eminent surgeon is so busy, no one would even think of criticizing him for not being involved in community matters. But he is concerned enough about preventive medicine to go around popularizing a slogan he has coined, "Live without ailments!" A worker, not a party member, not an activist in any organization, contributes articles to his factory newspaper. His fame as a writer is only local, but he spends his time and effort freely and often takes on a good deal of responsibility by bringing some neglect or inadequacy to public attention. A world-famed athlete takes on the onerous job of reforming teenage delinquents. He organizes an unarmed self-defense club, they flock to it and learn a good many other things besides. Or college students take summer jobs at construction projects in the Far North and Siberia. They can find vacation jobs easily in more comfortable places, but they want to contribute their enthusiasm where it is most needed. The socialist society is shaping this kind of concerned individual.

OLAI SOV: THE LIFE IN MY ANDS

By Valeri Demin

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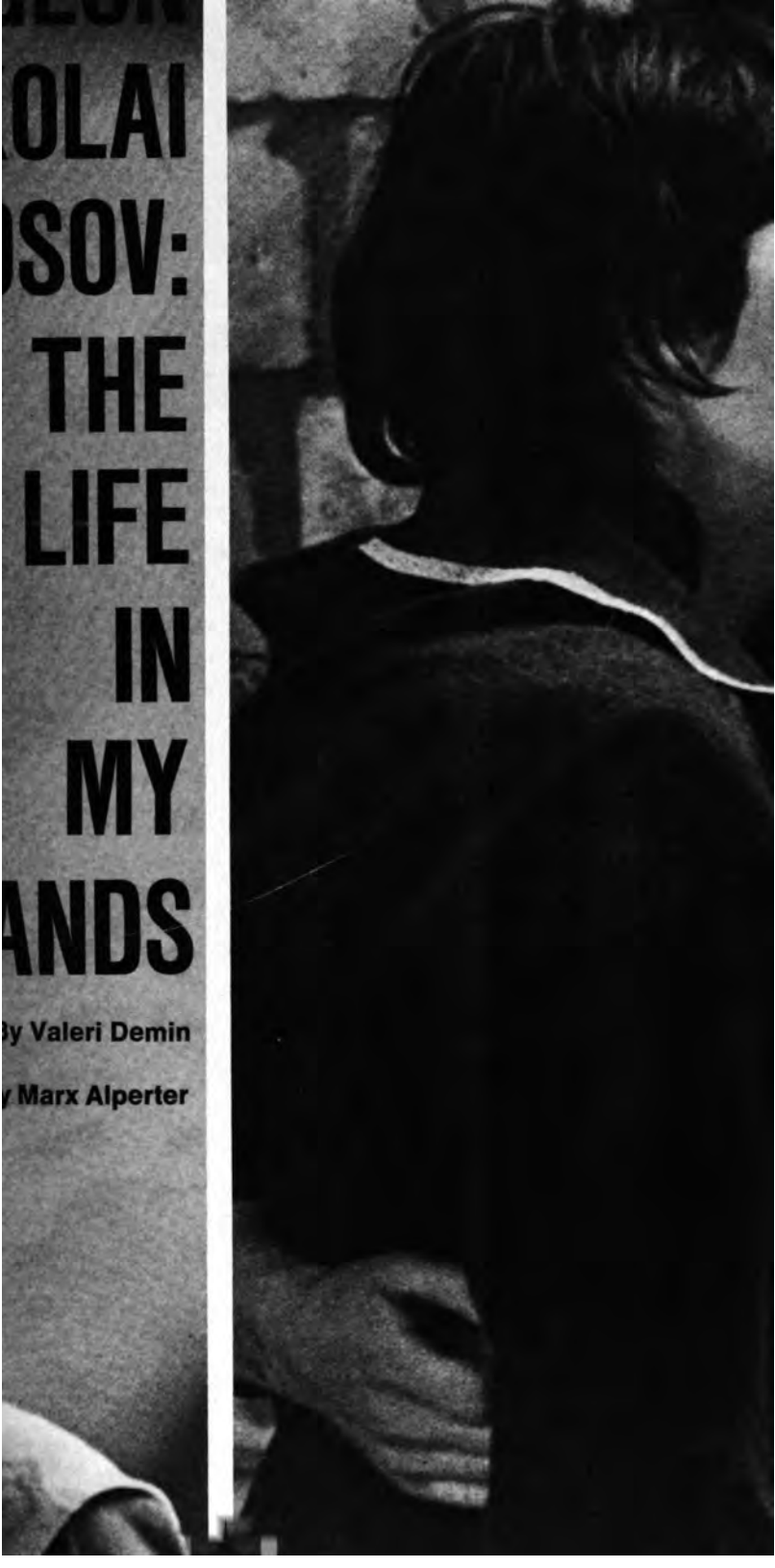


NIKOLAI AMOSOV is one of the Soviet Union's most eminent surgeons. His specialty is thoracic surgery, particularly operations on the heart. Last year he celebrated his sixtieth birthday. Amosov has been performing operations for more than 30 years, and if all those who owe their lives to him were gathered in a city square, they would prove by sheer numbers how much good one man can do.

For his pioneer work in surgery Professor Amosov has received the highest award the country has to bestow—the Lenin Prize. He has also been elected a corresponding member of the USSR Academy of Medical Sciences.

But the professional honors of this many-sided person are only part of the story. Professor Amosov is not a man to whom you can attach the word "typical," even in his work as physician.

He is an inveterate propagandist for that first principle of Soviet public health—disease prevention on a mass scale. Among other things, he attaches great importance to the dissemination of medical knowledge.

Every year thousands of people come to his lectures, which popularize such slogans as "Live without illness!" Another of his slogans, "Good health is stylish," has appeared in a number of newspapers and magazines. He is insistent that people change their way of living. "Our contemporary life," he says, "is inimical to the human organism. Insufficient exercise, overeating and hypochondria negate the achievements of medicine. You can't be healthy unless you exercise regularly. People should be ashamed to get sick because they're lazy."

The current enthusiasm for jogging among people who have never gone in for exercise may be attributed, at least in part, to Amosov's tireless propaganda.

He is at odds with such medical dogmas as "Any kind of pain indicates a disease," "Treatment means rest," "The sensation of hunger is always harmful," "Drugs do the curing."

Amosov thinks honesty is more important than a good bedside manner. "Insufficient exercise is responsible for many of the major diseases. In fighting them, it is the physician's firm hand and not his bedside manner that is crucial."

Many people, doctors in particular, don't care for Amosov's "extremism." But one thing they do recognize—everything he suggests he has tested on himself beforehand. So that even the criticism of his "ascetic views" is tempered with respect.

Amosov is a surgeon, statesman (he is a deputy to the Soviet parliament) and a writer. Besides all that, he has applied his creative talents in still another field, cybernetics. At the Institute of Cybernetics of the Ukrainian Academy of Sciences he has founded and heads a department of biological cybernetics.

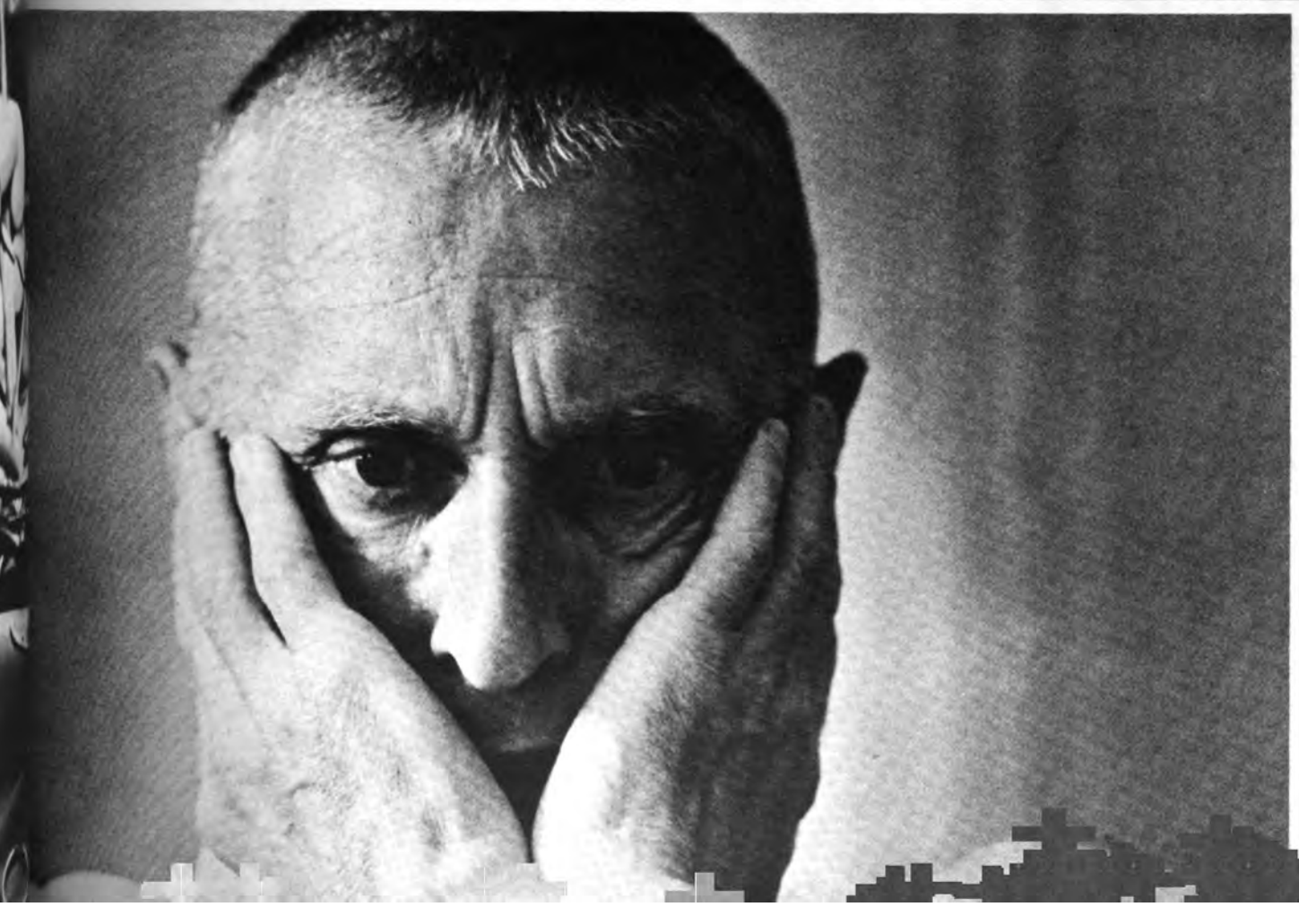
What prompted this man, who had become one of his country's most distinguished surgeons, to start working with cybernetics? He had some background in the field, having graduated from two institutes, one medical and the other industrial. But here is his own answer to the question:

"You see, a doctor has to deal with people who are suffering. He tries to alleviate their suffering, to make people a little happier. But the physician can't see all the elements that go into that suffering, that make up the ailment. In principle, cybernetics is capable of taking into account so many different factors—and in real life the number is always very great—that it can give us correct solutions to replace our present guesswork. That is why we are now trying to create a model of a living cell. Later we shall try to build a model of the body's functioning, then a model of the human intellect with a view toward creating an artificial brain and, lastly, models of social systems. Of course, all this will take more than one lifetime, but that's something we can't do anything about —as yet."

Notice the ". . . as yet." Nikolai Amosov is not the kind of person who consoles himself with such a phrase as "can't do anything about it." He will not reconcile himself even to the inevitable if it is inimical to man. "What I have achieved," he says, "will remain, produce shoots and live. But what I have experienced, been concerned about, all my cherished dreams—will they disappear? Disappear? . . . But that can't be possible!" Such a train of thought dictated by a passionate love of life is typical of him. And maybe it is this love of life, on the one hand, and a rejection of death in general and of his own death in particular, on the other, that form the core of Amosov's personality, permeate all his activities, prompt him to express himself in literature. It is no accident that Amosov has chosen this theme for his science fiction novel **Notes from the Future.**

"The operation is going fine. . . . See how beautifully all the vessels are separated. The root of the lung section is already exposed. That's not easy with these commissures and an aneurism in the close vicinity, I'll tell you. Still, I'm not a bad surgeon. One of the best, as a matter of fact. . . . Stop boasting."

"I take my place, slit the intercostal muscle and reach the pleural cavity. Everything proceeds almost automatically. The whole world is switched off. You can stand for six hours and never feel your feet . . . when the job's difficult. Right now it's difficult. Or, rather, it's going to be difficult."



"Sweet children, recovering after a successful operation! So near and dear, it's so hard to part with them." Left: "We are envied our clinic. People say we do miracles. Everybody sees the outer aspect, and very few know what all this costs us. I would gladly give up my fame and degrees for a very simple price—that my patients never die."

A physician dying of leukemia decides to have his body preserved by freezing. Analyzing the scientific and moral aspects of the experiment in the form of a documentary report, Amosov draws no final conclusions. But implicit in the novel is his own dream of immortality, his refusal to accept death and human suffering.

Meditations on the Heart is a more complete revelation of the surgeon's outlook. The book, a moving, authentic account of the struggle for human life, has become an enormous success. In the course of a few years, it has gone through several editions and a total printing of seven million copies in the Soviet Union alone. Besides that, it has been published in all the large countries of the world (26 editions) under different titles: **Russian Surgeon, The Life in My Hands, The Open Heart** and others. In the terse, rapidly paced language of the book you sense the beating heart of its protagonist, which is indeed open to the world.

Much has been written about Nikolai Amosov in the Soviet Union. Journalists ask his opinion; his books are adapted for the screen. A documentary film about the surgeon's life has won the Lomonosov Prize of the USSR Academy of Sciences, the highest award for works of this genre. Readers eagerly await the appearance of every new issue of the magazine **Nauka i Zhizn (Science and Life),** in which his new book is being serialized. It covers the years of the Second World War when he was a surgeon at a field hospital.

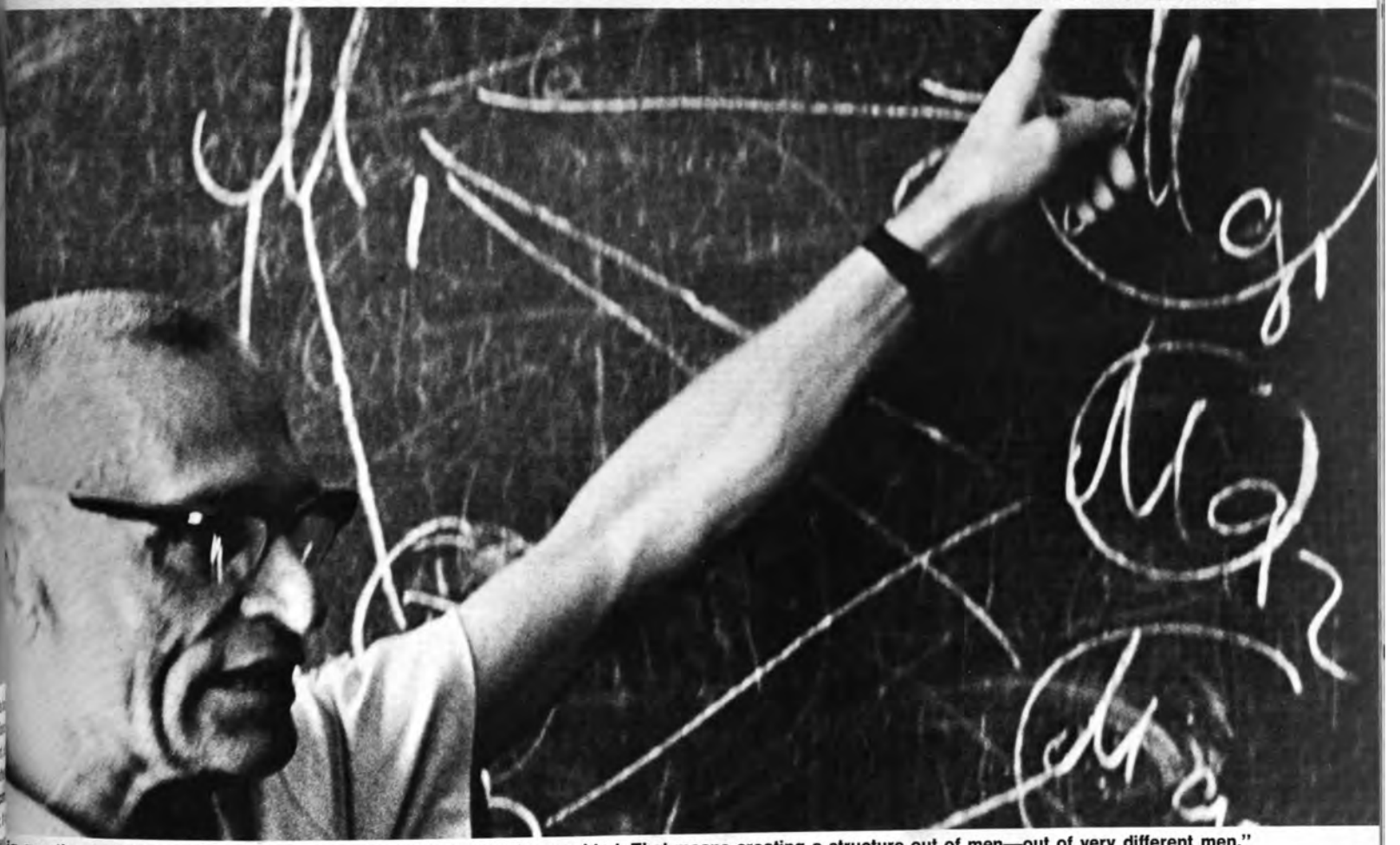
For many young people Professor Amosov has become a dominant influence. Here is what surgeon Beryozov, a colleague, says about him:

"What can move people nowadays when so many newspapers are published daily and when such an enormous number of books come out? Only important ideas, strong emotions and respect for the facts. Amosov has them all."

Dr. Amosov's book, *Meditations on the Heart,* is so moving and authentic that it has become a best seller. It has gone through several editions and been published in a total printing of seven million copies in the Soviet Union alone. Besides that, it has appeared in a number of foreign countries under various titles.

NIKOLAI AMOSOV: THE LIFE IN MY HANDS

people suffering from disease. But I do not see those who suffer from dignity lost, love unrequited, lack of understanding by others."



g question is how to organize a stable and happy society for mankind. That means creating a structure out of men—out of very different men."

Dr. Amoun
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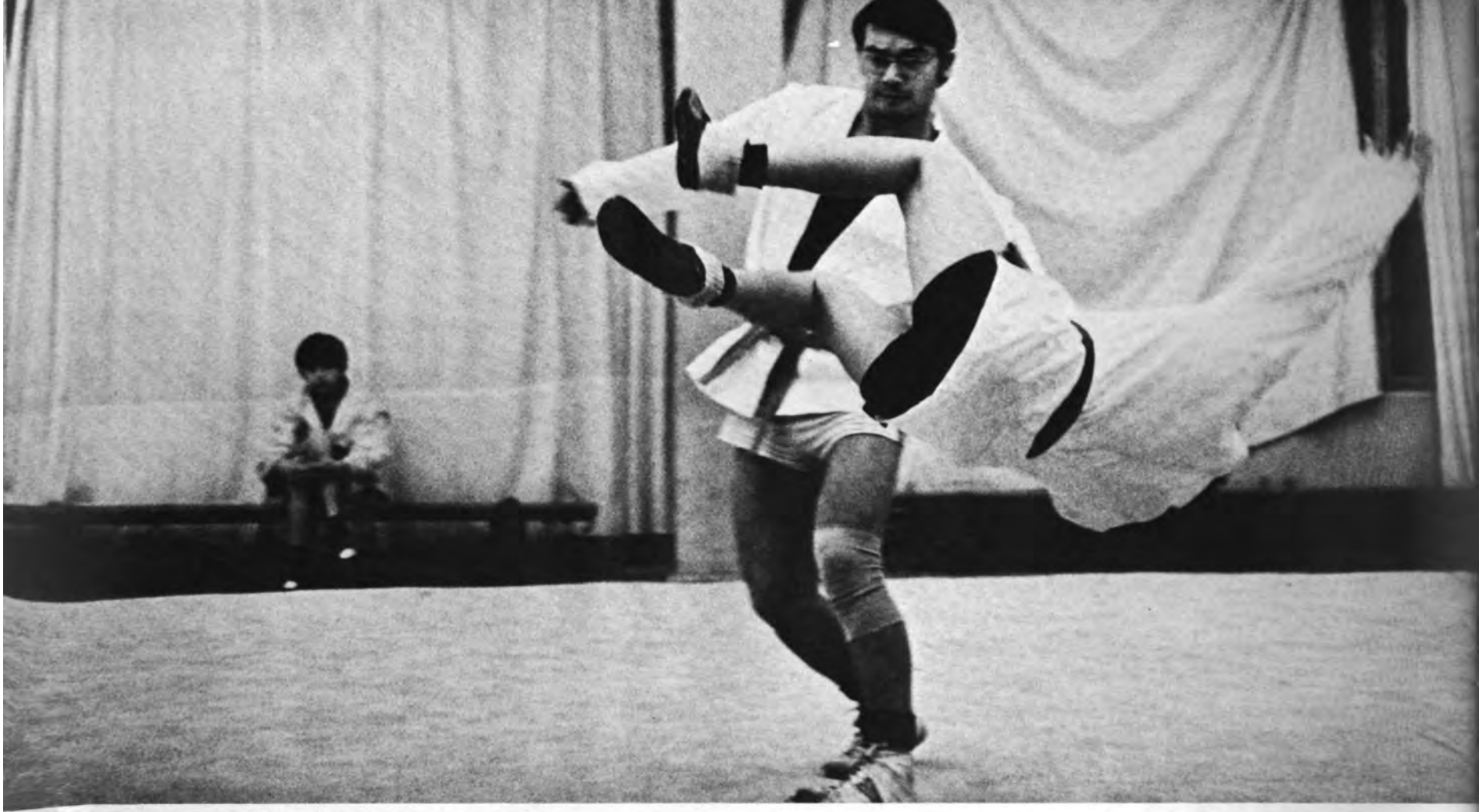


David Rudman, construction engineer by profession, is the world sambo champ. Interested in trying to straighten out present and potential juvenile delinquents, he thought a sambo club might attract them, serve as a kind of bridgehead to education for citizenship.

MORE THAN JUST A SPORT

By Mikhail Lukashev

Photographs by Sergei Lidov

AMBO is the Russian acronym of "self-defense without weapons." It is a system of stling holds that can also come in handy eal attack situations, even against armed ressors. I've known that for a long time. that these same sambo holds can serve cational objectives, especially in working problem children, I found out only re- tly.

The Impetus

all started four years ago, when Master Sports David Rudman, a sambo wrestler, his family were assigned a new apartment Moscow's southwest section, one of the new ricts of the capital that was not so long typically suburban but now is densely ulated. It goes without saying that in these districts you find youngsters of all ages, average kids, most of them pretty well aved but some of them going in another ection. They are the ones who get into trouble attract most of the attention.

Walking along his street, still not all built Rudman often saw such street-corner loaf- Clearly bored to death, they diverted themes with any prank they could think up. doubt about it—among these mischief-mak- could be potential lawbreakers. The youngs aroused in David neither righteous indigna- nor abstract sympathy but the sincere de- to help them, to save them from winding in real trouble.

Rudman had what it took to counter the o young loafers set upon the heads of their estionable heroes—the prestige of a leading lete. That weighs heavily with adolescents. ir models are almost invariably champion letes.

Development of a Champion

Rudman joined a sambo wrestling club when was 14. At the time, in the fifties, training cilities were quite poor, so young wrestling vices had no more than a corner of a mat practice. The center was the property of der and more experienced matmen. A cor-

Members of the Sambo Republic, as they call their club, have learned to be responsible to themselves and their peers. They themselves make all the decisions; the republic has its own elected government. Youngsters who get into trouble are tried by the club. The most dreaded penalty

ner doesn't give you enough room to wrestle standing up; David and his friends were reduced to polishing their holds lying on the mat. But that's how he developed his original style, which he called corner wrestling. Very few managed to get out of his holds. By the time he was 17 David had won the Master of Sports title, and relatively soon thereafter he defeated several sambo aces, USSR champions many times over. These victories of his were of special interest because they were products not of crude force but of calculated, intelligent tactics. In 1965 Rudman captured the national title, and he has won it five times since.

He also challenged foreign judo wrestlers (sambo and judo are closely related), adding to his big collection of sports awards two more gold medals for the European championship, and a bronze one for the world championship.

His greatest sports achievement came when he was 30. At the Farah Stadium in Teheran last year he won the world sambo championship; it took only two minutes in toto in all five encounters.

Throughout this portion of his sports career David continued his studies. After graduating from a building engineers institute, he took advanced work and started on his dissertation for a master's degree.

The Sambo Club

Apparently he had teaching talent as well. It was no accident that David's mates on the national squad elected him their YCL secretary: They liked his approach to people, his tact and his ability to get the boys tuned up for victory. Nor was it pure chance that got him interested in problem children and ended up in a decision to start a sambo club for them.

When I asked Rudman how he had worked it out, he replied with the well-worn phrase, "In the beginning there was the word." Yes, indeed, at first there was the word, then a great number of words to marshal arguments against people who thought his scheme not only foolish but even dangerous. "Have you thought through what you're doing?" David was asked. "You want to teach all these holds to hooligans? They make good enough use of their fists right now without any instruction. After your sambo course they will really fix people up. Don't bother calling the ambulance service."

But Rudman could not be dissuaded. "I'll be responsible for them," he said. Against the objections of many skeptics the district committee of the YCL went along with him. The Sambo-70 Club came into being.

Today the big windows of the club, decorated with stylized figures of wrestlers, are a bright spot on Ostrovityanov Street. The club attracts youngsters not only from the streets nearby but from the entire district. And not just young people; even adults stop now and then at these big windows to watch the struggle on the mat through the slits beween the curtains.

The club moved into a new building, what had been planned for a shop. It gives them a spacious hall, several small rooms and a basement with dressing rooms and showers.

The members call their club the Sambo Republic, and a youngster's republic it is. They make all the decisions. The republic has its own elected government, the Council of Ten Commissars.

"Sambo is what brings us together," Rudman says. Every youngster wants to be strong, a real he-man. But the lessons in wrestling also branch out to other interests. The club has a philatelic circle, a dancing school and its own jazz band. Celebrations such as the coronation of the Sambo King are annual events. Already it is a club tradition to mark the birthdays of its members, with a youthful master of ceremonies plucked right out of the club.

That big things are under way here is evident the minute you step into the foyer, with its wall newspapers and photo exhibits of recent and future activities.

But, as everywhere else, there have to be times of stumbling blocks, of problems and disappointments, which the boys also handle on their own. One fellow, for example, is authorized by the council to keep a sharp eye on club members' school marks. It does happen, though rarely, that someone, usually a newcomer, gets himself into trouble. What do you do in such cases? The guilty must be punished; a bad example has a way of becoming infectious. On the other hand, to kick out a 15- or 16-year-old deprives him of the beneficial influence of the group and leaves him to the dangers of the street. Rudman found the solution. Where there is no way out, the Council of Commissars expels the violator, but David sees to it that the road back to the club is never closed—provided the guilty one turns over a new leaf. There is no question that this is good policy: There hasn't been a single case where a youngster has not been eager to get back to the club, whose motto is: "One for all, and all for one." A good example is what happened to a young smoker who didn't want to break the habit and went on smoking in secret, despite the strict rule, "Whoever takes up wrestling does not smoke, and whoever smokes does not wrestle." He had to leave the club, but by the time he was let back in, he had forgotten all about cigarettes.

So sports and education for life go hand in hand. It is a far cry from holding up lamp-posts.

QUERIES FROM READERS

QUESTION: Is there a Supreme Court in the Soviet Union?

ANSWER: Yes, there is. The USSR Supreme Court is the highest judicial organ of the country. The union republics also have Supreme Courts which are their highest judicial organs.

The USSR Supreme Court is elected by the USSR Supreme Soviet for a term of five years and is composed of a chairperson, deputies, members of the Supreme Court and people's assessors. The chairpeople of the Supreme Courts of the union republics are also members of the USSR Supreme Court. While electing the Supreme Court, the USSR Supreme Soviet also decides how large it will be.

The USSR Supreme Court exercises supervision over the activities of all the judicial organs of the USSR and the union republics and enjoys the power of legislative initiative. It discharges its functions through its three collegiums: criminal, civil and military. As courts of first instance, they examine cases of exceptional importance, as well as appeals and protests. The plenum of the Supreme Court meets at least once in three months. With the participation of the Procurator General of the USSR, it examines the protests of the chairperson of the Supreme Court and the Procurator General of the USSR against the verdicts and rulings of the judicial collegiums; reviews the rulings of the Supreme Courts of the union republics that contradict the all-Union legislation; presents opinions to the Presidium of the USSR Supreme Soviet on questions regarding the interpretation of laws, as well as in cases when a particular question calls for a legislative settlement. The plenum also decides disputes between judicial organs of union republics.

The Supreme Courts of the union republics are elected by the Supreme Soviets of the union republics for a term of five years and are composed of two collegiums: civil and criminal.

QUESTION: In one of the articles published in your magazine it was said that trials in the Soviet Union are held with the participation of people's assessors. What is the difference between people's assessors and jurors?

ANSWER: Jurors are not members of the court. They form a separate body—a jury—which, after listening to the testimony presented to the court, decides only whether the defendant is guilty or not guilty. On the basis of its findings the judge passes sentence, deciding the penalty. In most countries jurors only participate in examining criminal cases.

In the Soviet Union all cases, both criminal and civil, are tried in all courts by a judge and two people's assessors. People's assessors of district or city People's Courts (courts of first instance) are elected for a term of two years at general meetings of citizens held at their place of work or residence. People's assessors of the regional, territory and city courts, the Supreme Courts of the union republics and the USSR Supreme Court are elected respectively by the local Soviets of Working People's Deputies, the Supreme Soviets of the union republics or the USSR Supreme Soviet for a term of five years. People's assessors are members of the court, enjoy the same rights as a judge and participate in deciding not only the question of guilt, but also the degree of punishment. The decision is adopted by a majority vote, and if the two assessors disagree with the opinion of the judge, then their opinion prevails.

People's assessors serve in court only two weeks a year unless a trial happens to take longer.

Every third person in the Soviet Union is doing some kind of formal studying. This thirst for knowledge is stimulated by two compelling factors. The first is the usual striving to qualify for a better job, to make oneself a more interesting, more respected person. The second is the urge to make a larger contribution to the country's economic, cultural and political life. The last factor has particular force in a socialist society. Literacy is universal in the USSR and the general level of education is high. Sixty-six of every hundred industrial workers and 44 of every hundred farmers have a higher or secondary (complete or incomplete) education. That makes a solid foundation for supplementary schooling to equip them to take part in management. That managerial role has been much enlarged by the current economic reforms. Courses in economics, for example, are now offered at factories all over the country. The worker with a better background in economics is a more effective contributor to the Permanent Production Conference or the People's Control group in his or her factory. Legal and legislative knowledge is widely disseminated. The aim is to equip people to use their rights and perform their duties knowledgeably.

Lawyer Klavdia Lyubimova heads the Legal Advice Bureau of the city of Gus-Khrustalny. There are consultation offices like it in most Soviet towns of any size.

LEGAL ADVICE—A FREE SERVICE

By Nina Gavrilova
Senior Editor of the magazine
Man and the Law

GUS-KHRUSTALNY's law office is headed up by Klavdia Lyubimova, who is not only a lawyer, she is a deputy to the City Soviet. When I came in, an elderly man was shaking her hand and thanking her. I asked what the visitor's problem was.

"He applied for a pension at the District Social Security Department some time back, of course presenting all the necessary documents. For no reason he could figure out, his application was held up there so that he lost payments due for the first three months. We helped him write the proper complaint to the chairman of the city executive committee. The oversight was found, and he has his back payments as well as the regular pension."

Lyubimova invited me to sit in on the complaints. People came in with all kinds of troubles, big and small. A spirited young man wanted to know whether he had deserved the disciplinary reprimand he had received from his factory management. From all the evidence the criticism was justified: Documents he presented confirmed that all the provisions of the relevant labor legislation had been observed by management. He would have to show himself a more conscientious employee.

The next client was a quiet, reserved gentleman who came in to sign papers empowering the lawyer to represent him in court. He was asking reimbursement for losses incurred in an automobile accident. Lyubimova explained to me that before suing in court he had come to the office for advice. To find out whether the man had a case, the lawyer had to study all the circumstances: whether his claim was within the competence of the court, whether there were sufficient grounds for a suit and what supporting proof he had. She had gone through it all, and

LEGAL ADVICE

there was no question in her mind that the court would decide in favor of her client.

One of the callers complained:

"I'm at retirement age, but I don't have the documents for the first five years of my 20 years of work."

"Can't you ask at the factory where you worked at the time?"

"That's just it—I can't! The city where this factory was located was occupied during the war, and all the records were burned."

"Do you still know some of the people you worked with? Could they back you up, confirm that you worked with them during those five years?"

"Well, sure. I still correspond with some of them."

"In that case you have nothing to worry about," the lawyer said. "All you need is just two signatures from fellow workers." Lyubimova went on to explain the procedure for re-establishing the service record through the testimony of witnesses.

Then a young couple walked in, somewhat apprehensively, it seemed to me. They wanted to know, first of all, whether their request to the law office for advice would be kept confidential. Lyubimova assured them that they had no reason to be concerned on that score; according to Soviet law the lawyer-client relationship presumes this obligation.

It turned out that the couple wanted to know the procedure for adopting children. They were given a pretty thorough consultation. The most important consideration, Lyubimova told them, is the conditions in which the child is to be brought up. Proof of their earnings, acceptable living conditions, their good health (medical certificates are required) has to be presented to the appropriate authorities.

The callers also included people who needed help starting a suit in court, others who wanted to appeal a court decision or ask for a pardon or get advice on a purchase-sale contract.

"We help people draw up all sorts of documents that can lead to legal action," Lyubimova explained. "We're here until 8 in the evening so that people who work all day can come in. We're also open on Saturdays."

"What if the client can't get here because of illness, let's say?"

"In that case he or she can write us, and we do our best to give our advice by mail."

"And what is your fee?"

"Most services are free—for such things as problems on the job, pension matters and divorces. For any other kind of legal advice the charge is no more than a ruble. Lawyers also defend the interests of the plaintiff in accident cases at no cost. For people invalided in the war or from a work-connected injury, all legal advice is free."

After the last client left, I asked: "Well, what now, going home?" "Yes, today I'm going home," said Lyubimova. "This hasn't been a typical day—our work is not limited to legal advice and appearances in court. We lecture on legal matters at factories, Houses of Culture and clubs. We give legal advice in the local press and answer questions of radio and TV audiences. Tomorrow, for instance, I have to talk to high school seniors on the legal responsibility of minors. So tonight I'll be spending some time thinking over what I'll tell them and preparing answers to some tough questions."

PEOPLE'S CONTROL— A FACT OF SOVIET LIFE

Back in 1920, the first People's Control bodies were set up by Lenin as a means of teaching working people how to run their industries and institutions.

Today's structure and methods of People's Control, established in 1965, have evolved out of a half-century's change and experience.

THERE ARE People's Control groups and posts at all factories, construction sites, collective and state farms and educational institutions. This is how they are set up: The primary units of the party, the trade unions, the Komsomol (YCL) and other mass organizations elect a certain number of their members, depending on the size of the organizations, to serve in People's Control groups. The size of a group can vary from seven to 50 members. Small enterprises or shops have People's Control posts with a minimum of three persons.

The mass character of the system is evidenced by the fact that Moscow, for instance, has 40,000 groups and posts, with over 232,000 people's inspectors.

A People's Control body has the right to examine the premises, materials, documents —financial records included—of a given factory or institution. It can require management to explain discrepancies and failures to meet standards. The remedial changes it recommends will, of course, be within its competence. It is not the business of a People's Control body to substitute for management; its obligation is to give effective assistance.

To get close to the way the groups and posts work, let us visit the truck loader plant in Lvov in the Western Ukraine with correspondent Vladimir Popov.

We opened the door of the trade union committee office to find two men in the midst of an argument. One of them, Nikolai Bessmertny, a shortish man with graying temples, was saying to the other, "Your arguments don't convince me. We are not discussing abstractions. It all comes down to mismanagement and the poor discipline of some workers. I've checked it out. And it's too bad that you, a department head, can't understand that. I'll see you tomorrow at the director's."

When we were alone, Nikolai said, rather apologetically: "Sometimes you have to be tough. Not everyone, unfortunately, is disciplined and conscientious. It's got to affect the work."

He told us that the plant party committee had instructed him, chairman of the plant's People's Control post, to look into the operation of the sales department; there had been complaints. A checkup showed that the department had been slow shipping out goods—with no justifiable reason—and that its paper work was sloppy. The department chief had to be hauled over the coals, and the operations of the section given a thorough inspection.

Nikolai Bessmertny is 50 years old. An engineer at the plant, he is responsible for the quality of the machines shipped from Lvov to cities all over the Soviet Union and to 50 countries abroad.

In 1969 the engineers, bench and office workers at the factory nominated Nikolai to chair their People's Control post. The engineer had his doubts about filling the job. It was no simple matter to keep a check on the work of a whole plant: 15 departments and a score of auxiliary shops. His fellow workers insisted he was the man for the job, and he finally agreed to do it.

Nikolai well understood that management and the People's Control inspectors had the same goal: Increasingly efficient operation of the country's factories, mines, railways, farms and its various institutions.

There are 570 people's inspectors at the truck loader plant. More than 300 of them are factory and office workers, the rest are engineers and technicians. Nikolai and his assistants keep an eye on every area of plant activity. Their job is to help management build up to the point where it gets maximum productivity with the smallest expenditure of labor and materials.

People's inspectors found, for example, that electric motors with capacity way beyond the operational need were mounted on certain machine tools. They were replaced by motors with lower capacity; in six months the plant had saved a very considerable volume of electricity. A concurrent thrift drive also saved the plant almost a thousand tons of ferrous and nonferrous metals.

A complaint came in from the chief mechanic's department that some new equipment, which would hike profits considerably, was held up in the machine assembly shop. The shop chief stubbornly insisted that the old and obsolete equipment was continuing to work well and that the new machines still had to be checked. Bessmertny made a call on the chief engineer and convinced him of the immediate need for the new equipment.

A disagreement of another kind had to be ironed out in the hydraulics shop. The workers' earnings took a sudden drop. People's inspectors found the foremen to blame: They had not been keeping complete records of the work done. The control group recommended that the workers recoup their losses from fines paid by the foremen. Man-

Continued on page 47

VALGA-VALKA

THE BORDER THAT NO LONGER EXISTS

By Pavel Antonov

Photographs by Yan Tikhonov

lore than a hundred nations and ionalities live in the 15 union republics, 20 autonomous republics, eight utonomous regions nd 10 national areas of the Soviet Union. Basic to the USSR Constitution and all legislation is the rinciple of complete national equality. t there is more than legality involved. he day-to-day living together over the last 50 years has changed the nvironment, created an atmosphere f natural and kindly relations among all the country's nationalities. Everything in the SR is inter-national: the composition of e party, the Soviets, work and research teams, university student bodies. onomics, of course, is fundamental. The country's economy develops as a single unit, with the terests of every one of the republics taken into account. The Soviet nations assist each other every way possible. The emotional bond strengthened by the interaction of tional cultures. This bringing together f the Soviet nations economically and culturally is accelerated by personal relations. Mixed marriages have become common practice.

IT WAS ONE O'CLOCK in the morning. A dance at the palace of culture had just ended, and groups of teenagers walked along the silent streets of the town toward a six-foot wooden bridge. Probably none of them knew that they were approaching a border, that once this bridge had been surrounded by barbed wire.

I stood with one foot in Estonia and the other in Latvia. But unlike the famous border in Chaplin's film *The Pilgrim,* this was not a broad white line under my feet, but a stream that had the same name in both Estonian and Lettish, Frog Ditch, though it sounded very different in the two languages.

Seeds of Discord

In the second decade of the present century, a number of important events took place in the Estland and Lettland provinces of czarist Russia.

In Petrograd, then the capital of Russia and some 300 miles northeast of Riga, a socialist revolution was imminent. Kornilov, one of the czar's generals, trying to create a threat to revolutionary Petrograd, treacherously surrendered Riga to the Kaiser's troops early in September 1917.

By January 1919 almost all the territory of former Lettland, now called Latvia, had been liberated from the Germans and a provisional Soviet government formed there. But some time later a counterrevolutionary army equipped by the interventionists invaded Latvia and set up a bourgeois government.

The bourgeoisie also seized power in Estonia, the neighboring Estland province.

On the border of the two provinces was a small town named Valga in Estonian and Valka in Lettish. Nothing momentous ever happened there. In February 1920, however, an armed conflict brought the town into the limelight.

Two recently born bourgeois governments laid claim to Valga-Valka, ready to support the claim by armed force. The Estonians and the Letts, who had always lived in peace, were at the point of war.

With the help of foreign mediators the dispute was settled by dividing the town into two parts, with the border between Estonia and Latvia running along Frog Ditch. Barbed wire was strung along the brook, and the six-foot wooden bridge was blocked by striped gates. This artificial division of the town became a breeding ground for international enmity.

Plan for Unity

If you were to make a list of the cities and towns in the Soviet Union in order of population, territory and industrial production, Valga-Valka, with its population of 25,000, might appear somewhere in the fifth or sixth hundred.

Thousands of cities and towns were rebuilt from ruins after World War II—Valga was not one of them simply because the war had by-passed it. Giant plants, mines and hydroelectric stations were built, and their names made the front pages, while Valga-Valka never even got a mention. The town patiently waited for its hour.

And the hour did come. A conference was held in Tallinn, the capital of Estonia, in July 1969. At the conference were representatives of two building committees, Estonian and Latvian, two design institutes and two district executive committees—Valga and Valka.

I quote from the resolution adopted at the meeting: "The border between the two parts of Valga-Valka shall be only de jure—it shall not be permitted to affect the development of the town as one whole."

The town, divided under bourgeois rule and embroiled in nationalistic differences during the nazi occupation, acquired a new sense of unity following the liberation of the Soviet Baltic territories in the autumn of 1944. The border between Latvia and Estonia stayed where it was, but it no longer bred alienation and enmity.

A general plan for Valga-Valka was drawn up by the two design institutes: The Estonians planned the town's over-all architectural and industrial development, while the Latvians designed communications and worked out major technical problems. A joint meeting of the Soviets of Valga-Valka adopted a 30-year program for town development.

Aivar Kondrac, a 30-year-old district architect in Valka, comments on the general plan:

"The city will have a joint center with two multistory buildings—a 12-story in Valka, a 14-story in Valga—and between them a wide avenue with traffic crossings at different levels. This will be the city's most attractive street, lined with movie theaters, brightly lit shops, and numerous cafés set on different levels, also. One, for instance, will be on the roof of a tall department store and another in the cellar of a wine distillery.

"There will be two industrial districts. This is not a throwback to the past division of the town, it's a matter of convenience and more efficient operation.

"The Letts are taking on the responsibility for public health. We intend to build a dam on the river Pedele in Valka, a beach and a boathouse. We've chosen a good location on the Latvian side for a new hospital where both Estonians and Letts will get medical

There is nothing left of the bitter hostility that once poisoned the atmosphere of this border town, sealing off those who lived in the Estonian district, Valga, from the Latvians in Valka. The 25,000 people of Valga-Valka now work and play together.

The Latvians know Estonian and the Estonians know Latvian, and everybody knows Russian. When the townspeople get together at festivals, the folk music of each nationality receives the same billing.

treatment, as well as a spot for an old people's home. All these facilities will be open to everyone."

Still Another Link

Mudite Semyonova met her future husband on a bus. Mudite, who is Lettish, was coming home from the Estonian part of town where she had gone to buy buns—the Valga bakery is famous for its buns and bread.

On the Latvian side a young man who looked like an athlete addressed her in Russian. He was Karu Vello, an Estonian. The friendship started in a bus continued next day at a theater where the two saw a film about love, of course.

The romance developed slowly; both Estonians and Letts are reserved people. For a long time the young people met only on Saturdays and Sundays, since Mudite's parents were not too pleased that their daughter was dating an Estonian.

The story ended with a marriage, another link to unify the town.

There were 60 guests at the wedding: 30 Letts, 15 Estonians and 15 Russians. For all of them Frog Ditch as a symbol of national discord was very much a thing of the past.

Friendship

As a stranger, I saw no difference in the districts separated by Frog Ditch, though I crossed the "border" several times a day. I had to because I lived in an Estonian hotel and ate lunch in a Latvian café.

The difference between Valga and Valka no longer seems important to the local people. And if those I spoke to mentioned any difference, they also pointed to the advantages offered by the other side.

The bus fare in small Estonian towns is three kopecks. All over Latvia it is four kopecks. The two district executive committees agreed to have both parts of the town served by Estonian buses, and the bus fare in Valka is the cheapest in the republic.

Under the bourgeois system the towns had separate railroad stations. Latvian Valka was connected with the main Riga line by a very inconvenient narrow-gauge road. Maintenance was expensive and troublesome, and the smoke from the small engines polluted the air. So Estonian and Latvian railroad engineers, who worked together after the Hitlerites were driven out of the Baltic republics, decided to dispense with one of the stations—the Valka one.

Now, in order to reach their capital, the Letts cross over first to Estonia. However, no one objects. In a few minutes the comfortable, inexpensive Estonian buses bring passengers to the Estonian railroad station, from which five trains leave for Riga daily.

Everything is quiet in Valga. The girls and boys are all home from the dance. I stand on the small bridge, one foot in Estonia and the other in Latvia: Frog Ditch, which once separated the town, flows underneath. It will soon be out of sight, enclosed in a big concrete pipe—the end of still another reminder of a disunited past.

Deputy chairman of the Valga District Soviet Linda Myaghi and chairman of the Valka District Soviet Yanis Lapinsh. Right: By the time these children grow up, the last vestiges of the old division will have disappeared.

LE'S CONTROL—A FACT OF SOVIET LIFE

nued from page 42

ent seconded the recommendation. ople's Control groups study every sec- f the plant's work, locate the kinks he inefficiencies and help to eliminate . As a general rule they operate on own initiative, but sometimes manage- or the party committee will ask them ok into this or that matter. Though it s the over-all state of affairs at the , management does not always see is happening in the corners. That is the People's Control body most fam- with a particular area is called on for

e plant director, engineer Anatoli Golo- does not remember a single instance n shortcomings found by the People's trol were not eliminated.

What is our function?" Nikolai Bes- rtny asks and answers the question: "To e control the responsibility of all the ple; with that our basic principle, we ure a thorough and effective organiza- "

ne can see how effective People's Con- is by the hard-fact accomplishments of roups and posts. With their help annual tricity consumption by Moscow indus- alone was cut by 324 million kilowatt- rs, enough to light the capital for four rs.

he practical benefits of People's Control obvious; of equal importance is its nendous educational value for those di- ly involved and for the public also. Once eek *Pravda, Izvestia* and other news- ers run a People's Control page. Here what *Izvestia*, for example, wrote some e ago:

The People's Control Committee of the SR looked into fuel expenditure per out- unit in the glass industry and found t it was two or three times higher in he enterprises than in others that were nparable. Three ministers responsible for sphere of production were instructed the committee to correct the situation to demand an accounting from those o were to blame for the excessive fuel enditure."

nother *Izvestia* story cited a situation Makhachkala, the capital of the Daghestan onomous Republic, Northern Caucasus. ople's Control bodies had found that sev- collective farms were delivering below- ndard wool to the state. Among other gs they discovered that the quality of wool was inferior because sheep on cer- collective farms were being marked h indelible paint. The appropriate reme- steps were taken.

nd, finally, a photograph in *Izvestia* wed four people's inspectors from the khod Clothing Factory in Smolensk, e women and one man. Last year they wed the amalgamated textile mills how ave 4,000 rubles on electricity consump- , to cut potential losses on more than 00 yards of fabric and to raise profits 200,000 rubles.

Control by and for the working people, ng with other democratic institutions of ialist society, provide working people h the opportunity to run their industries to help shape their country's present future as well.

ORBITS OF INTERACTION

Critic Mikhail Kapustin, special correspondent of the journal *Literaturnoye Obozreniye (Literary Review),* talks with writer Chinghiz Aitmatov.

Lenin Prize winner Chinghiz Aitmatov was born in Kirghizia in 1928. He graduated from the Agricultural Institute in 1953, a year after his first story was published. His books are read throughout the Soviet Union.

Kapustin: Kirghizia's art and literature has won countrywide recognition, and some of it even the respect of the world. I can name several examples off the cuff: your own writing, Bolot Shamshiev's film *A Shot on the Karash Pass,* Tolomush Okeyev's *The Sky of Our Childhood, Worship the Fire* and others, in particular, documentaries that have had successful runs in Western Europe and brought home prizes.

That kind of success doesn't just happen. Nor can it be explained by the phrase Kirghiz miracle, which crops up now and then in our press and abroad.

A single, united Soviet socialist culture has been created in our multinational country. That's why it is so interesting and so important to analyze, in each of the cultures that make up this single socialist culture, what we might call its inner mechanism of development: its specifics, complexities and transformations. This is important and instructive for all Soviet cultures. For this reason the experience of Soviet Kirghizia is of considerable interest.

Aitmatov: Well, we can try, although we can't expect to get very far in a verbal exchange; it's inevitably top-of-the-head commentary.

Kapustin: The original and characteristic form and content of the art of a people are usually considered the reasons for the stature of that art as distinct from those of other cultures. Let me point out, to begin with, that this is the result rather than the cause, for our first concern is to determine how such national distinctiveness is shaped by contemporary conditions. Secondly, singularity per se is by no means everything. I could name you scores, hundreds of works in every field of art which, and I mean to be objective, are quite original, even unique, but they lack sufficient esthetic significance to make a serious impact on world culture.

Still, one cannot arrive at generalizations without taking the national factor into account. So too much emphasis on either ethnography or abstract generalization can become a real obstacle on the road to artistic discoveries. However, we today have a right to speak of the discoveries of Kirghiz Soviet culture despite its obvious youth.

Aitmatov: I'm convinced that what makes true art is realism. If we are linked by thousands of bonds—not only in form but in essence—with realism, we will also be bound to our national soil.

Kapustin: How do you explain the fact that from the very outset it was mostly Moscow film directors—Andrei Mikhalkov-Konchalovsky, Larissa Shepitko, Sergei Urusevsky and Irina Poplavskaya—who turned to your work while Kirghiz film directors have done so only recently?

Aitmatov: Well, I think Muscovites became interested in my stories simply because I appeared in literature at a time when film art once again realized it needed a literary base. And when directors began looking for that literary foundation, they discovered it not only in Russian literature but in the literatures of our national republics.

Kapustin: It's clear that at the beginning the real-life material of your stories was somewhat foreign to a number of Moscow's cinematographers. They had to get the feel of the psychology and the life and customs of the Kirghiz people; after all, they were working with the material for the first time. The problems were not much different for the young Kirghiz directors: They were not yet able to handle contemporary themes with the artistry those subjects demanded.

The roads to organic unity are many, and none of them is easy. For example, take the image of nature in films by Russian directors on Kirghiz themes. It's very impressive at times, and yet it differs decidedly in representational style from anything in your works. But we do find a picture of nature closest to yours in Tolomush Okeyev's films *Legacy* and *The Sky of Our Childhood*. Perhaps the reason is that the image is a natural one for the Kirghiz director, who is nourished on the juices of his native land.

But here is what is so important in all this: Both the landscapes re-created by your pen and nature as seen by the cameras of the Moscow and Kirghiz cinematographers complement each other, they are no longer conceivable separately, they create, as it were, a qualitatively new picture.

By the way, isn't the bilingualism of certain contemporary men of

letters an esthetic parallel? For instance, when do you write in Russian and when in Kirghiz?

Aitmatov: It depends. I even dream in both languages, sometimes in Russian and sometimes in Kirghiz. Today, for instance, I had a dream in Kirghiz, in color. What language I may write in depends on purely external factors; certainly it enriches my palette rather than hinders my work. To write, and so to think, in Russian is the same for me as to make a 70-mm. film. The experience of another language with great literary stature and the culture behind it is always present and helps to broaden my vision. It is an ongoing process—gradual, spontaneous, invisible. To deny yourself interaction with other cultures, particularly if their development is more advanced, is to deprive yourself of a source of growth.

Kapustin: But if this interaction has the force of a cultural law, why then do certain film makers of the Orient still seek to withdraw into themselves, turning the external attributes of the national way of life into chains around their own necks? Or is it because they are ignorant of more productive ways of developing their craft?

Aitmatov: Oh, who doesn't know all of that these days! With today's communications everybody knows everything. No, the reason is quite different—it is a conscious leaning toward established mass taste. This guarantees commercial success and film making that is relatively easy and without unsettling complications. In some countries a large sector of art is oriented (not esthetically but sociopolitically and economically) toward the old in the national, the outdated but artificially restored. This art exploits the prejudices of the masses!

The question of mass culture in general and mass art in particular is very important. The Philistine who, by the way, shouts most loudly for the immutability of Philistine-comprehended national originality looks only for entertainment and escape in art; his taste is conservative and predetermines the easy accessibility of the art that services him. What is the result? The difficult and complex in art, even such unquestionable masterpieces as *The Bare Island* or *Raspberry Meadow,* draw small audiences almost everywhere.

I have no doubt that social conditions in our country offer real possibilities for overcoming the Philistine's taste and his craving for mediocrity. But it is no simple matter to bring about such basic changes. General literacy alone does not do the trick, for literacy, unfortunately, does not always presume good taste.

Kapustin: In practice genuine works of art counter the influence of mass culture and poor taste, those calling for a thoughtful and creative reaction from the viewer, forcing him to strain his intellect and spirit. And that means that fostering artistic taste, supporting an active esthetic mentality, is a part of the general task of insisting upon developing ideologically mature and socially active people. This is no easy job, for as Leonid Brezhnev noted in his report on The Fiftieth Anniversary of the Union of Soviet Socialist Republics, "Human psychology is remade much more slowly than the material foundations of life."

This psychological inertia was the reason why the film *The First Teacher,* based on your story, did not immediately make its way to the hearts of many viewers, though this was the film that obviously gave birth to Kirghiz cinema as a distinctive school of art. Do you agree with me? To my mind, it was in the making of this movie that there was maximum cooperation between the writer's vision and the director's and, in addition, cooperation of different nationalities.

Aitmatov: What do you mean by that?

Kapustin: To clarify my point, permit me to repeat several ideas I voiced in my book, which you are familiar with, and, while I'm at it, let me check with you whether my conjectures were correct.

Not just two kindred artists—writer Chinghiz Aitmatov and film director Andrei Mikhalkov-Konchalovsky—met in the film *The First Teacher.* The traditions and viewpoints of two peoples met, and this produced a most involved and multifaceted work that turned out to be a milestone in the development of national Kirghiz film art as well as an outstanding event in the united socialist culture of the Soviet people.

Re-evaluation of the initial literacy source made for a many-sided depiction of man. The Russian director added considerable depth to the images. This creative cooperation obviously left its mark both on you personally and on Kirghiz cinema art as a whole.

Aitmatov: Yes, it did indeed.

The reception of the film was hardly a simple reaction. The fact that a portion of the national filmgoers was esthetically unready for it was abundantly clear. Prior to this film what this group of viewers wanted to see in our cinema art and in our literature generally—their attitude was so much taken for granted that it had acquired the qualities of a psychological and esthetic stereotype—was a decorous, substantial image of ourselves on the screen, regardless of history, of historical change. But the film unexpectedly exposed the negative qualities we had inherited. It disclosed not the result but the process of great changes that were taking place in our inner world, in the people, in their psychology; it showed us our past without any psychological and esthetic cosmetics, coverups to which art itself, by the way, had accustomed a good portion of the viewers. That was why the moviegoers themselves had to find the courage—and that was not at all easy—to admit, "Yes, that was really so." Not everyone could do that right away.

Kapustin: But that's a must.

Aitmatov: The indignation which the film's bitter soberness aroused in the narrow-minded, Philistine portion of the audience showed that there were those who still hadn't a mature view of themselves—that is, who couldn't look at themselves without admiration and national conceit. I think self-irony says it best. The very capacity for self-irony, to my mind, speaks most clearly to the maturity of man and of society. It is this element in Europeans and in the French particularly that appeals to me most. They are not afraid to seem ridiculous by speaking ironically of themselves. Only people confident of their own worth can, obviously, afford to see themselves critically.

So, Konchalovsky's film was bitterly realistic, and it became impossible to make just toy films after that. Not everyone here immediately understood this, but eventually they did! And gradually accepted it. A kind of Soviet Union standard of national art, I would say, came into being, and anything less than that it was impossible to produce.

Work with the Russian director also enhanced my understanding of how far realism should go, my awareness of the need to get rid of the sentimentality which, incidentally, to this day gets in the way of the efforts of many national writers and directors in national film studios. The root of this sentimentality is again that same desire to see only a decent, proper image of oneself and therefore always and everywhere to favor oneself. Time passes, and much sooner than they expected, people stop reacting painfully to things that formerly touched a raw spot and wounded their national pride. Something inside them is hurt, but people have the ability to heal themselves and they do not reopen old wounds.

Kapustin: Art is one of the principle expressions of the nation's cultural self-awareness, which is why it is altogether proper for the outstanding artist to have an esthetic awareness that is sharper than that of the masses. It elevates both the standards of art and the public taste. But very important to remember is that an artist who has consciously placed his art at the service of the people cannot help wanting his work to have a maximum esthetic and social effect. A national artist cannot bring solutions to creative problems if he doesn't believe that the spiritual growth of his people is an objective law of developed socialism.

The criterion worked out by our united Soviet socialist culture has become the determining one in the development of all the national detachments of our culture. The experience of our country's national cultures, including that of the historically most developed—the Russian—is constantly perfecting this single standard, doing away with purely national evaluations. It has been the case in recent years that this or that innovative work first wins considerable recognition beyond the boundaries of a given republic, and the evaluation, which the culturally advanced sections of the public at home also make, then influences the opinion of the home masses.

Now, I would like to hear your opinion of the dialectics of the national and international in art abroad. You pointed out that a distinguishing characteristic of today's realism was its careful attention to, and, at the same time, creative attitude toward, national sources in art. Right?

Aitmatov: Yes, and I'm glad to repeat that. Only realism is national, and this is as true today as it was in the past century. Now, modernistic art is fundamentally speculative, intellectualized through and through. It is individual-oriented and, technology-wise, at times rather well designed to cater to the elect; it does not flow from the author's pulsing emotions. Nor does it embody genuine participation in the life of the people but, on the contrary, is indifferent to everything, even to that abstract extrasocial man. Not the national character but an abstract stereotype of man is operating.

Kapustin: Don't you sense a certain historical aging, if you will, of the European man, and don't you feel, accordingly, a certain esthetic exhaustion in the West's art and in cinema art particularly?

Aitmatov: I personally don't feel that, at any rate with regard to realism (what you said can be applied probably only to modernism). Furthermore, European professionalism, its generally high cultural level, cannot be questioned, and that alone is destined to live a long time yet and serve as an example for artistic training. It is my conviction that we should also give more study to the techniques of art.

Kapustin: Judging by recent international film festivals of Asian and African countries, it is evident that we should expect in the not too distant future certain accomplishments, a typologically new order of images, a different vision of the world, from the art of these countries. The art and literature of Latin America has already revealed to us an entire unexplored continent of culture.

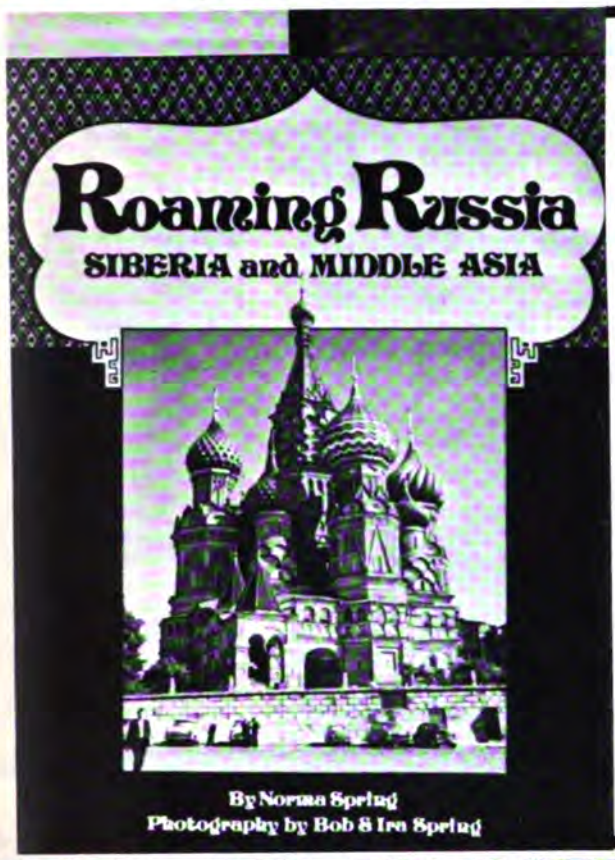
Aitmatov: The old "East is East and West is West" formula has long been an anachronism. Times have changed. Such great social transformations have taken place on our planet over the last half-century that they can be compared perhaps only to geological, let alone biological, shifts—but at an incredibly more accelerated rate. Speaking of the achievements of contemporary art in developing countries, it should be pointed out that they are dependent, first of all, on the search for ways of social development, on the solution of social problems. It goes without saying that the cultural riches of these countries will influence other arts more and more. But this process is also socially dependent.

I would like, finally, to emphasize one point: The more profoundly we evaluate our own experience, the experience of developing our Soviet socialist multinational art, the more intensively will the world's utilization of this experience proceed.

Kapustin: Marx voiced the idea that man looks at other people as though he were looking at himself in a mirror, thereby learning about the different aspects of his own possibilities. The same idea can obviously be applied, to a certain degree, to peoples. Every nation recognizes its own essential characteristics in other nations—only in a different form. That is how national characters and concepts change and become enriched.

Aitmatov: I think many people have experienced that in their own lives. Take me, for instance: Am I, a person brought up from childhood on our epics but also on Russian culture and world culture, am I an Eastern man?

Abridged from *Literaturnoye Obozreniye*



Norma Spring talked to everybody she met. She didn't limit her sightseeing to churches and museums but visited people in their homes. She asked and answered a lot of questions. Often there was no need for an interpreter.

"ROAMING RUSSIA, SIBERIA AND MIDDLE ASIA"

A Book Review by Georgi Isachenko

I HAD a special reason for being interested in *Roaming Russia, Siberia and Middle Asia,* an attractive, well-illustrated book put out by the Superior Publishing Company of Seattle, Washington—I know the author and one of the illustrators personally.

I met the Springs for the first time in Anchorage in June 1970. There were many reporters from the mass media there. Like me, the editor of SOVIET LIFE at the time, they had been invited by Alaska Airlines to participate in the ceremony of launching the first commercial flight from Alaska to Siberia.

I already knew Bob from our correspondence but had never met him in person. He was helping put out the itinerary booklet to be given to the passengers on this inaugural flight and, with characteristic ingenuity, had gotten in touch with the SOVIET LIFE office in Washington, D.C., to see if we could give him some photographs.

It is always interesting to see the work of people you know, so that I read *Roaming Russia, Siberia and Middle Asia* nonstop. Norma, Bob and Ira Spring had obviously toured our country with open minds. They wanted to see it as it really is, to try to understand its people and their spirit. Their efforts were successful in most respects.

One of the merits of the book is that it contributes to creating an atmosphere for bettering Soviet-American relations. This process began with the summit meetings in Moscow in 1972 and in Washington the following year. It is not simple. Many obstacles, some created artificially, are still in the way. But every bit of factual information based on personal experience and good will helps to overcome misunderstandings and, finally, to build normal relations between the two peoples.

A look at the map makes it clear that the Springs covered the Soviet Union from east to west and from north to south. They tell about Khabarovsk, Irkutsk, Kiev, Vladimir, Suzdal and Moscow, about Kizhi, Leningrad, Novgorod, the Black Sea coast, Tbilisi in the Caucasus, Tashkent, Khiva and Samarkand in Central Asia.

This is a fascinating kaleidoscope of changing geographic regions, time zones and historical backgrounds. The skillful blending of photographs and the text, with its detailed descriptions of places and meetings, gives the reader a vivid picture of the country through the eyes of this professional writer-photographers team.

Norma's humor adds spice to her narrative. Here, for instance, is her description of a visit to a nursery at a Central Asian collective farm in a suburb of Tashkent:

"We were interested in women's roles. Families live in their own house, and the average number of children quoted—five—appeared large to us. Our host said some families have even more—twelve. Both parents work, and the children are looked after in a day nursery on the premises. Naturally we wanted to see this. He looked at his watch and said the children, over a hundred-strong, would all be sound asleep now. At 4:00 P.M. they would wake up, have a shower, snack, and be picked up by a parent.

"A hundred children sacked out collectively in midafternoon? The impossible dream; we mothers smiled among ourselves as he led the way to the facilities. It was a very quiet building. The play equipment looked well used, and there was lots of it. What a sight as we wandered from room to room: various-sized children, in minimal clothing this warm afternoon, perfectly relaxed, and all sound asleep!

"All except one. It delighted (and relieved) us mothers to observe a dissenter. A little fellow, diaper dragging, about two, came toddling out. 'He's the Bold One,' someone quipped. A non-napper he was for sure, bent on joining our group. His keeper had other plans for him, but she was smiling, too, as she gently led him back to bed."

I regret that so much space in the book is taken up with descriptions of memorials, churches and museums. This is probably because of the particular interest the Springs, like many tourists who come to our country, have in the ancient.

It goes without saying that the peoples inhabiting the Soviet Union have a very old culture, a rich historical past, and this, of course, attracts tourists. But visitors will also find no less impressive the monuments to the work, enthusiasm and creative energy of the Soviet people, not to mention the social changes that have come with the Socialist Revolution.

Those Americans who have seen our new cities, giant industrial plants, wildlife sanctuaries and our new cultural and scientific centers call that part of their trip unforgettable.

But I suppose it is impossible to embrace everything in a single volume. I hope, therefore, that Norma, Bob and Ira Spring will find a way to add a supplement to their book that will include the newer aspects of life in the USSR.

Around the Country

HISTORICAL SPACE VISITOR

Traces of a cosmic catastrophe 100 million years ago—the fall to Earth and explosion of a gigantic meteorite—have been discovered by scientists near Ilyintsy, a village in the Ukraine.

The meteorite crater was identified in a series of aerial photographs by the characteristic rim. Energy released by the crash was equivalent to the explosion of a 120-megaton bomb.

As a result of the impact the solid granite-like rocks in the epicenter of the explosion were melted into lava and a vitreous mass. The main body of the space visitor was mixed with local rocks and turned into a unique hybrid of cosmic and terrestrial matter. It was still possible, from the few preserved fragments, to analyze the composition of the meteorite. It consisted chiefly of rocks of the orthophyric type found on Earth. Its original weight must have been hundreds of thousands of tons.

AWARD ANNIVERSARY

Forty years ago saw the establishment of the title Hero of the Soviet Union. Among the fi... receive the honor were the pa... pants in the Moscow-North P... North America flight. Beaut... designed sets of badges ... issued to commemorate the a... sion. The route of the flights ... relief portraits of the pilots—V... Chkalov, Georgi Baidukov, A... ander Belyakov and Mikhail G... mov—are shown against a b... background.

FIFTY YEARS OF CONSERVATION

For exactly a half-century ... Voronezh Preserve, in the c... tral European part of the U... has been doing exceptional w... breeding boars and deer. It ... has the country's biggest bea...

FROM THE STONE AGE

The remains of a giant mammoth, recently dug up from permafrost on a bank of the Shandrin River (a tributary of the Indigirka, Eastern Siberia, Lat. 70° North), were brought by special flight to the city of Novosibirsk (Western Siberia). This Stone Age animal had been imprisoned in ice for centuries.

The first person to spy the tusk jutting from the river's steep bank was Deodor Kuzmin, a fishing inspector. It took scientists three days of work with a motor pump to wash away the frozen loam and uncover the huge animal. It was lying prone, the fore and hind legs extended. The flesh had been gnawed off the skeleton by beasts of prey, but the entrails, protected by the mammoth's rib cage, were intact. Grain seeds were found in the stomach.

There were only 10 complete mammoth skeletons in the world. The Shandrin specimen, the largest, will be the eleventh. It is 13 feet in height, weighs about 7 tons. The distance between the tusk tips is about 10 feet.

What makes the Shandrin mammoth unique is the presence of the entrails and soft tissues—heart, liver, stomach and intestines. This find will give scientists fresh data on Stone Age animal and plant life.

APITOXIN EXTRACTO...

A device which extracts ... toxin has been developed ... specialists in Latvia. The elec... extractor, which operates au... matically and does not harm ... bees, makes it easier to withd... the considerable amounts of ... toxin used in the manufactur... 70 different medical preparati...

The device consists of a s... box with electric wires acros... glass bottom. The box is pla... near or inside the beehive. W... the bee touches the live elec... wire, irritation causes it to s... the glass bottom, leaving its st... of poison behind. The extract... switches on and off automatica... and a self-adjusting system re... lates the voltage so that the ins... are not overstimulated, an un... sirable condition which can ex... the whole swarm very rapidly.

With the new electric device ...

TRACTOR FIGHTS FIRE

A caterpillar go-anywhere for putting out forest fires has been developed by the Far Eastern Forestry Institute in Khabarovsk. The vehicle can extinguish fires while running at full speed, with the whole fire-fighting process controlled from a panel by a single operator.

The new forest fireman can move in taiga conditions at a speed of up to six miles per hour.

GEOLOGICAL MAPS

An atlas of 20 maps, to be used primarily for finding mineral deposits in the Soviet Union, has been compiled by Leningrad geologists. It is the first atlas of its kind in world geological literature.

Marked on the map sheets are the areas most promising for prospecting in the near future for iron, nonferrous metals, phosphates, sulfur, asbestos and other valuable minerals. These prediction maps represent years of detailed study by Soviet geologists, particularly of the country's eastern areas.

Appended to each map are recommended prospecting techniques.

PROBING THE EARTH

The Siberian Research Institute of Geology, Geophysics and Mineral Products has designed ... portable radio, remote-control ... seismic installation called ... Taiga. It can plumb the Ear... structure six miles deep.

DANCE CONTEST

A traditional young dance ... competition was held rec... ly in the Lithuanian city of Kau...

ng farm. The animals are
d to different parts of the
y as well as abroad.

CTRONICS EXHIBIT FROM THE U.S.

ducts of the American com-
ny Ampex Corporation—the
in video tape recorders,
ıter memories and other
onics equipment—were on
y at the Polytechnical Mu-
in Moscow in early January
ear.

M ON MAYAKOVSKY

documentary has been pro-
duced in the USSR about Soviet poet Vladimir Mayakovsky (1893-1930). The famous writer Konstantin Simonov based his script for the film on an exhibition of the poet's life and work first shown in 1930. Last year, to celebrate the eightieth anniversary of Mayakovsky's birth, the exhibition was mounted again.

NEW USSR-USA TRADE ROUTE

The U.S. freighter *Mason Lykes* recently brought a cargo of equipment from New Orleans to Odessa for the truck plant going up on the Kama. The run initiates regular shipping from U.S. eastern ports to the USSR Black Sea harbors.

Soviet bottoms have begun carrying steel, marble, refrigerators and other freight from the USSR to American ports on the Great Lakes.

TYPHOON INDEX

A new kind of reference book has been issued by the Far Eastern Hydrometeorological Institute. It will be a useful tool for studies in typhoon forecasting. The unique inventory describes over 500 tropical cyclones meteorologists have registered in the last 20 years in the northwestern part of the Pacific.

TWO-HEADED SNAKE

A double-headed grass snake has been caught on the shore of the Caspian Sea in the Azerbaijan SSR.

Biologically it differs in no way from the usual snake of its kind. The heads, located on the body at an angle of 30 to 35 degrees, do not impede its orientation and coordination of movement.

According to Khayam Alekperov, an Azerbaijanian scientist, this is a rare but not entirely unique find. A double-headed *Vipera Lebetina* was caught 10 years ago in Shemakha (Azerbaijan SSR).

½ ounces of apitoxin can be
cted from a 40-hive apiary in
gle season.

NEW HOMES FOR WILD ANIMALS

Wild animals are being
trapped in the Ussuri taiga
hipment to forests on Sakhalin,
European part of the USSR and
Caucasus. Numbers of lynx-
es, Far East martens, roe deer, boars and the noble roe buck are being prepared for resettlement. A few of the Far Eastern animals will go to zoos.

SCIENTIST-COMPOSER

Mikhail Zherbin is well known to lovers of music. His songs, romances, orchestral and piano pieces are frequently heard in radio programs and concert halls. He has written about 300 compositions.

But music is an avocation for Zherbin. He is a professor at the Kiev Civil Engineering Institute and holds a doctor's degree in technical sciences. Author of many scientific books published at home and abroad, Zherbin has been awarded the State Prize for his contributions to science and technology.

HALF-CENTURY OF FILMS

Mosfilm, the country's first and biggest film studio, is 50 years old.

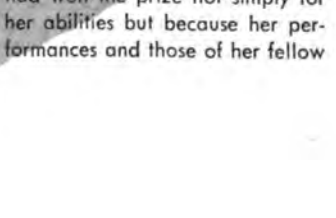
It has produced 1,249 films; 43 were awarded the State Prize. *Potemkin, Ballad of a Soldier, The Fate of a Man, The Communist, The Chairman, Liberation* and dozens of other films have won international recognition.

CHILDREN'S DANCE GROUP

The School Years Children's Choreographic Ensemble, its home the House of Culture of the Moscow Auto Plant, is celebrating its tenth year of performances.

The dance group has a repertoire of more than 100 numbers.

Most interesting are the dances that incorporate elements of children's games. Skipping rope, based on the universal children's pastime, is very popular with audiences.



ATOMIC POWER STATION

The world's northernmost atomic power station at Bilibino (the far northeastern part of the USSR), located in the permafrost zone, has started generating electricity and heat for local mines and settlements.

SCHOOL FARM EQUIPMENT

The word tractorodrome is the latest addition to the vocabulary of rural students in the Soviet Central Asian republic of Uzbekistan. It describes an area equipped for teaching agricultural students how to use farm machinery. Three hundred and sixty schools in the republic now train with their own tractors and mechanical cotton pickers.

The new subject is very popular. A two-month course qualifies postgraduates as skilled farm-machine operators.

dren from many parts of the
R and from Hungary, the Ger-
Democratic Republic and
nd took part. The program
ided the slow waltz, cha-cha,
o, polka and samba.
unas youngsters won the con-

EDICINAL WATERS OF BAIKAL

beria's scientists have conclud-
ed a study of the Baikal area's
eral and balneological waters.
map they compiled pinpoints
mineral springs of considera-
industrial and medicinal value.
discovered in toto more than
springs showing a high min-
content.
uthorities say that for diversity
mineral waters and their bal-
logical properties the Baikal area rivals the Caucasus, the Carpathian Mountains and the European Alps. It has almost every known type of medicinal water—sulfate, hydrogen sulfide, cold and thermal carbonic acid, nitrogen, methane and radon.

Several health resorts are already in operation on the shores of the lake, and a number of large sanatoriums are on the drawing boards.

MUSICAL FILM

A new Georgian film, *Melodies of the Vereisky District*, has just been released. The locale of the musical is a colorful corner of ancient Tbilisi, the capital of the Soviet Transcaucasian republic of Georgia. In the popular cast is Vakhtang Kibabidze, who sings with the Orera vočal-instrumental group, a well-known Georgian ensemble.

HOME ZOO

The garden around the house of militia sergeant Gennadi Polosmaks and his wife Taisia, on the outskirts of the Ukrainian town of Mena, is the closest thing you can get to a private zoo. The couple keep two young wolves, a roe deer, a fox and squirrels. They have more than 30 birds—canaries, goldfinches, parrots. One very visible parrot is from the Amazon region, recently donated by Soviet seamen. A host of varicolored small fish swim in the four aquariums. Dwarf hens walk around the small pond, where lazy, fat tench and bream slumber, and doves hover in the sky. Peace and harmony prevail.

SPORTS AWARD

Soviet gymnast Lyudmila Turishcheva, world gymnastics champion, has been awarded the Benrus Company's Gymnast of the Year prize. Victor Kahem, chairman of the company's board of directors, said that Turishcheva had won the prize not simply for her abilities but because her performances and those of her fellow gymnasts give the whole world so much pleasure.

RECORD VINE YIELD

A ton and a half of grapes was gathered from just one vine by residents of Kvemo-Bodbe village in Georgia. The record-breaking vine is 150 years old. Its trunk, 46 inches in circumference, rises to form a tent of foliage wide enough to give shade to some 300 people.

THE WORLD OCEAN

By Leonid Brekhovskikh

THE SCOPE of oceanographic research has been increasing from year to year in many countries, the USSR included. The reason for the growing interest is the crucial role the ocean plays in our lives.

The ocean is the "lungs" of the Earth; its phytoplankton produces, through the process of photosynthesis, about half the oxygen in our atmosphere.

The ocean has tremendous resources of mechanical and thermal energy which it exchanges with the atmosphere. Our weather is largely the result of the processes that occur in the ocean and the atmosphere above it.

The ocean is also a vital source of the world's food supply. Sea fisheries today produce one-sixth of the animal protein we consume. In 1970 they provided more than 44 pounds of fish and other seafood for every person on Earth.

Leonid Brekhovskikh (born 1917) is a well-known Soviet physicist, a specialist in hydroacoustics. He is a member of the USSR Academy of Sciences, chairman of the academy's Oceanographic Commission, professor at the Moscow Institute of Physics and Technology and editor in chief of the journal* Okeanologia. *He has participated in a number of expeditions and in 1970 directed Soviet research in the Atlantic Ocean.

The ocean is very rich in mineral resources. The most promising deposits are on the continental shelf, which now supplies a fifth of the world's oil and gas. The possibilities of working the continental slope adjacent to the shelf and the ocean floor are being studied in various countries. The prospects are good for mining the ferromanganese concretions that spread over vast sections of the ocean floor.

The ocean is vital for transport. The annual shipping costs of the cargo carried by thousands of freighters amount to some 15 billion rubles, more than the value of all the food resources and minerals extracted from the ocean. Shipping would be cheaper if we had more reliable forecasts of hydrometeorological conditions in the ocean.

However, our prime concern with the ocean these days is not so much how to use it as how to save it. Enormous amounts of industrial and domestic waste are dumped directly into the ocean or discharged by rivers. Even hundreds of miles offshore, the seas and oceans bordering industrially developed countries contain mercury, lead pesticides (such as DDT) and oil products in concentrations much in excess of permissible limits. If the dumping continues to grow at the present rate (and without radical measures it will grow much faster as the extraction of gas and oil from the shelf in-

creases), there may be disastrous, irreversible changes in the ocean's ecological system.

Scientists are trying to learn more about the world ocean so that human beings can use its wealth without inflicting irreparable damage. Soviet specialists are making a sizable contribution to ocean studies. In recent years our extensive research in the dynamics of Atlantic waters has led to the discovery of two new subsurface currents. One of them, the Lomonosov, is a narrow strip running along the equator; the other, the Antilles-Guiana, stretches for thousands of miles along the northeastern coast of South America.

In 1970 Soviet scientists pursued a large-scale investigation in the Atlantic, a first in the history of oceanography. Imagine an immense area of the ocean, 125 miles square. This was our research site. In it we arranged crosswise a large number of anchored buoy posts. A large array of instruments for measuring the most important characteristics of deep water was suspended from each post. In this way we were able for the first time to synchronously measure a thick layer of the ocean. The experiment went on for half a year and resulted in an interesting discovery. All our concepts of the motion of water masses had to be revised. A substantial part of the ocean's mechanical energy proved to be confined to medium-scale motions resembling the cyclones in the atmosphere and the so-called Rossi waves. While these giant eddy systems do not have as global a nature as the Gulf Stream, for instance, they are quite a significant phenomenon nevertheless. Their diameter may reach hundreds of miles, and despite their negligible rate of movement—only about an inch per second—they exert a major influence on various processes in the ocean depths. The study begun by Soviet scientists is being continued. In 1975-1976 the Mid-Ocean Dynamics Experiment, a large-scale international project for the study of eddy systems, will pursue investigations in the equatorial areas of the Atlantic.

Soviet scientists on the research ship *Dmitri Mendeleyev* have made some interesting discoveries. In the first half of 1973 the vessel completed a cycle of geochemical investigations of the Pacific Ocean and encountered on the ocean floor substances not found on land. This leads to the conclusion that our planet was never completely covered by water. There were basins of the type of the Black or Mediterranean seas, but the Earth was never completely submerged. This obviously disposes of the theory that minerals occur where volcanic material rises from the sea or ocean floor. The expedition made a thorough investigation of the zone around the Hawaiian Islands, which are famous both for their ancient craters and for their active volcanoes. The study has shown that volcanism is largely a local phenomenon and that the evidence of such activity over large ocean expanses is insignificant.

The results obtained by the research vessel *Academician Kurchatov* of the Institute of Oceanography, USSR Academy of Sciences, bolster the conclusion of geologists that quite "recently"—some five to seven million years ago—the Caribbean Sea was not part of the Atlantic Ocean, but a gulf of the Pacific.

The confirmation of this hypothesis is of major importance, not only theoretically but practically; it gives us a better understanding of the laws underlying the formation of mineral deposits and their distribution.

Soviet scientists have been participating in a number of international studies of the world ocean. Examples are the investigation of the Indian Ocean, the Japan Current and the Caribbean and Mediterranean areas.

The expeditions of the American research and drilling vessel *Glomar Challenger*, in which Soviet scientists participated, have led to the radical revision of concepts of how the Earth's crust originated.

However, the ocean is so vast and complex a system that what has been achieved is negligible compared with what has to be done.

What tasks confront scientists now? The construction of a thermohydrodynamic model of the ocean, for one thing. Such a model would show us all the dynamic processes in the ocean that are related to the transfer of great masses of water (and of heat along with it) over many thousands of miles. These processes are the chief determinants of weather on the continents. The European part of the USSR, for instance, receives moisture in summer and warmth in winter from the Atlantic. However, for a correct estimate of the ocean's effect on weather, we must know the laws underlying the motion of water masses, ranging from global current systems to capillary waves on the water surface. The model should help us forecast all these phenomena well in advance. This is important for water transport as well as other aspects of oceanography. Marine biologists and chemists, for instance, need this information to determine the drift patterns of nutritive substances, chemical elements and pollutants.

Most important are the processes of interaction between ocean and atmosphere—their exchange of moisture and mechanical and thermal energy. To study these, we need a mathematical model, without which we can do little to make long-range weather forecasting more reliable. Such forecasts are, of course, critically important for every country's economic well-being and for agriculture particularly.

We need a biological model of the ocean as well. For that we must study the functioning of each living organism, from bacteria to large mammals, and establish the interconnections between them. This model is necessary for a complete census of the ocean's biological resources and their rational development and use. For example, the continued increase in the catch of traditional varieties of fish may have serious consequences for the entire marine ecological system. To prevent this, we must determine which sources of animal protein in the sea it is most expedient to draw on.

Another task scientists have set themselves is to build a chemical model of the ocean. For that the chemical composition of the ocean and sea waters and the deposits on the ocean floor must be studied, and the reasons for changes in the composition of the oceanic depths determined. In particular, scientists are interested in the exchange of chemical elements between the ocean and its floor, the ocean and the atmosphere. Without a chemical model of the ocean, it is impossible to build its biological model and to solve many key problems connected with its history and present composition.

We must build a geological model of the suboceanic crust of the Earth to get a picture of our planet's global tectonics and to reveal its mineral resources. We cannot forecast weather without taking into account the vast areas of the Earth's surface covered by oceans; similarly, we cannot learn anything about the geological history of our planet and current geological processes without studying the geology of the ocean floor. The geological model should also incorporate the ocean's geophysical fields—gravitational and magnetic—and the heat flow emanating from the Earth's crust.

The last but not least of our tasks is to make the ocean a safe environment for human beings. Failing that, we cannot explore it in depth, use its mineral and biological resources to best advantage and operate the technical devices placed on its floor.

Though we have already visited the Moon's surface, we have never set foot on the ocean floor. The 300- to 600-foot depths that people have reached are typical of the coastal zone and shallow seas, while depths of 10,000 to 16,000 feet are typical of the open expanses.

The construction of each of the above models is an incredibly difficult task, because of the complexity of the ocean as an object of investigation and our limited areas of observation. Nevertheless, the rapid broadening of the scope of ocean studies in the developed countries and the acceleration of technological progress give us reason to expect substantial advances in oceanography in the next 10 or 15 years.

Scientists in many countries believe that in the coming decades the development of the ocean's resources will call for maximum effort. They also know what needs to be done and what technical facilities are necessary. Since no single state can afford the complex and costly experiments required, the answer is pooling knowledge and resources. The 1974 international tropical experiment, the first effort to create a mathematical model of atmosphere and ocean circulation and their interaction, is an example of such cooperation. Almost 30 research vessels, including 10 from the Soviet Union, artificial Earth satellites and a large number of planes will take part in this experiment.

We are also getting many interesting results from our joint work with scientists in the socialist countries.

The exploration of "hydrospace" is proceeding at a growing rate and will probably add much to our knowledge of the ocean in the next few years.

JOINT EXPLORATION OF THE OCEAN

By Andrei Monin

Joint study of the world ocean ranks high among Soviet-American agreements for scientific and technical cooperation. Its significance is evident in the steadily growing role of the ocean and its resources. The pooling of efforts in this field will not only avoid expensive duplication, but will also accelerate research and development. Work on a number of important joint projects has already started. Professor Andrei Monin, corresponding member of the USSR Academy of Sciences and director of the academy's Institute of Oceanography, writes about objectives and progress.

THE USSR ACADEMY OF SCIENCES recently joined five American research institutes in a study of the deep ocean bed—the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES) project, headed by the Scripps Institution of Oceanography. Our Institute of Oceanography is the sixth and coequal participant in the project, under which the sedimentary layer of the ocean bed will be drilled to a depth of half a mile and more.

Exploratory drilling is done in all oceans and many seas, in the spots oceanographers think are most likely to be productive. The results have provided evidence, for instance, that seven million years ago the Mediterranean Sea ran dry and became a deep depression. This conclusion was drawn after a reflecting layer of evaporites —rocks formed only during the evaporation of shallow water—was found at a depth of 1,000 feet. Deeper drilling disclosed bathypelagic sediments. This project also produced direct evidence of the validity of the ocean bed diffluence (plate tectonics) theory. Oil was found in the bottom of the Gulf of Mexico at a depth of 11,500 feet. The discovery led to a radical change in the theory of oil formation.

Three Soviet scientists—Professor Alexander Lisitsin of our institute, Valeri Krashennikov of the Geological Institute of the USSR Academy of Sciences and Leonid Dmitriyev of the Vernadsky Institute of Geochemistry and Analytical Chemistry—have already participated in the drilling rig expeditions of the research ship *Glomar Challenger*.

A group of researchers from our institute has left for the USA to take part in another joint project, a study of the variability of ocean currents called MODE (Mid-Ocean Dynamics Experiment). It continues the polygonal experiment conducted by Soviet scientists under Academician Leonid Brekhovskikh in 1970: A network of 17 buoy posts measured the water temperature and current velocity in the Atlantic Ocean over a period of six months. The results proved quite interesting and will be applied in the joint project.

Special orbital satellites will also serve as important tools for oceanic study. Observations from satellites will give us information on the surface temperatures of oceans and their major currents (the Gulf Stream, for instance), their variability, and wave disturbance. Equipment aboard the satellites, by measuring the chlorophyll absorption spectrum, will be able to establish the amount of phytoplankton in the upper layers of the ocean. This will help determine the biological productivity of various parts of the ocean. Once we know the location of the phytoplankton fields, which provide food for fish shoals, we can organize fisheries to best effect.

However, before we can program a satellite to collect oceanographic information, a great deal of preparatory work must be done: drafting the most rational programs, determining the jobs the satellite can do, deciding what instruments it must carry. Oceanographers from the USSR and the USA are working on this problem jointly.

In 1972 scientists of the two countries pursued a joint program of observations to check a number of theoretical assumptions in practice. Soviet oceanographers aboard the research vessel *Academician Kurchatov* and American scientists aboard airplanes measured the temperature and phytoplankton content of the surface waters of the Atlantic and then compared their results, which proved quite similar. The conclusion drawn was that sensitive radiometers and spectrographs operating at satellite altitudes can gather information from thermometers and nets lowered into the ocean. An acoustic wave locator developed by Soviet scientists was first tested on the *Academician Kurchatov*. It helps determine the height of waves even during a storm, something quite difficult to do by earlier methods. The new instrument measures the distance from shipboard to the top of the wave. In 1973 the *Academician Kurchatov* conducted a study in the Atlantic Ocean near Iceland. About 15 American scientists participated in the voyage.

That is a promising beginning, but only a beginning.

Soviet and American oceanographers are pursuing several other joint programs, among them the exploration of the Bering Sea. There is a great deal of interesting work ahead for marine geologists, who for a number of years have been using geological and geophysical methods to study the medial oceanic ranges.

During the exchange of oceanographers delegations, the American and Soviet scientists suggested a number of lines for joint research. Both our countries, and world science generally, benefit from such cooperation because oceanography is a science for which pooled effort is vital. If one vessel puts to sea to study a process of global scale, the value of the results is bound to be small. But if two vessels (say a Soviet and an American ship) embark on such a study and make synchronous measurements at different sites under a single program, then the value of their work increases many times over.

The participation of scientists of one country in the research voyages of another has become traditional in recent years. On such missions we work under a joint program, each with our own instruments, test new methods and equipment and, of course, exchange observations.

Facilitation of the study of the world ocean will benefit all mankind. That is why the Soviet-American agreement on cooperation in this field is so important.

Oceans once separated the nations of the world; now they must help unite them.

COOPERATION ON THE 180TH MERIDIAN

Twentieth century scientific research demands the cooperation of all the nations of the world. For some time oceanography has been one of the most fruitful areas for joint Soviet-American studies. As far back as 1963 the American research vessel* Chain *and the Soviet research vessel* Mikhail Lomonosov *worked together in the Atlantic. In 1967 the scientists of the two countries cooperated on Operation Albatross, a study of the fishing areas along the Atlantic coast of America. Two years later the joint explorations were repeated, this time in the Black Sea. Soviet scientists took part in many of the voyages of the American ship* Glomar Challenger. *In the summer of 1972 an agreement on joint space exploration was signed by the two countries. It includes, among other things, space meteorology. The first step in this direction was the Soviet-American Bering Sea expedition in February to March 1973. It will be followed by the TROPEX and POLEX expeditions, whose purpose is to investigate the role of the tropics and polar areas in weather formation. The story of the Bering Sea expedition is told here by the head of the Soviet part of the project Kirill Kondratiev, corresponding member of the USSR Academy of Sciences, Chairman of the Committee on Application Satellites of the International Astronautical Federation and honorary member of the American Academy of Arts and Sciences.

RESEARCHERS studying the processes that form weather have been turning their attention increasingly to the Arctic.

Differences in temperatures between the tropics, which receive radiant heat from the Sun, and the polar areas, which depend on the flow of heat from other regions of the Earth, determine the planetary movement of air masses. There are extensive international research programs under way to investigate the part played by the tropics and the polar latitudes in the general circulation of the atmosphere, as well as the contribution made by the dynamic ice cap of the Arctic Ocean and the nonfreezing waters of the Pacific and the Atlantic to the atmosphere's energy balance. They include the Global Atmospheric Research Program and the more limited Atlantic Tropical Experiment, to be conducted this summer in the equatorial latitudes.

Contemporary investigations of the state of the environment on a planetary scale are pursued by recording the Earth's electromagnetic radiation on different wave lengths. This provides information on the physics of natural processes, a rapidly developing body of physical and geophysical data which must be checked in natural conditions. Thus, the purpose of the joint Soviet-American expedition in the Bering Sea was to work out methods for determining the different characteristics of polar ice, snow, the turbulent surface of the ocean, the unsteady Arctic atmosphere.

Participating in the expedition were two flying laboratories—an IL-18 from the Main Geophysical Observatory of the Hydrometeorological Service of the USSR and a Convair-990 from the National Aeronautics and Space Administration of the USA. The U.S. Coast Guard icebreaker *Staten Island* was stationed in the ice in the northern part of the expedition site and the Soviet weather research ship *Priboi* at the edge of the ice out at sea. The Soviet side of the expedition brought a radar-equipped AN-24 belonging to the Arctic and Antarctic Research Institute. Use was made of data from a thermal ice survey conducted by Kolyma hydrologists from IL-14 planes. The total number of participants from NASA and the USSR Hydrometeorological Service was about 500. The planes were based on Cape Shmidt (Chukchi Peninsula) and in Anchorage, Alaska.

We met with the hazards resulting from the interaction of natural forces. The high winds, troubled seas and ice demanded selfless work from the plane and ship crews, especially from the crew of the *Priboi*, which was located in the storm and ice formation area.

By the way, our expedition was sited in the most remote areas of the Soviet Far East and the American West, on the international date line. Since the work schedules of some of the groups had varied by one day, we decided to set our watches by Greenwich time.

The nonfreezing north of the Atlantic and Pacific is especially interesting as the source of energy for weather formation in winter. Here the atmosphere, ice and stormy sea interact. Sea turbulence, spray, foam and air bubbles increase the ocean's transmission of heat to the atmosphere. In two or three days of storm the ocean emits as much heat as in a month of calm weather.

The part played by polar ice is also of great importance. It both creates weather and depends on it. The ice, located between the atmosphere and the ocean, is a constantly varying heat-exchange factor. It has an impact on weather making and on navigation conditions. The age of the ice, thawing, cracks, ice floes, icebergs and ice islands must all be studied.

The forecasting of weather and ice conditions in the vicinity of the northern seas is critical for more reasons than navigation. Scientists have been trying to work out methods for constant satellite observation of the hydrometeorological processes in the Arctic. For this purpose, the Bering expedition used planes to make direct measurements in ice and open water, simulating the work of space equipment, and then checked the data against satellite observations.

The Bering Sea expedition is part of the preparation for a round-the-clock satellite service in the polar latitudes which will supply scientists with data on the ice cover, its movement, local weather and its relation to the weather of the Northern Hemisphere. A dynamic global picture of winds, turbulence and precipitation is also in preparation. The first such experiment was conducted by the Soviet satellite Cosmos 243 in 1968, followed by Cosmos 384 and the American Nimbus 5.

The very definite program, common research goals and thorough technical preparation assured the success of the Soviet-American expedition. The preliminary processing of its data confirms that judgment.

A symposium on the detailed data gathered by the expedition will take place this year in Leningrad. I am certain that this Soviet-American joint effort will do a great deal to encourage international cooperation in the study of the Earth.

Right:

The Soviet flying laboratory in the air.

The American icebreaker *Staten Island*.

Two expedition researchers at work aboard it.

Arctic Ocean ice hummock.

NEUSTON, A LIVING CONTINENT

by Alexander Kharkovsky

Yuvenali Zaitsev, neustonologist and director of the Institute of Biology of the Southern Seas.

UNTIL 15 years ago the Black Sea yielded a plentiful supply of gray mullet. Then the commercial catch began to go down, and the staff of the Odessa University biological station decided to find out why.

Yuvenali Zaitsev, a junior researcher at the station and fresh from the university, was working on fish origin and growth. The problem was made to order for him. He began with the natural question: Where is mullet spawn found?

Reason and experience told him that each kind of spawn remained at a depth that corresponded to its specific weight. To find that depth, Zaitsev submerged mullet spawn in sea water, but it always floated to the surface. So it was lighter than sea water.

In August 1957 Zaitsev and his colleagues went to sea to fish for mullet spawn. The surface-layer catch was 79 eggs, their deepwater catch only three. Other samplings gave much the same result. These findings not only buttressed Zaitsev's theories, but supplied new data on the surface layers of the ocean.

That Mythical Blue Desert

For a long time researchers had held that ultraviolet sunrays killed every living thing in the surface layer of sea water.

"The surface of the sea," says Zaitsev, "was pictured, directly or indirectly, as a desert where the scorching sun burned out all living organisms. But we found mullet spawn there." And the spawn of other fish as well.

The experiments done by Zaitsev revealed a previously unknown world in the surface layer of sea water. Investigators came across web-footed Cancridae and the flagellate Noctiluca, shellfish grubs and fry. Did they live there, or were they just surfacing?

Zaitsev continued his observations. He discovered that young fish and grubs, because of their structure and the habits they had formed in the evolutionary process, could not live below the surface level, which turned out to be a veritable incubator for mullet spawn and for khamsa spawn as well.

Zaitsev spent many hours in his underwater breathing apparatus, watching through goggles the life processes in the surface layer of the Black Sea, the Mediterranean and the Caribbean. He invented several devices for surface fishing. The expeditions of the Odessa Institute of Biology of the Southern Seas sailed across thousands of miles of ocean to prove that marine life in the surface layers is not confined to the offshore areas. By the time the young scientist summed up his results, it was evident that the upper layer of the seas and oceans, which had been thought barren, was teeming with life.

This layer, about four inches deep, absorbs half the solar radiation and almost all the destructive ultraviolet rays. Does it make a good habitat for marine plants and animals? Nature does not give a simple Yes or No to such questions. Some organisms die, others barely survive, and still others prosper. The spawn of khamsa, horse mackerel, goatfish and gray mullet stand up well to ultraviolet radiation. Some kinds of roe are transparent and let the rays go through, some are dark and reflect them, and some, like minute lenses, focus the rays on the embryo to speed up its growth. In short, living organisms adapt themselves to ultraviolet rays and even make use of them.

Scientists had earlier found evidence that ultraviolet rays kill bacteria in the surface layer. But fry and Cancridae live on the organic substances processed by bacteria.

The Soviet research ship *Miklukho-Maklai* of the Institute of Biology of the Southern Seas went to the confluence of the Danube, the Dniester and the Black Sea. The researchers collected surface water in sterilized containers, let it settle and sieved the sediment into various nutrients—extracts of weeds, fish and mussels. They found that the upper layers of the ocean contain thousands of times more bacteria than the lower ones. Admittedly, it was not clear why the surface bacteria were so resistant to solar radiation. The researchers noted that they were colored differently; perhaps their pigment protected them. What did these bacteria eat? Biochemists tested the surface water and found out it was not sterile, but had accumulated a good many organic substances.

The results of earlier research helped Zaitsev determine all the components of life in the surface layer: organic substances, bacteria and the living organisms which he called neuston.

Neuston in Danger

His discovery won him recognition. He was elected a corresponding member of the USSR Academy of Sciences and later appointed director of the Odessa Institute of Biology of the Southern Seas. In 1970 his monograph *Marine Neustonology* announced the emergence of a new science. He named the community of fauna and flora he had discovered in the surface layer of sea water "marine hyponeuston."

Zaitsev proved that hyponeuston was a new element, as different from any other as the sea is from the sky, a vast continent on the interface between the ocean and the atmosphere.

Some oceanographers have questioned whether Zaitsev's discovery is actually just a few islands scattered over the world ocean. Doubts notwithstanding, his findings are both an end and a beginning. Every now and then Soviet and foreign expeditions find neuston in the ocean. The outlines of the new continent become more distinct.

At a recent conference of oceanographers held in Monaco, a marine neuston section was founded. Thus, scientists recognized the existence of neustonology but at the same time warned that the neuston of the seas and oceans is threatened with extinction.

A ship sails across the sea, leaving in its wake countless clusters of dead fish eggs. Could alternate routes be planned so that fish can spawn and embryos can develop safely?

Is neuston threatened on busy seaways only? Not at all. Thor Heyerdahl and his companions crossed the ocean in their papyrus boat *Ra* along a little used route, but everywhere they ran into dead fish floating on oil slicks.

Human beings must recognize their responsibility to protect the ocean. The discovery of neuston gives science a fundamental sense of what marine pollution entails. Oil slicks attract other contaminants, including radioactive substances. This means additional danger for neuston, one of the most vulnerable areas of the biosphere. The new science of neustonology has emerged at a particularly crucial time.

Courtesy of the magazine
Vokrug Sveta (Around the World)

UNRIDDLING THE OCEAN BED

The ocean, which covers almost three-quarters of our planet, is an immense collection of riddles. In this issue we reproduce 10 photographs made on the ocean bed. What do these pictures tell us about the bizarre forms of life far below the surface? They were taken by Nikita Zenkevich, who heads the submarine photography section of the Institute of Oceanography, USSR Academy of Sciences. Zenkevich has been doing underwater photography for over

20 years. His atlas of ocean bed photographs was published several years ago. The first Soviet pictures of the ocean bottom were made in 1953, during an expedition of the research vessel *Vityaz* of the Institute of Oceanography. Submarine photography is done with special Soviet-made equipment mounted on a stand devised by Zenkevich. The upper crosspiece of the stand carries a camera, and the lower one supports a powerful pulsating light. Pictures are taken at intervals of 60 to 90 seconds while the vessel is drifting. The spacing depends on the drift rate: With shots at 90-second intervals, the spaces between photographs range from 30 to 230 feet. In one submersion the camera can take as many as 22 pictures.

ONLY a hundred years ago people pictured the ocean bed as a monotonous plain covered by viscous silt. Our concept has changed radically. Underwater photography has revealed the new, extraordinary world of the deep ocean. The relief is as varied as on land, with high mountain ranges and gloomy abysses, vast plains and canyons. A wide range of biological, physical, chemical and geological processes take place on the ocean bed. Underwater photography has made it possible for us to observe bottom-dwelling animals in their natural conditions and to study their propagation and interaction with the environment.

The diverse fauna that inhabits the bed surface can be found in abundance on the continental shelves and slopes, where a good many organic nutrients collect from the shore. (See page 64, Photograph 1.)

You don't usually see animals on the bed surface at any distance from the coast. In the deep ocean you find traces of a wide range of benthonic organisms, mainly mud eaters, that live in sediments (Photograph 2). In contrast to the sands of the shelf and continental slope, which are too loose to retain the tracks of animals, ocean bed ooze, thanks to its viscosity, is able to record all the stages of bottom-dwelling animal life and to preserve these records for a long time.

In some cases, on the bottom of ocean depressions where velocities of benthonic currents are probably higher, you come across outcroppings of bedrock and rubble deposits. Frequently individual sea animals move into camera range (Photograph 3).

Traces of the activity of benthonic currents are evident practically everywhere on the deep ocean bed: scour marks, bared cliffs and specific fauna. But heavy benthonic currents are best indicated by ripple marks (Photograph 4) similar to those seen on coastal sand. It takes rather high velocities—at least eight inches per second—to form these marks.

Since not much sedimentary material reaches the central parts of the ocean, the tectonic and volcanic relief of the ocean bed persists for thousands of years. The slow rate of sedimentation creates favorable conditions for the formation of manganese nodules. These dark brown concretions have a concentric structure (Photograph 5) like that of onions. They range in size from about three-thousandths of an inch to six inches. The nodules are formed on the bed surface mainly on red clays, around small cores—fragments of basalt, tuff, sharks' teeth and the like.

Manganese nodules are a kind of oceanic ore with a high content of manganese, nickel, cobalt and other rare, valuable elements. Submarine photography indicates that the nodules cover vast areas of the ocean bed. The quantities of such oceanic ore run to hundreds of billions of tons; some scientists even talk in terms of trillions of tons.

Manganese nodules are one of the ocean's riddles. Though their volume has been estimated approximately, scientists still argue about how they form.

In the most outlying parts of the ocean, far from the coast, there are areas of bedrock without any sedimentary cover (Photogaph 6). The bed here consists almost entirely of bared pillow lavas and volcanic tuffs covered by a thick, rough manganese crust. We can assume that there is no life in this stone desert.

But the most amazing phenomena recorded by the underwater camera are the mysterious and often erratic tracks

Continued on page 64

FIRE FIGHTERS AT SEA

PHOTOGRAPHS BY MAY NACH

The coveralls are fire-proof and waterproof.

They head out to sea when all other ships, large and small, seek haven. An SOS and they are on their way to fight fire and storm with courage, ingenuity and the most modern equipment.

TWICE EVERY HOUR for three minutes, radio transmitters on board all the ships of the world go silent. That is when radio operators just listen. For those few minutes, set apart as if they are sacred, no one may use the air waves except those in distress. Then the piercing sounds of the Morse code signal break through the silence: three dots, three dashes, three dots. SOS! SOS! SOS!

We know that ships change course, no matter which flag they fly or how fast they have been racing against time. The brotherhood of seamen is one of the oldest and strongest of kinships; that is a fact of dramatic witness in times of emergencies.

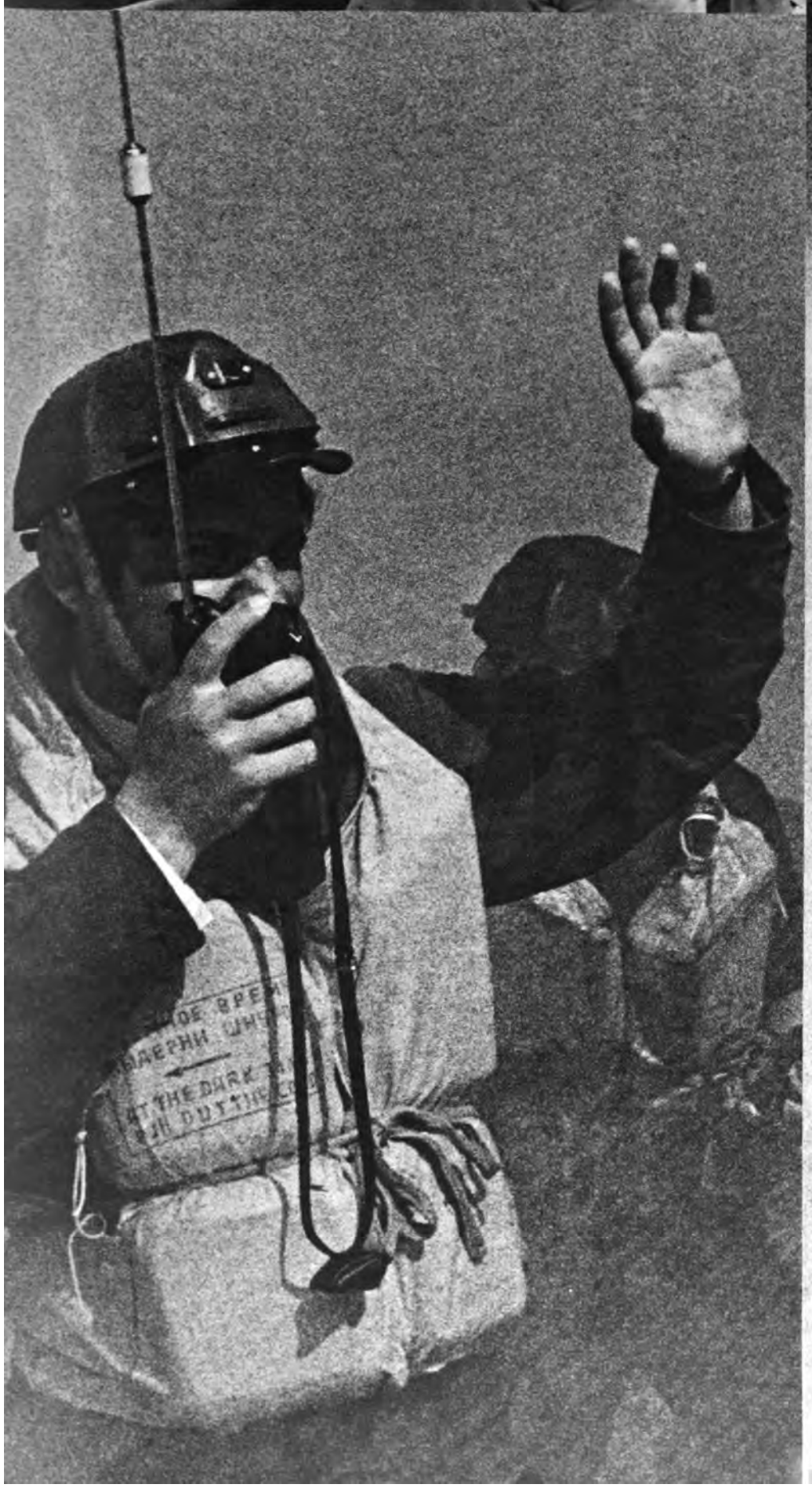
Certain types of ships are built specifically to rescue those in distress and are manned by seamen chosen for their skill and experience. Rescue crews have to head out to sea at times when all other ships, large and small, seek haven in quiet harbors; they have to know how to fight fires and how to work underwater or on the topside of a ship that may go to the bottom at any minute. They have no nine to five hours, their workday may stretch for several days and nights without a break if the crisis demands it.

Disaster doesn't wait for blue skies and calm waters, so rescue ships are designed for all kinds of sea and weather. They are equipped with powerful engines, decompression chambers for divers, extra-strong cables for towing damaged ships or pulling them off shoals and powerful cannonlike fire-fighting equipment. Scientists have developed new chemicals that can swiftly douse the flames from burning metal, oil and kerosene, as well as dry cargo and other things afire in the holds or tanks of a ship. Rescuers have special suits that can take them through fire and water.

These emergency ships and their crews are ready to put out to sea at a moment's notice. In the most traveled areas of the ocean they have regular safety patrols. Soviet rescue ships continuously scan the sea routes connecting our country with others.

The Soviet Union is a member of the Intergovernmental Maritime Consultative Organization (IMCO). IMCO drafted the International Convention on Safety of Life at Sea, 1960, and the International Regulations for Preventing Collisions at Sea, 1972. These agreements deal with radar techniques, new types of safety equipment, engineering of ships and other matters.

With the rescue service there is always room for improvement, and its preparedness is constantly tested. Exercises to try out new methods of fighting fire on cargo ships were held recently on the Black Sea; the rescue and fire-fighting ships *Vladimir Rusakov* and *Crimea* and the towboat *Udarnik* were participants in the testing.

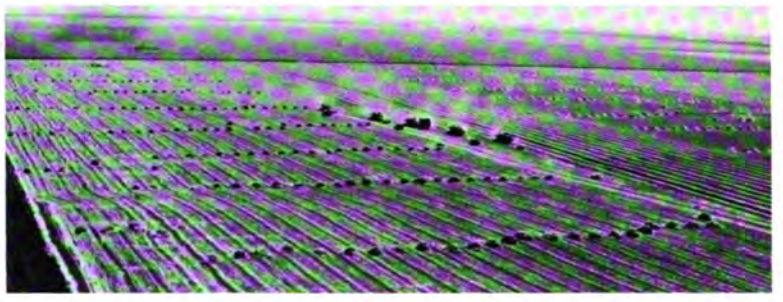


Rescue ships are designed for all kinds of seas and weather and come equipped for every maritime disaster. They carry these cannon-type extinguishers. Left: The walkie-talkie is so indispensable that you wonder what earlier fire fighters did without it. Top: The crew of a rescue ship must have all the skills of

NEXT ISSUE

Rasul Gamzatov, Daghestan's national poet, is an Avar, one of the 30 nationalities of this autonomous republic in the Caucasus. Besides being printed in huge editions in 26 different languages, Gamzatov's works are featured frequently on national TV and radio. His home in Makhachkala is usually filled with mountaineer guests, and huge crowds invariably await him when he tours the republic in his capacity of deputy to the USSR Supreme Soviet. A group of articles describe the role of this mountain poet and of the flourishing amateur theater created by another mountain region, Gorny Badakhshan in the Pamirs, the Roof of the World.

At Pushchino, the new biological research center near Moscow, a youthful group of scientists are studying the behavior of protein molecules in living organisms and the possibility of manufacturing protein nutrients from petroleum. They have also been investigating the living cell for clues concerning genetic inheritance in animals and humans. The staff includes biochemist Alexander Spirin, one of the youngest members of the USSR Academy of Sciences, whose work resulted in the discovery of ribonucleic acid (RNA), the determinant of protein production in cells. An account of this scientific center near the Oka Terrace Preserve.



What contributed to last year's bumper crop of grain in a country where northern and desert climates reduce the amount of arable land to only 30 per cent of the total? Agronomist Victor Pannikov describes the agricultural program which has mechanized almost all field work, reclaimed thousands of acres of virgin land, introduced new types of basic crops and, through improved production methods, considerably increased the country's supply of meat, milk, eggs and fruit.

In 1856 Guards Colonel Ivan Turchaninov left Russia, giving up a brilliant career, and traveled in Western Europe and the United States. Known in America as John Basil Turchin, he worked for Abraham Lincoln in the 1860 presidential campaign and served during the Civil War as brigadier general in the Northern Army. The author of a novel based on his life, Alexander Borshchagovsky, presents new facts about Turchaninov-Turchin.

Literary critic Yuri Kuzmenko discusses partisanship and ethical values in Soviet literature and drama from the time of the Revolution to the present.

Armenian biophysicist Grant Demirchoglyan outlines his theory on the light flashes observed recently by Soviet and American spacemen.

COMING SOON

250th anniversary of the Russian Academy of Sciences

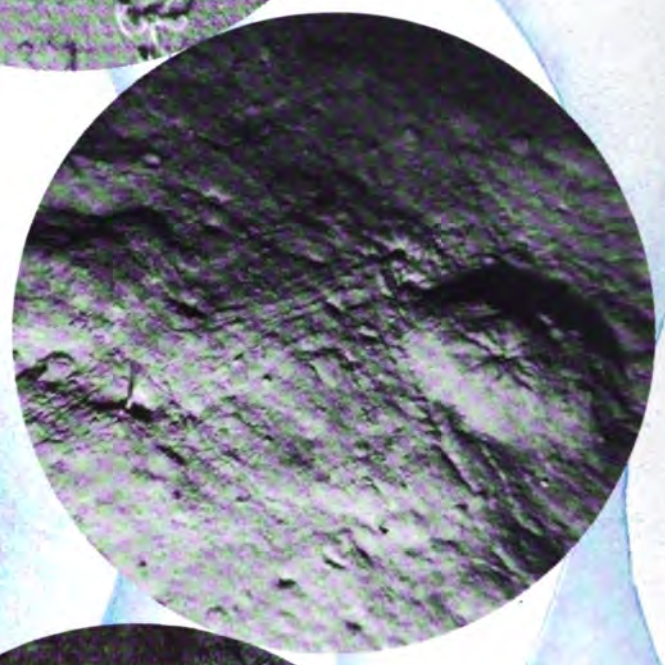
Continued from page 59

left on the surface of benthonic silts by some unknown organisms. (Photographs 7 to 10). These are broad, winding sculptured bands like the imprint of a tire, furrows with ribbed edges, and large hills obviously produced by the activity of some living thing.

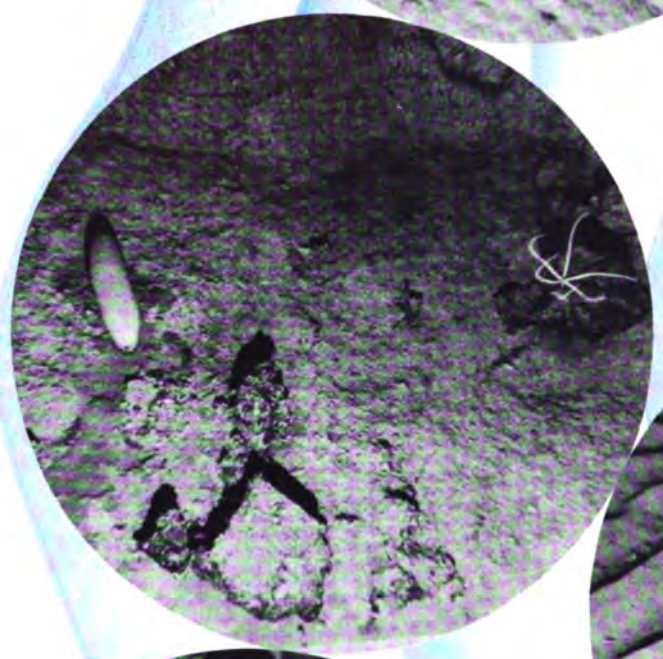
The dimensions of these tracks are striking—they are much larger than those of the animals usually collected from the deep ocean bed by trawls and bottom samplers. Moreover, it is hard to determine with what organs these unknown animals produced such tracks. We can only guess. In some cases the tracks break off suddenly or change their appearance.

Most of these mysterious marks could have been made by organisms quite familiar to scientists. The fact is that we still know very little about the way of life of benthonic animals, their behavior in natural conditions on the ocean bed, and the tracks they leave. However, these animals constitute only one of the many fascinating problems set by underwater photography.

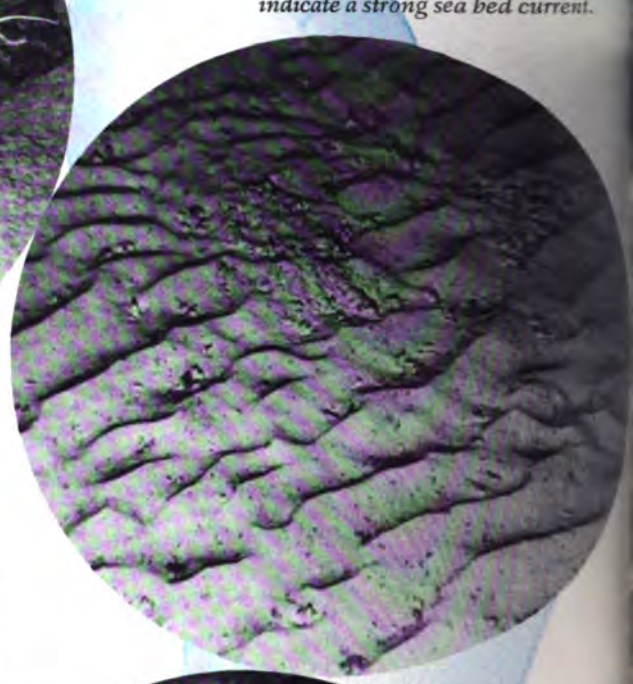
1. Pacific Ocean. The continental slope of the Gulf of Alaska. The depth is 1,000 feet. Food is plentiful here, and numerous sea bed animals can be found on the surface of coarse-grained sand. They include brittle stars (partially buried in the sediment) and sea anemones.



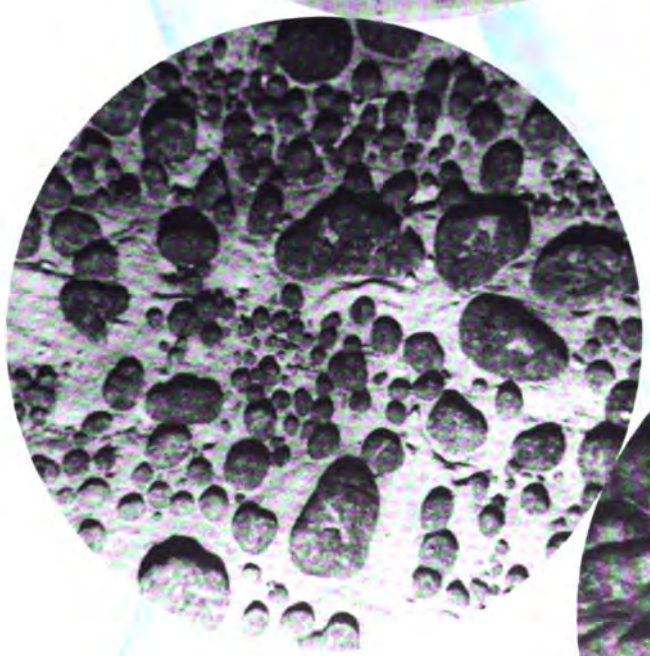
2. Atlantic Ocean. The Cape Verde basin at a depth of 13,450 feet. The silt-covered surface has been disturbed by numerous burrowing organisms. You can see small hills, holes, small ridges and rills created by animals. But it is not easy to determine to which animal a particular trail belongs.



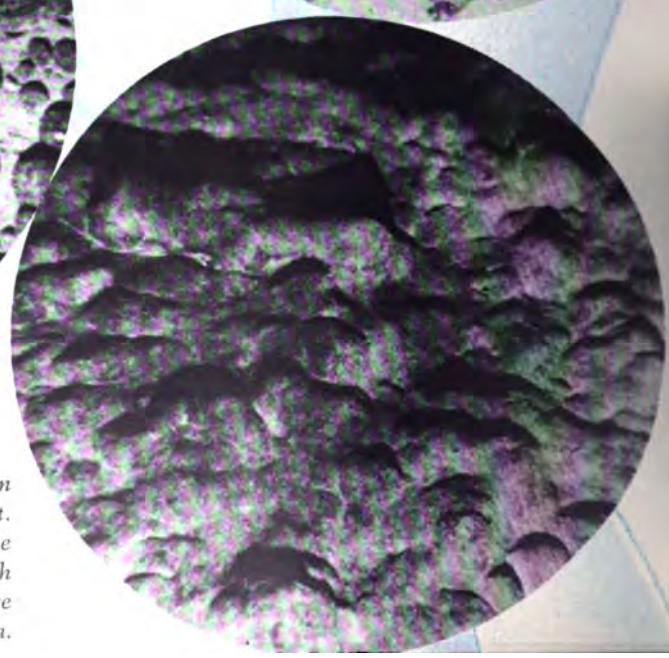
3. Indian Ocean. The West Australian basin at a depth of 15,700 feet. Outcrops of rock and debris. (Soft sediments are found in the deeper areas.) At left is a holothurian and at right an unidentified animal.



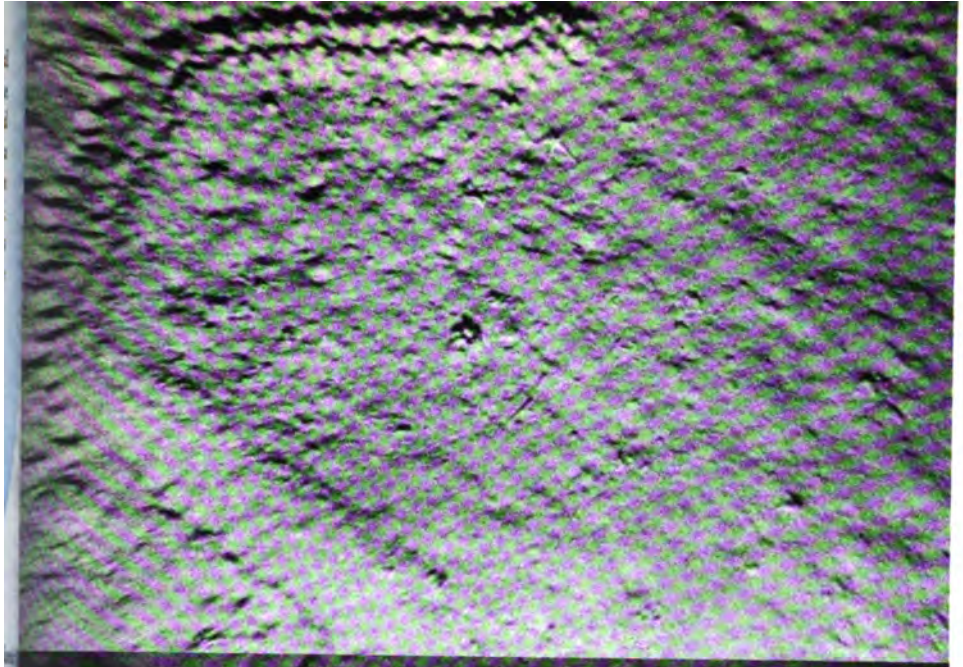
4. Indian Ocean. The slope of a large submarine mountain. The depth is 7,900 feet. Well-formed asymmetrical ripple marks indicate a strong sea bed current.



5. Pacific Ocean. The southern basin at a depth of 16,100 feet. A large group of round manganese concretions. The area also has triangular concretions formed around the teeth of giant Tertiary sharks. Rills in the sediment indicate a rather strong bottom current.



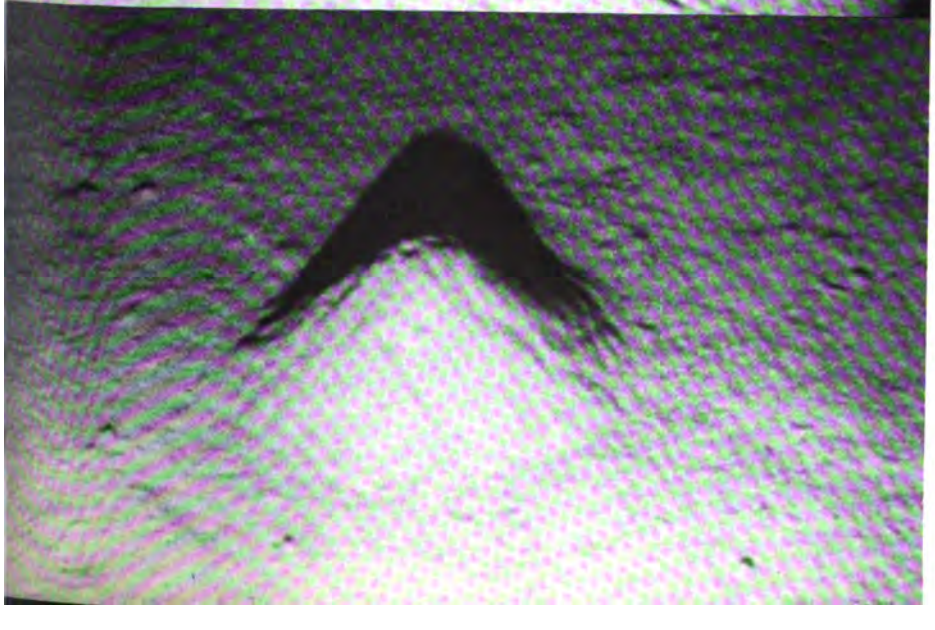
6. Pacific Ocean. The southern basin at a depth of 14,100 feet. The hilly surface of the hardened lava flow encrusted with manganese oxides. There are no soft sediments in this area.



7. *Pacific Ocean. Slope of the Aleutian Trench. The depth is 17,980 feet. A salient sculptured trail with a longitudinal middle rill apparently formed by an animal moving under the sea bed surface. The trail is about five inches wide and ends where the animal has descended deeper into the sediment.*

8. *Pacific Ocean. The abyssal lowland of the Gulf of Alaska at a depth of 11,220 feet. There is a unique, flat rill with two longitudinal ridges. The rill, some four inches wide, ends abruptly. In all probability it was formed by an animal crawling on the sea bed surface.*

9. *Pacific Ocean. Slope of the Vityaz Trench at a depth of 16,900 feet. The rill with longitudinal sculptured ridges was apparently formed by an animal crawling on the surface. The rill is over five inches wide. This rare trail was found near the shore of the Antarctic.*



10. *Pacific Ocean. Slope of the Vityaz Trench at a depth of 16,800 feet. The hill, of unknown origin, has holes on the summit. It is over 20 inches wide at the base and about 16 inches high. Similar hills are very rare.*

Hydroelectric station in Estonia

Photograph by Lev Bystrov

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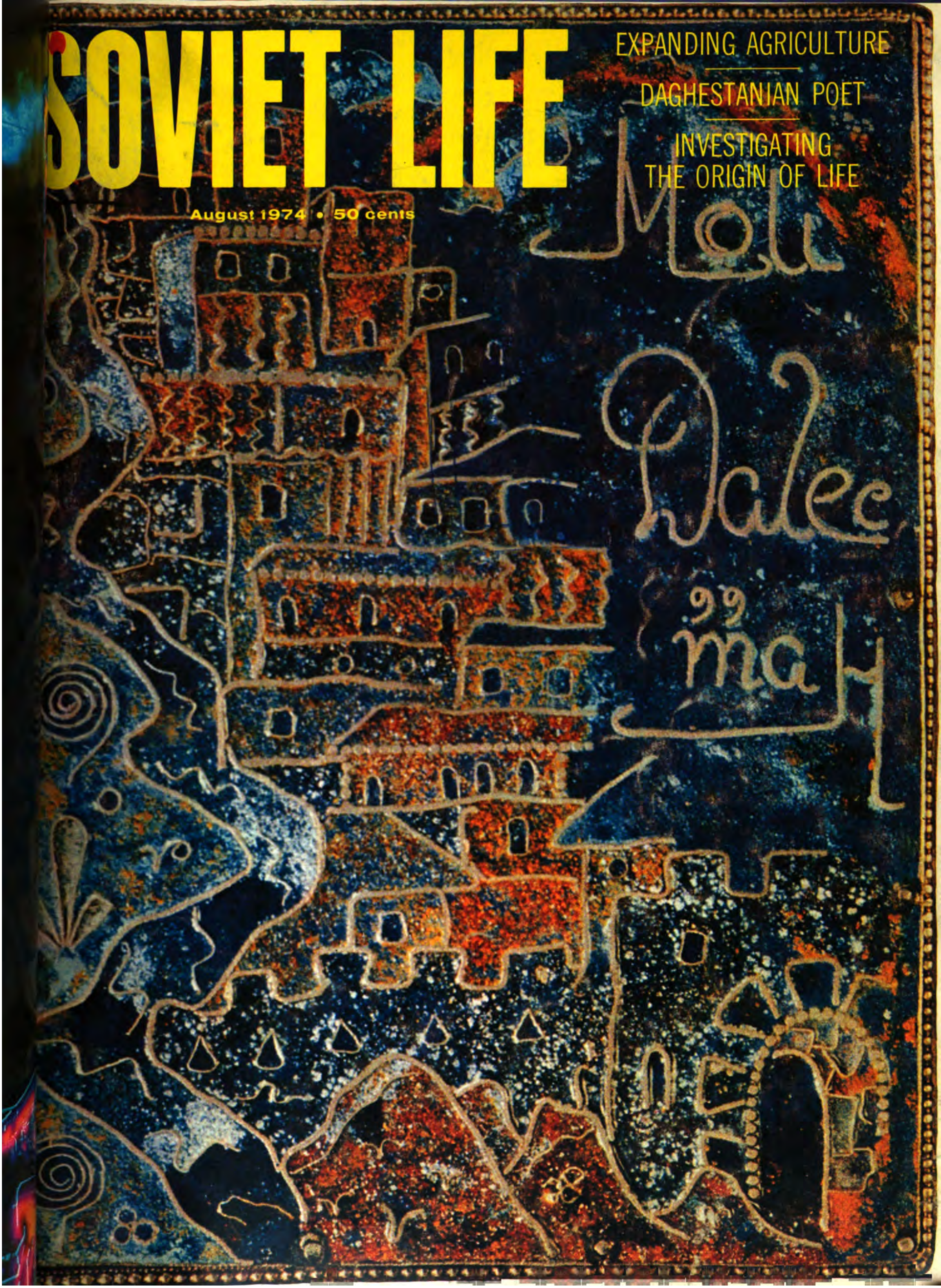

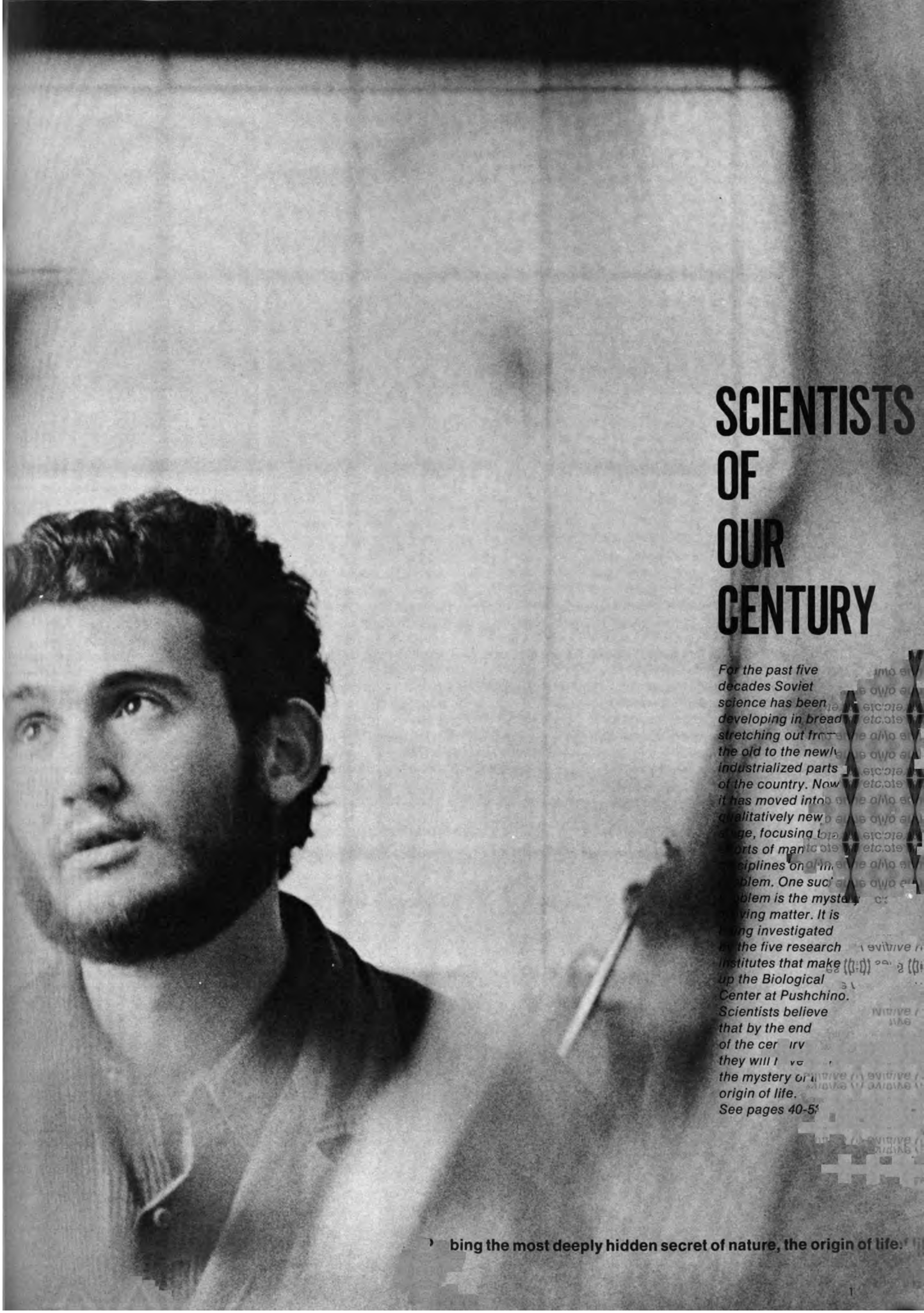

SCIENTISTS OF OUR CENTURY

For the past five decades Soviet science has been developing in breadth, stretching out from the old to the newly industrialized parts of the country. Now it has moved into a qualitatively new stage, focusing efforts of many disciplines on one problem. One such problem is the mystery of living matter. It is being investigated by the five research institutes that make up the Biological Center at Pushchino. Scientists believe that by the end of the century they will have solved the mystery of the origin of life.
See pages 40-5

bing the most deeply hidden secret of nature, the origin of life.

AUGUST 1974, No. 8 (215)

SOVIET LIFE

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LETTERS TO THE EDITOR

A most enlightening and esthetica[lly] pleasing periodical. Cultural exchange through media such as this periodical can lead to better understanding and lessening of harmful prejudice.

Joan S. Bulley
Fredericksburg, Virgin[ia]

We haven't visited Leningrad for sev[eral] eral years, but we found the material in your May issue very interesting, especially with regard to the continued efforts to improve the quality of life in the city.

John C. Goldner
Brooklyn, New Yor[k]

We would hate to miss any issue of your wonderful magazine. Our fondest wish is to visit your great country, but reading your magazine every month is the next best thing.

Helen L. Crowe
Framingham, Massachuse[tts]

Since my visit to the Soviet Union I have appreciated your magazine even more.

Carolyn Bright
Feasterville, Pennsylvan[ia]

I enjoy the magazine a great deal and find it most helpful at the school where I work as a Library Media Specialist. Our sixth grade social studies classes study the USSR, and the photographs help a great deal at that age.

Roberta Wessendorf
Guilderland, New Yor[k]

Your magazine is one of the most interesting I have the pleasure of reading. Not only is the photography outstanding but the quality of writing is praiseworthy. I am a writer by profession, and I appreciate reading such well-written articles.

From my studies of Soviet history I firmly believe that the fantastic achievements the Soviet people have accomplished in such a short period of time were due to the brilliance and determination of Lenin coupled with the patience and hard work of the Russian people. Keep up the fine work.

Connie Smith
Columbus, Oh[io]

My sincere thanks to the class and teacher of Washington High School in Tulsa, Oklahoma, for sending their comments on SOVIET LIFE. It is tremendously helpful for the staff to know what readers think about the magazine.

The Editor

SOVIET PARLIAMENTARY DELEGATION IN THE UNITED STATES

Wide World photo

By Boris Strelnikov

Photographs by Pyotr Fyodorov

AT THE WHITE HOUSE. The President of the United States with Boris Ponomarev, head of the Soviet Parliamentary Delegation (left), and Anatoli Dobrynin, Soviet Ambassador to the U.S.

AMERICAN and Soviet flags were flying at Andrews Air Force Base on the evening of May 19 when the Soviet Parliamentary Delegation arrived. A group of American Congressmen were there to meet the members of the USSR Supreme Soviet, the country's highest legislative body. Among those present were Senators John J. Sparkman, Vance Harke and Charles H. Percy and Congressmen John J. McFall, Samuel S. Stratton, Clement J. Zablocki and Peter H. B. Frelinghuysen.

While waiting for the plane from Moscow to land, I talked to Senator Sparkman of Alabama. In answer to my question about the significance of the visit, he called it a historic event. "Our countries," he said, "have had diplomatic relations for more than 40 years, but there was never the contact between Soviet and American legislators that should have existed. This is the first time that a Soviet parliamentary delegation has come to the United States." The Senator said he was confident that regular contacts between the U.S. Congress and the USSR Supreme Soviet would help to strengthen mutual understanding between our two peoples.

The Senator, who is a member of the Senate Foreign Relations Committee, appears to be right. The delegation's 10 days in the United States were filled with fruitful discussions and meetings, with frank talks about how to further develop and improve Soviet-American relations.

The visit is the opening of regular contacts between the representatives of the highest legislative bodies of the two countries. In view of the fact that the Supreme Soviet and the Congress play an active part in formulating the foreign policy of their countries, the importance of this visit cannot be overestimated.

During their stay in the United States the deputies of the Supreme Soviet met Senators, Congressmen, high State Department officials and businessmen. They talked with Ronald Reagan, Governor of California, and with David Rockefeller, Chairman of the Board of Directors of the Chase Manhattan Bank.

The Soviet deputies were received

ON CAPITOL HILL. Speaker of the House Carl Albert spoke for all concerned when he called the meeting between the Soviet and American parliamentarians memorable and important. From the left: (first) Vasili Kavun, (third) Alexander Chakovsky, (fourth) Boris Ponomarev, Zoya Pukhova (next to Carl Albert), and Lev Tolkunov (far right).

with warmth and friendship everywhere they went and were applauded in the halls of the Senate when Republican Leader Hugh Scott interrupted the session to greet the guests and introduce them to the Senate.

The head of the Soviet delegation, Boris Ponomarev, is one of the country's foremost statesmen and a prominent scholar. He has had a long and interesting life. At 15 he volunteered for service in the Red Army. Today he is an alternate member of the Political Bureau of the Central Committee of the Communist Party of the Soviet Union, the Chairman of the Foreign Affairs Committee of the Soviet of Nationalities of the USSR Supreme Soviet and an academician of the USSR Academy of Sciences.

Zoya Pukhova, a member of the Presidium of the USSR Supreme Soviet, is much younger than Ponomarev. Her father was a farmer who fought in the Soviet Army and was killed during World War II, when the nazi army invaded the Soviet Union. Pukhova was only 16 when she started to work at a textile mill. Like hundreds of thousands of Soviet young people, she continued her schooling while working. She graduated from a special school for young workers and then from a textile institute. Now, at 37, she is the director of a textile mill in Ivanovo.

Vasili Kavun, like Pukhova, is a member of the Presidium of the USSR Supreme Soviet, but he is a little older. He is the son of a Ukrainian farmer. After graduating from the Uman Agricultural Institute in the Ukraine, he wrote his thesis and received a Candidate of Science degree in agriculture. After working as an agronomist on a collective farm, he was elected its chairman and was considered one of the best in the Ukraine. In 1970 Kavun was elected Chairman of the Executive Committee of the Vinnitsa Regional Soviet—roughly equivalent to an American Governor—a post he still holds.

Also in the delegation were Lev Tolkunov, editor in chief of *Izvestia;* Leonid Zamyatin, Director General of the News Agency of the Soviet Union (TASS); writer Alexander Chakovsky, editor in chief of *Literaturnaya Gazeta;* Boris Stukalin, Chairman of the USSR Council of Minister's State Committee for Publishing, Printing and Book Trade; and Georgi Zhukov, Pravda's political observer.

On May 23 the Soviet Parliamentary Delegation was received at the White House by President Richard Nixon. White House Deputy Press Secretary Gerald Warren informed the press that the President "had been awaiting this meeting with anticipation as an opportunity for exchanging views on Soviet-American relations." The President, he said, stressed the significance of the steps already taken as a result of the two summit meetings.

"What do you think of the Soviet Parliamentary Delegation's visit to the United States?" was a question Soviet and American officials were asked many times during the 10-day visit. And each answer confirmed that we had progressed to a new page in the book of Soviet-American relations, that a new and important step had been taken toward better understanding between the two countries.

Soviet delegation head Boris Ponomarev pointed out in this connection:

"Our visit is taking place in a special period of Soviet-American relations. This period was inaugurated by the two summit meetings between Leonid Brezhnev and Richard Nixon, which created a good foundation for expanding Soviet-American cooperation.

"It has been our experience that when we want long-term stable relations between states, when we want to expand ties, it is necessary to have a reliable mechanism of cooperation. That is why we think that along with the contacts between the governments, regular contacts and relations between the parliaments of the two countries can play a major role."

"Your country is a great and powerful one," Speaker of the House Carl Albert said at the reception in the Capitol. "Your peoples have accomplished much, of which they are justly proud. We respect and admire your achievements.

"Our two countries are in the process of moving from confrontation to negotiation. Much has been accomplished, but much remains to be done. It is my conviction . . . that we both understand the importance to the peoples of our two countries and to the world of pursuing the road of negotiation with persistence and good will. Any other course in today's world makes no sense. . . .

"I would like to say on behalf of my colleagues and myself that your visit has been a memorable and important one for us."

AT THE SOVIET EMBASSY. Boris Ponomarev told the reporters attending the press conference: "In Soviet-American relations, the turn from confrontation to agreements in the political sphere must be backed with developed trade and scientific and technological exchanges. We are deeply convinced that it is to the benefit of both our countries, their people and the course of world peace."

SENATOR EDWARD KENNEDY VISITS THE USSR

SENATOR EDWARD KENNEDY toured the Soviet Union recently with his wife Joan, his son Edward, Jr., and daughter Kara as guests of the USSR Parliamentary Group, visiting Moscow, Tbilisi and Leningrad.

While in Moscow, the Senator met with Leonid Brezhnev, General Secretary of the Central Committee of the Communist Party of the Soviet Union. Their talks covered a wide range of questions involving Soviet-American relations as well as international problems. It was unanimously agreed that the steady improvement in Soviet-American relations has not only benefited the peoples of both countries, but has contributed substantially to the reduction of international tension. General Secretary Brezhnev emphasized the Soviet Union's readiness to continue expanding and developing relations with the United States on the basis of equality, mutual benefit and noninterference in domestic affairs.

In Tbilisi Senator Kennedy addressed the Eighth Dartmouth Conference, a gathering of legislators, scientists and other public figures from the USA and the USSR.

At Moscow's Sheremetyevo Airport, just before leaving for home, the Senator told members of the press:

"I want to express my very warm feeling of appreciation to the USSR Parliamentary Group, which invited me here . . . for the program they arranged, particularly the meetings with top Soviet officials, the General Secretary and the Foreign Minister."

Senator Kennedy described the questions discussed at his talks with Soviet leaders: disarmament, European security and Soviet-American relations. "I was impressed," he said, "with the frankness of the Soviet leaders and their willingness to express their views. I think there are some important areas in which substantial progress can be made."

Asked by a Moscow radio correspondent about his impressions of the Soviet Union and the Soviet people, Senator Kennedy said that the welcome given his family had been exceptionally warm and cordial. He and Mrs. Kennedy expressed their gratitude to the Soviet people for their hospitality and kindness.

The Senator was also interviewed by a correspondent for SOVIET LIFE magazine:

Q: In what perspective do you see Soviet-American relations?
A: I think the relations between our two countries are a genuine basis for peace, stability and security in the world. I believe that the interests of the United States and the Soviet Union are very much alike in terms of their mutual relations and the problems of world security as well.
Q: How would you assess the results of your trip?
A: I think it's difficult for anyone who has not visited the Soviet Union and talked to the people here to measure the impact of the last world war on them. It's an important way for Americans to understand the people who experienced the war and the devastation it caused.

I got the impression that the Soviet leadership is deeply committed to a policy of continued progress in areas of mutual interest.

I feel that meaningful progress can be achieved in many such areas and am very hopeful that we will see such progress on a broad scale in the future.

AT THE EIGHTH DARTMOUTH CONFERENCE

SENATOR HUGH SCOTT ATTENDS MEETINGS

A NUMBER of Soviet and American public figures attended the Eighth Dartmouth Conference last April in Tbilisi, capital of Soviet Georgia. This forum is named for Dartmouth College in New Hampshire, where representatives of the two countries first met in 1960. Its purpose is to discuss major problems of Soviet-American relations and questions of détente, peace and international cooperation. The delegates include deputies to the USSR Supreme Soviet, members of the U.S. Congress, Soviet and American scientists, writers and publicists, representatives of public organizations and businessmen.

In their final joint communiqué, the conference participants emphasized that they see détente "not as a temporary tactic but as an ongoing and indispensable instrument for world peace."

The delegates stressed that they met "in a positive atmosphere, largely the result of the policies adopted by both countries." They described the Basic Principles of Relations Between the USSR and the USA and the Agreement on the Prevention of Nuclear War, signed by Leonid Brezhnev, General Secretary of the CPSU Central Committee, and President Richard Nixon of the U.S. as "significant landmarks in the development of détente."

Senate Minority Leader Hugh Scott, when asked by a Novosti Press Agency correspondent for his impressions of his visit, said that like earlier ones it had been most helpful and cordial. "I particularly enjoyed the very frank and friendly two-hour conversation with General Secretary Brezhnev. I also had a very good meeting with Alexei Shitikov [Chairman of the Soviet of the Union, one of the two chambers of the USSR Supreme Soviet—Ed.]. I felt that we accomplished a great deal in our discussions, which were quite candid.

"I think this year's meeting in Tbilisi, which resulted in a unanimous final communiqué, was the best of the Dartmouth conferences," the Senator said. He expressed confidence that the difficulties in the normalization of Soviet-American trade would be successfully overcome and emphasized that the agreements on technical cooperation and exchange of scientific information have wide support from the American public. "We would like to see additional agreements along these lines," he said, "and along the lines of further joint experiments in space and experiments in weather control. And we want to see improved trade relations. I am one of those who are working very hard to secure a good trade bill.

"I believe," he emphasized, "that we should grant the Soviet Union credits and most favored nation status."

"Trade not only improves the standard of living and provides employment, it also creates a network of relationships that leads to better understanding among peoples. It makes it more difficult for people to break off relations because they lose more if they have more invested and involved," he said.

The Senator stressed that meetings between representatives of the USSR and the USA help considerably to strengthen and expand relations between the two countries.

CULTURE IS MULTINATIONAL, LANGUAGES ARE EQUAL

WORLD CULTURE is a product of the spiritual lives of all nations. There are no primitive cultures and languages. There are cultures and languages which reflect diverse periods, diverse levels of historical development and diverse national, local features. With this in mind, we must appraise the significance of culture and language and their contribution to world culture historically. The demands made in different countries at different periods to eliminate the "primitive" cultures and languages were antihumanist. For instance, the various theories pertaining to Europeocentricity were based on an underestimation of the enormous contribution made by the non-European peoples to the development of mankind.

When he elaborated the basic premises of the Marxist theory of national relations, Lenin countered the views of chauvinists with a humanist concept: There must be no repression of the cultures and languages of national minorities and oppressed peoples, no coercive assimilation of the small nations, no absorption of their languages and cultures by those of the big nations, no destruction of the "primitive" cultures and languages, no mutual isolation or "freezing." Instead, there must be all-round development and mutual enrichment of the big and small nations and peoples, of their cultural potentials.

The Marxist-Leninist concept that every nation can and should learn from others is the cornerstone of the linguistic structure in the USSR. The Tenth Congress of the Communist Party (1921) adopted a program designed to raise the cultural level of the then backward peoples of Russia and to develop their languages. The decision of the congress called on the party to help the working masses develop and strengthen their Soviet statehood in forms corresponding to their national conditions; to develop and strengthen in their native languages court proceedings, administration, economic bodies and bodies of power, comprised of local people conversant with the customs and psychology of the local population; to develop the local press, schools, theaters, clubs and cultural enlightenment institutions in the native language; to institute and develop in the native language a broad network of study courses and schools both of a general education and professional-technical nature.

In the Native Tongue

The Soviet Government had to create completely new methods to end the backwardness of the former colonial districts; world practice offered no ready prescriptions. It was the first time in history that the state had implemented such a broad plan of linguistic development in so multinational a country.

Right after the October 1917 Revolution preparations began to develop the national cultures on the basis of the native languages. For peoples without written languages the first step was to create them. As for the old-style languages—Uzbek and Tajik, for instance—their alphabets had to be modernized and their social usefulness had to be enlarged.

The Soviet Government did more than guarantee these peoples the right to teach the new generation in their native languages, it created the practical conditions that would encourage the development of the national cultures and languages.

Some scholars in the West maintain that we created written languages for peoples who had none "for propaganda purposes." This is nonsense. The compelling considerations were the urgent needs of the small nations. First, the native language is the best and simplest medium through which to express a national culture. Second, teaching is most effective in the native language, assuming, of course, that the people in question do not use another language more generally for day-to-day communication. Third, the fastest way to end illiteracy is by teaching people to read and write in their native language, again assuming that they do not use a second language which might be called developed and literary.

An All-Union New Alphabet Committee was set up to supervise the work of devising alphabets for the nonwritten languages, with local committees in the national republics and autonomous regions.

Soviet linguists did comprehensive research in languages that had never been studied before, searching out the interrelations between the native languages and the dialects. Expeditions were sent to look into the mutual ties between languages and folklore and into local cultural peculiarities. Scholars from Moscow and Leningrad, the country's oldest cultural centers, made a particularly large contribution. Those local people who were literate also participated in the program.

In laying down fundamentals, our scholars used these three criteria for the most part: whether the majority of the people for whom a written language was being created spoke the given dialect; whether the people speaking this dialect played a leading role in local economic, political and cultural affairs and, lastly, whether this dialect reflected the main elements of the given language. Of course, the grammatical and lexical peculiarities of other dialects of the language under review were also considered.

In compiling an alphabet, the phonemic structure and orthoëpic norms of one or another modern language or, more precisely, of the particular dialect, were drawn upon. The principles of orthography and concrete rules for writing borrowed words were specified. Rules were drawn up for the spelling of old borrowed words whose phonic forms had developed historically, and also for the spelling of new borrowed words. Special attention was paid to systems of terminology for various branches of science, technology and culture.

We can hardly overestimate the work done in compiling textbooks and devising teaching aids in the native languages. In the early period the main burden was shouldered by the Russian scholars, with assistance from scholars of the other more developed peoples of the USSR. As time went on, the new national intelligentsia began to contribute.

The campaign to end illiteracy and semiliteracy and to institute universal primary education—generously financed by the state—required an enormous number of teachers. They, together with teachers from the local youth, were trained at higher educational and secondary-level teachers institutes and in short-term courses.

At the same time, the number of secondary schools, specialized schools and higher educational institutions was increased. One of the most urgent problems was the training of native specialists for all fields of endeavor. The national languages were used increasingly in such training. In the union republics the native languages of the bigger nations gradually took the lead, first in training personnel with a secondary education and subsequently in other areas.

Of course, errors were inevitable; this was pioneering work. For instance, written languages were created for peoples and ethnographic groups with populations between several hundred and several thousand. Some of these peoples had no particular need to write in their own languages.

The whole country pitched in with funds, teachers, teaching aids in this extraordinary campaign to help millions of people in the former czarist provinces catch up with the more advanced republics in their political, economic and cultural development.

The East: Cultural Revolution

The results were phenomenal, a real cultural revolution! Take, for example, Central Asia and Kazakhstan. By the forties this region was one of the most progressive in the world for its literacy rate. From 0.4 per cent in 1897 it climbed to almost 100 per cent in the fifties.[1]

Education in the Soviet republics of the East was open to everyone, regardless of racial, national and social background. In the 1914-1915 school year only 137,500 people, chiefly children of the rich, attended the schools of Kazakhstan and Central Asia. In the 1972-1973 school year the general education schools had an enrollment of 9,187,000.[2] Before the Revolution there were no higher educational institutions in Kazakhstan and Central Asia. In the 1972-1973 school year there were 108 higher educational institutions teaching in Russian and the native languages, with a student body of 558,900, most of them local people.

Some figures on periodicals, radio, television and movies: In

[1] Official figures published in 1906 noted that at the current rate it would take 4,600 years for the men of this region alone to become universally literate.

[2] The population of the region in 1972 was 35,284,000.

By Pigam Azimov
President, Turkmen Academy of Sciences
and Professor Yunus Desheriyev
Doctor of Science (Philology)

1972, 108 scientific, sociopolitical and literary periodicals and 399 newspapers were published in the Uzbek, Kazakh, Kirghiz, Tajik and Turkmenian languages. In 1973 there were 17,926 public libraries, 16,193 film projectors, 13,706 clubs, 80 theaters and 80 museums in Kazakhstan and Central Asia.

The Rich All-Soviet Culture

Efforts to develop the cultures of the union republics raised all sorts of questions. Wasn't there a danger that the use of the native languages would isolate the local "folklore" cultures from larger outside influences, make for a kind of undesirable purism? On the other hand, was there not also the danger that the use of some other language would tend to suppress the national cultures?

At every stage of development of our state, the theoretical and practical approach to such questions was concretely historical. In the early Soviet period attention was paid mainly to the development of the national, so-called folklore cultures. The reason was the desire to salvage everything valuable in the unique culture of each people. The goal even then was the mutual enrichment of the national cultures and languages: We were well aware of the dangers of isolation and language barriers. We were always against nationalistic and purist trends in the development of the cultures and languages. And we were also against tendencies to confine a people to the framework of its folklore culture based on the native language alone. To our way of thinking, this kind of "purity" is scientifically erroneous and harmful.

At the same time, the Marxist-Leninist approach to the national question rules out the possibility that some cultures and languages will be suppressed and absorbed by others, even by those that are more highly developed. In each of our national republics the native culture and language, whether it is Uzbek, Kazakh, Turkmenian or whatever else, is flourishing, enriched by accretions from the all-Soviet culture. Charges that other national cultures are being swallowed by the Russian culture have no basis in fact. The point is that over the years of socialist construction a new historical community of people—the Soviet people—has evolved. All-Soviet culture is a product of the evolution of this community.

The all-Soviet culture, which has assimilated the best characteristics of world culture, includes elements of the cultures of Russia, the Ukraine, Uzbekistan, Tajikistan, Armenia, Georgia, Latvia, Moldavia, Tataria and the many other republics of the USSR.

The contribution each people makes to the all-Soviet socialist culture depends on its cultural potential, its history and traditions, the level of social development of its language, as well as on the role this people plays in the contemporary affairs of our multinational country. The all-Soviet socialist culture has more resources and wealth than any single national culture. Enriching the specifically national elements in the life of each of our peoples, it too becomes enriched, constantly drawing upon the progressive elements of the local cultures. Of course, all-Soviet culture is not an ideally finished form. It continues to change and develop with the development of our entire society.

Obviously a country with so many nationalities must have a language everyone can understand. Russian plays that role. It is the language of inter-national communication among all the peoples of the USSR, the language of their cooperation in sociopolitical, cultural, economic and scientific matters, the language of correspondence, daily contact and cultural exchange among the national republics, and of their continuous contact with the central state institutions.

Despite all this, the Russian language is only one of the equal languages of the equal peoples of the USSR. In the early years of Soviet power, Lenin fought off all efforts to make Russian the official language, the only language for instruction, the press, etc. Each people was given not only the right to its own native language, but every opportunity to develop it. But for their common language of inter-national communication and cooperation, the nations and peoples of the country selected the Russian language, which gave them access to all the cultures of the Soviet Union and the world.

More than 100 nations and nationalities of the Soviet Union live together under conditions of complete equality and mutually beneficial cooperation.

MOUNTAIN REPUBLIC

DAGHESTAN means "a country of mountains." The name is apt: The Daghestan Autonomous Soviet Socialist Republic spreads across the northern slopes of the eastern part of the Greater Caucasus. Most of it is mountainous, but a coastal lowland extends in a narrow strip on the east where Daghestan is washed by the Caspian Sea. You can take a dip in the Caspian and immediately follow it with a climb in the mountains. The gentle maritime terrain rises sharply to the west, with rows of mountain ridges 6,500 to 9,000 feet high. Deep river valleys cut through them, and gorges are common. The Main Sulak Canyon (5,900 feet) is one of the deepest in the world. Some mountains rise to an altitude of 13,000 feet, and their peaks are covered with perpetual snow and glaciers.

Such a diversity of relief makes for a diversity of climate. Almost all the climates characteristic of Eastern Europe, including continental, temperate and subtropical, are represented on the 19,400 square miles of Daghestan's territory. It has vegetation from almost all the climatic zones, polar to desert: alpine meadows, dense forests, reeds, lianas and mountain-tundra plant life.

The area has long attracted scientists, writers and travelers and, in our day, hosts of tourists. Not only do Daghestan's geographical phenomena draw them, but the ancient and distinctive culture of the country's numerous peoples, its ethnic mosaic.

Daghestan is part of the Russian Federation. Its population of 1.5 million includes more than 30 local nationalities who speak 87 languages and dialects, belonging in the main to the Daghestanian branch of the Ibero-Caucasian language. The most numerous peoples are the Avars, Dargins, Kumyks, Laks and Lezghians. Polyglotism has not impeded the development of Daghestan's culture since the population, when necessary, uses one of the principal local languages or Russian as a common language.

The teaching in schools is done in the native languages, and Russian is studied as a separate subject. There are also Russian schools.

Daghestan has always been famous for its poetry and music. Today the work of its poets and composers is known not only in the Soviet Union but in countries all over the world. In addition, symphonic music, painting and sculpture, and other artistic genres once foreign to Daghestan are developing.

The republic's decorative and applied art goes back to antiquity. Its metal, stone, ceramic and wooden articles were always known for their original, fanciful geometric and floral patterns and their exquisite and precise workmanship. Today, too, the reputation of Daghestan's folk craftsmen extends far beyond the boundaries of their republic; they are regular participants in international exhibitions.

The *aul* (mountain village) of Kubachi is a center of fine jewelry work. Over the centuries craftsmen here evolved a special technique for notching and chasing precious metals. The secrets of the craft passed down from generation to generation, and today's creations with their original designs and fanciful interlacing of lines are universally admired.

Some *auls* in Daghestan are famous for their ropewalkers, others for their dancers, and still others for their equestrians. Every village has its distinctive quality. But they all have many things in common that arrived with Soviet power—schools, hospitals, libraries, houses of culture. Thousands of young men and women leave their native villages each year to study at universities, institutes and technical schools in the republic and elsewhere in the Soviet Union. People with a higher education are as common in Daghestan today as shepherds once were. The status of women is one of the major indicators of a country's cultural level, and Daghestan's formerly enslaved women now work as teachers and doctors, engineers and agronomists. The economy of the republic, whose people since ancient times have been cattle breeders, farmers and artisans, today includes such new branches as machine building, oil and gas, metallurgy, chemicals, glass, light industry and food processing.

POEMS BY RASUL GAMZATOV

You bear your portion of life's sorrow
With tearless eye, not giving way;
With like restraint upon the morrow
You can be supremely gay.

To what but the eagle's measured
flight
Can I your melodies compare?
To what your dances but the sight
Of a stallion charging, as on air?

I love your grace, your stateliness,
Your speech, so rich in imagery,
And none can know or even guess
How dear is Daghestan to me.

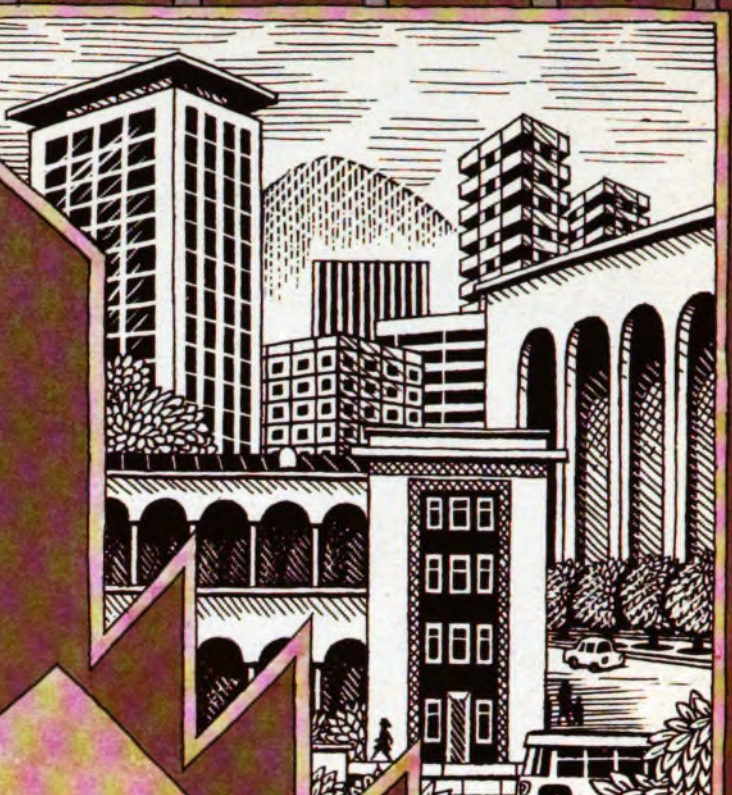
Your heart, in mountain fastness bred,
Where morning mists enwreath the
chain,
Shares not the narrowness of passes,
Is wide and open as the plain.

The feuds are done, the daggers
broke,
That once our fathers held so dear;
No more are you a backward folk,
Nor I—benighted mountaineer.

Now trains and planes extend
communion
Where late but horse and donkey ran;
And I, son of so big a Union,
Still love my little Daghestan.

Translated by Margaret Wettlin

AND PROSE



A traveler setting out on his way,
What does he take for his fare?
He takes some wine and some bread he takes,
But you, our dearest, needn't care.

We'll offer you all the welcome we can,
Leave your bread and your wine behind.
A highlander's wife will bake you cakes,
And her husband will give you wine.

A wayfarer starting upon his way,
What does he take for his fare?
He takes a well-sharpened dagger along,
But you, dear guest, needn't care.

The mountains will give their shelter to you,
But if anyone wishes you ill,
Highlanders take their daggers too
Their duty as hosts to fulfill.

The traveler setting out on his way,
What else does he take, you think?
He carries along a merry old song
Upon his way to sing.

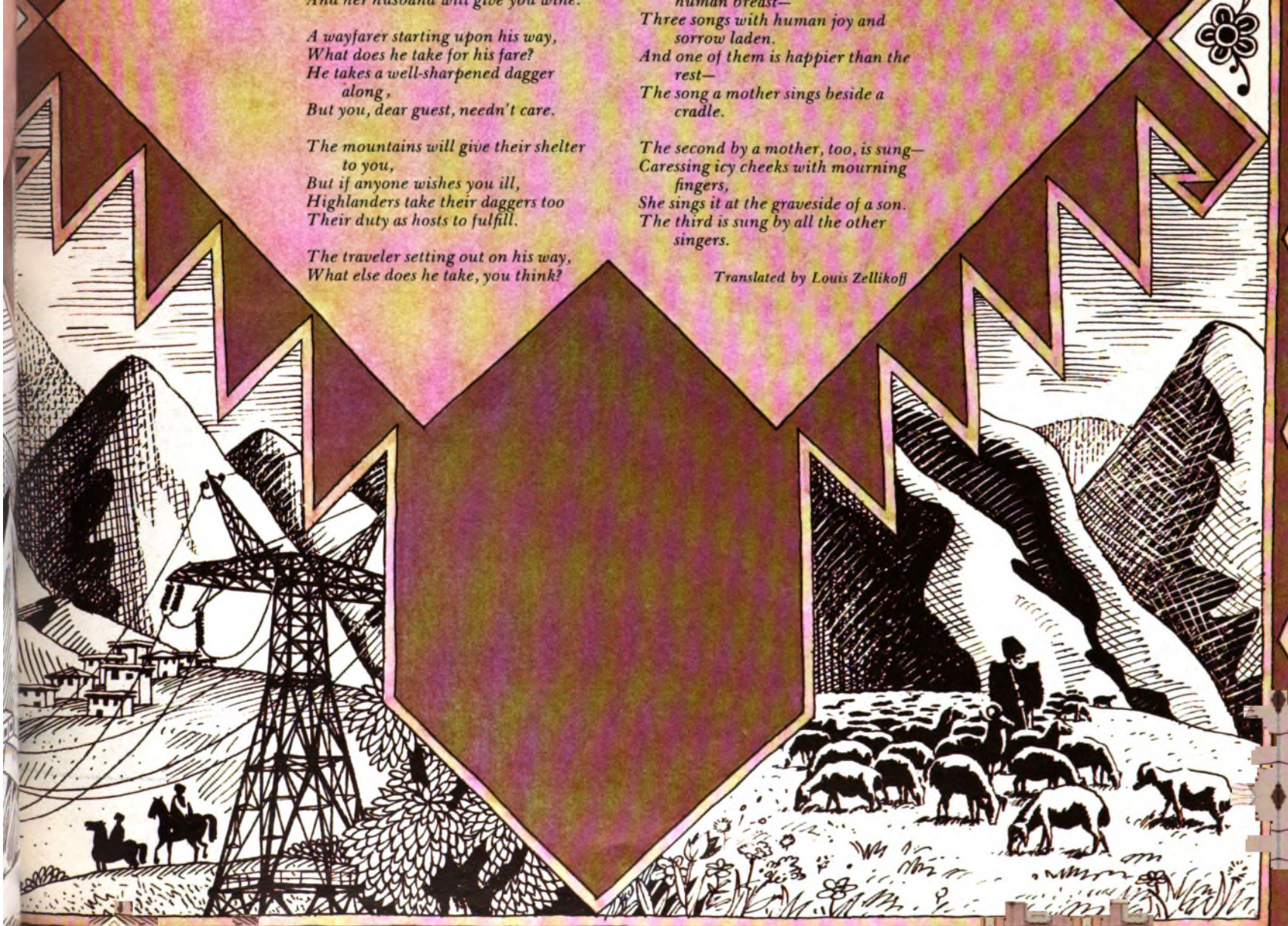
We too, dear guest, have many a song,
You may perhaps have heard them.
Yet come along and bring your own song,
It's not too great a burden.

Translated by D. Rottenberg

Three songs there be that thrill the human breast—
Three songs with human joy and sorrow laden.
And one of them is happier than the rest—
The song a mother sings beside a cradle.

The second by a mother, too, is sung—
Caressing icy cheeks with mourning fingers,
She sings it at the graveside of a son.
The third is sung by all the other singers.

Translated by Louis Zellikoff



PEOPLE'S POET OF DAGHESTAN

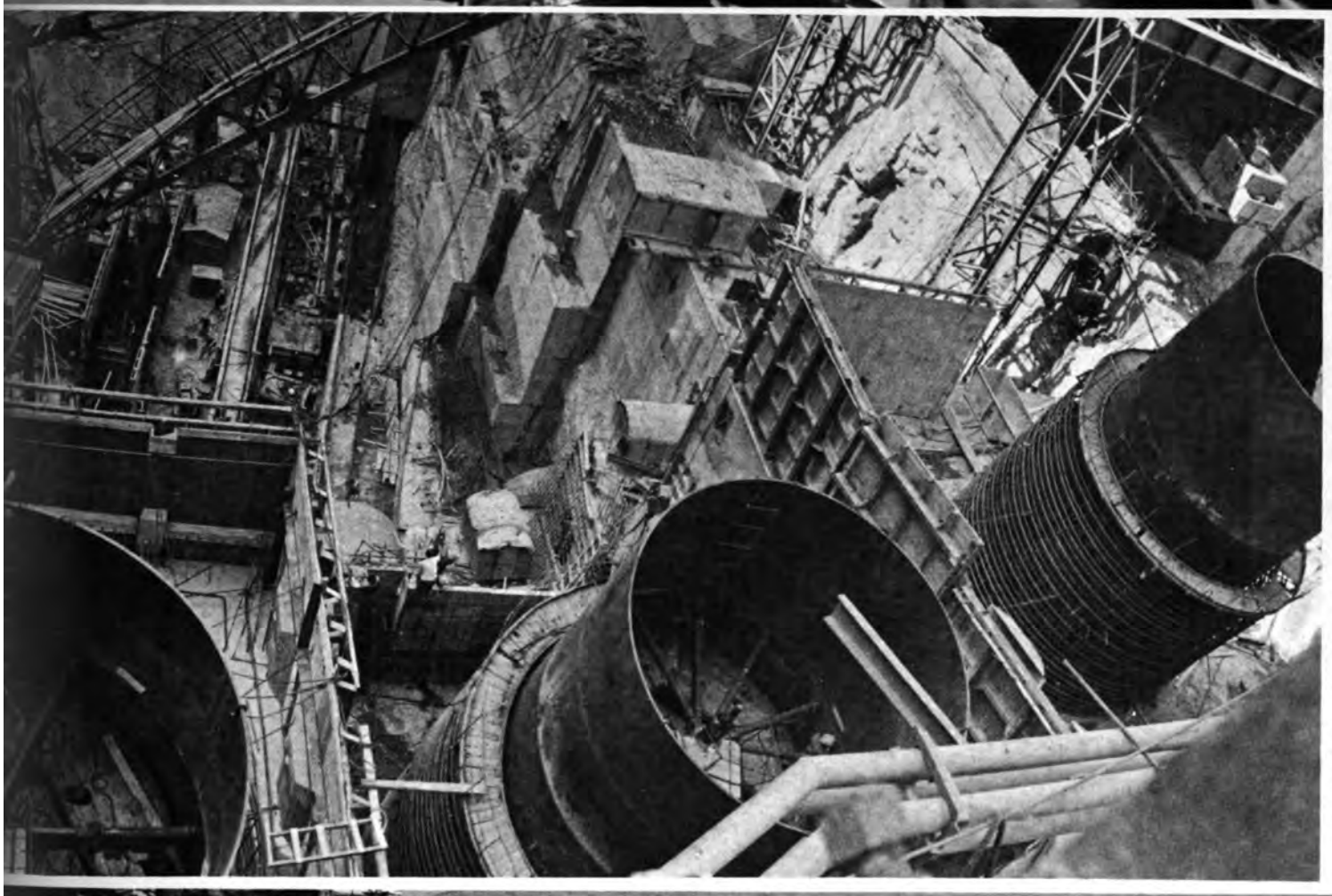
By Dmitri Mamleyev

ADDRESSING his readers, Rasul Gamzatov once wrote, "I have a single desire: just to be a poet, just to be human. I want to be honest and frank with you, my reader, and with those who don't read my writings. That's all. My address is the same: 15 Gorky Street, Makhachkala, Daghestan ASSR."

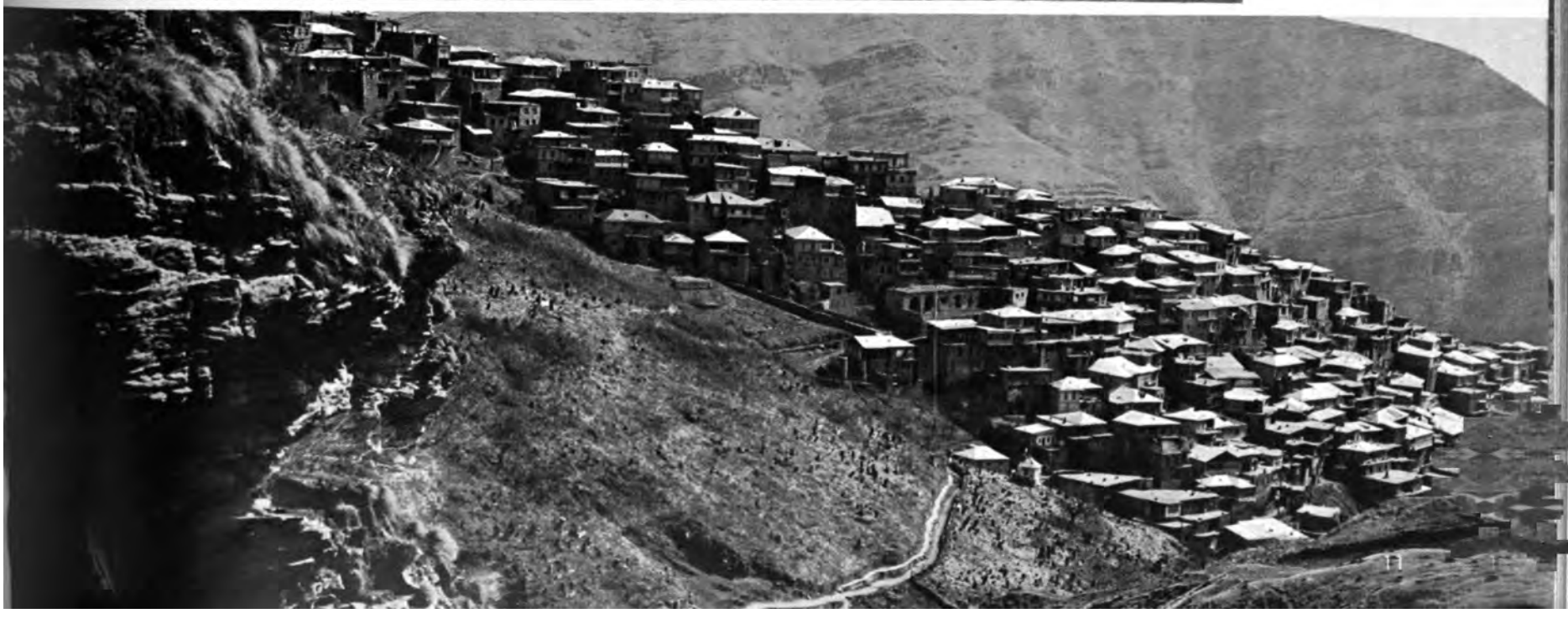
In that small city, the capital of the Daghestan Autonomous Republic on the shore of the Caspian Sea, Gamzatov has a big house whose doors are open to everyone. I've visited there many times and can't remember when the mountaineer poet did not have at least one guest from his native *aul* (mountain village), Tsada.

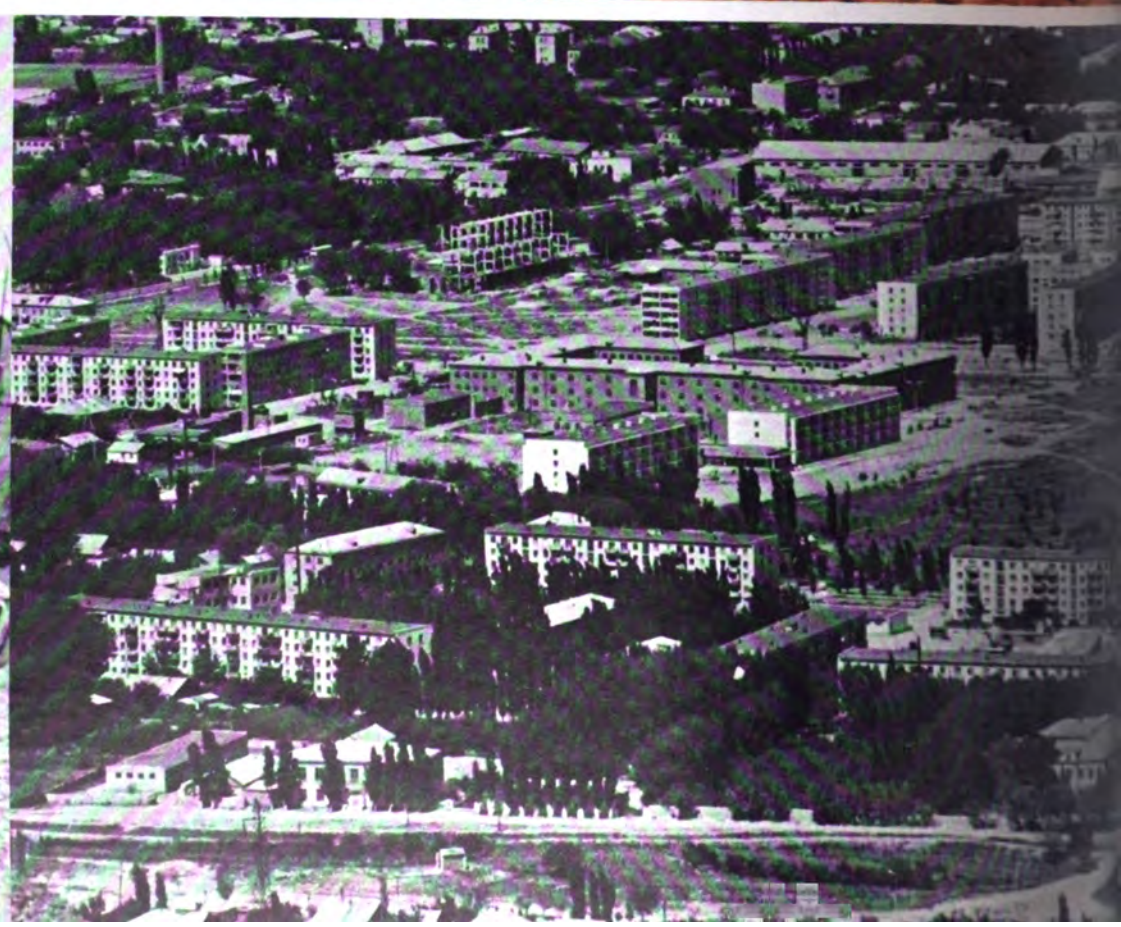
Gamzatov also has an apartment in Moscow, "an eagle's nest" on the nineteenth floor, in the very center of the Soviet capital, Kalinin Prospect. I can't remember seeing him alone there either. Among his guests there were sure to be countrymen, if not from Tsada, then from somewhere else in Daghestan. There is not a single *aul* in this multilingual Caucasian republic whose inhabitants do not consider him one of their own.

Continued on page 14

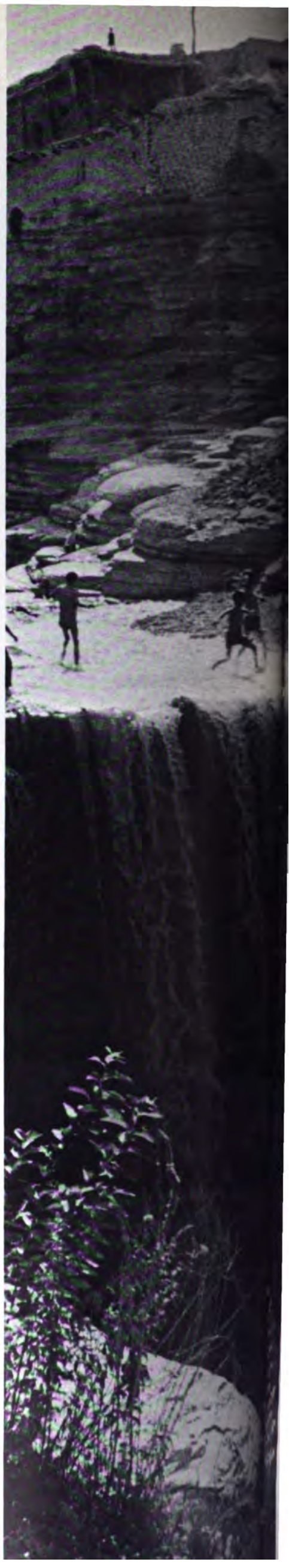


There is no better index of the social progress of a nation than the status of its women. Daghestan's women, once enslaved, now work as teachers, doctors, engineers, agronomists. Left: The Chirkei hydroelectric plant. Before the Revolution, the only occupations in this region were cattle breeding and farming, with some handicrafts. Today the republic boasts such industries as oil and gas extraction, chemicals, machine building and metal working. Below: A mountain village. Daghestan's 1.5 million people speak more than 87 languages and dialects. Top left: Rasul Gamzatov reads his poems. Bottom left: A village poetry festival.





Most of Daghestan is mountainous. It is located in the eastern part of the Greater Caucasus, a region of high ridges, some of them covered with perpetual glaciers and snow, of deep canyons and river valleys. Below, left to right: Going after the daily paper means a real workout in this rugged terrain. Makhachkala, on the shore of the Caspian Sea, capital of the republic and the home of Rasul Gamzatov. The poet on one of his frequent visits to his native village. Old fortress in Derbent, Daghestan's port on the Caspian.

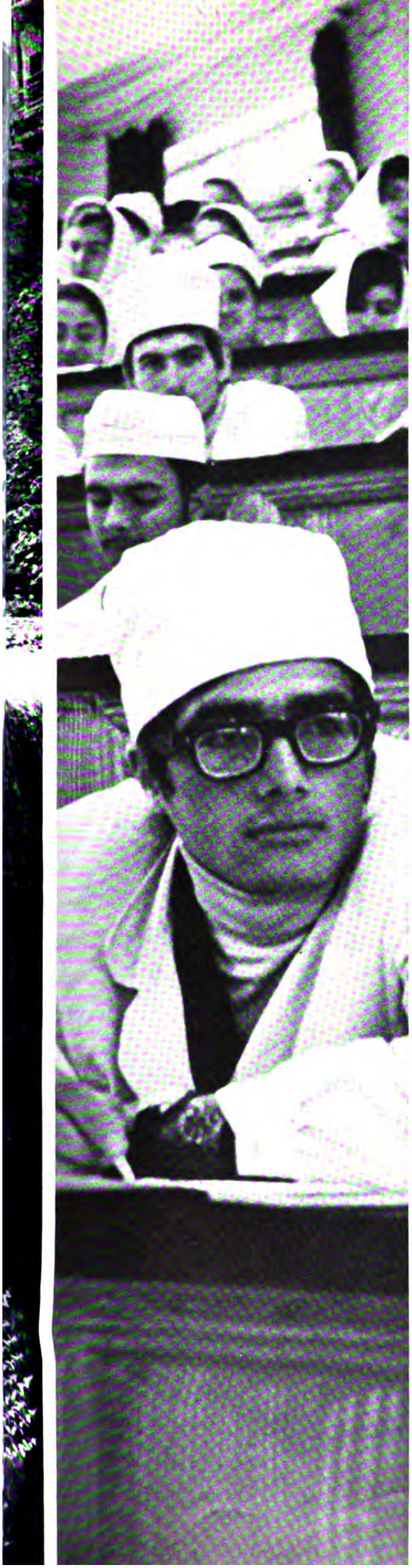


PEOPLE'S POET OF DAGHESTAN

Continued from page 10

Gamzatov is an Avar, one of Daghestan's 30 nationalities (there are some 400,000 Avars in the USSR). His writings are welcome guests in homes throughout the country. His generous, heartfelt, fiery poems are reflections on life and love, the poet's answer to universal questions. Fused in Gamzatov's works are folk wisdom and the moral credo of a citizen of the world's first socialist state, a moving lyricism and his own peculiar aphoristic style, subtle humor and native wit. All this is augmented by an inexhaustible love for his fellow human beings, for his native land, his friends, his wife. The poet's books come out in huge editions—by the turn of the year they totaled almost six million copies. They sell almost immediately. His works have been translated into 26 languages and are published in Yakutsk and Paris, in Warsaw and Tashkent. Gamzatov's songs are sung on TV and radio and at get-togethers of friends. Blended with choreography, his poems have come to life on the ballet stage, and his first book of prose, *My Daghestan,* was immediately adapted as a color documentary. It is very difficult to get tickets to his public readings in the huge halls of Moscow's Polytechnic Museum or the Leningrad Philharmonic Orchestra; so many people want to see and hear him that they crowd the stairs and aisles and even sit on the stage.

He writes about joys and doubts, about mothers and fathers, about love, about the legends and true stories of the Caucasus; he writes poems and inscriptions for cradles,



jugs and daggers, and always thinks of himself as a correspondent from the land of his birth, Daghestan.

"This is my land," he says, "my customs, my mountains, my sea. My Daghestan. . . . It is my confession, my thoughts and feelings. I have visited 50 countries, but my native country was always with me."

That is why Gamzatov surrounds himself with people from the mountains, and why he never returns from distant journeys without visiting his native Tsada.

Tsada means "on fire"; the sun here rises early and sets late. Several times I accompanied the poet to this village of 70 homesteads at the foot of the peak that overhangs the *saklias* (mountain homes).

Rocks, rocks, rocks. . . . "If people bought rocks at any price," say the mountaineers, "we'd be rich."

His father, people's poet Gamzat Tsadasa, lived the life of a peasant. He was the first to plant an orchard in the mountains, the first to pipe water to his home and the first of the local people to listen to a radio broadcast. Of his son's early poems he said, "If you were to take fire irons and dig about in these ashes, you might come upon a live coal to light a single cigarette." Those were poems a 12-year-old boy had written, lying on a bull's hide on the roof of his father's *saklia,* from which he saw his first airplane.

Recalling his father's words, Gamzatov wrote many years later, "If there's enough fire in my poetry to light at least three cigarettes, I owe it all to Moscow, Russian literature and my friends and teachers."

The trip from Makhachkala to Tsada is not easy. Narrow mountain roads skirt bottomless canyons. At some points there is not enough room for two cars to pass. The trip takes about 10 hours, but Gamzatov has never managed to cover the distance in that time.

About three miles outside the *aul* people on horseback, on motorcycles and in cars are there to greet their famous countryman. And a noisy crowd waits for him in the village square. Old and young are eager to speak with him, listen to his poetry and, of course, ask him to their homes. No one announces his arrival, but people in the mountains quickly hear about it. This is a region where each piece of news flits across the peaks like a bird.

Several years ago the Daghestan mountains suffered a destructive earthquake. Gamzatov's house, like many others, was badly damaged, and he had to spend the night in an arbor nearby. But he was up at dawn and on his way. It was election time, and Gamzatov, a deputy to the USSR Supreme Soviet, was scheduled to report to the voters in Buinaksk.

The city was badly hit. People were salvaging their belongings from under the ruins, children wandered about, field kitchens were smoking, and trucks with building material, food and tents rumbled by. The weather got worse, a strong wind blew up, followed by a hailstorm; it was cold and depressing. But when we arrived at the stadium where Gamzatov was scheduled to appear, the stands were filled with thousands of people. Even on a day like this they had come to meet him, and he spoke with his usual passion. Everyone was wet to the skin, but no one wanted to leave and, at the audience's request, he recited his poetry afterward.

Rasul Gamzatov was awarded the Lenin Prize for his book of poetry *High Stars.* He was honored with the title People's Poet of the Republic. He is a deputy to the USSR Supreme Soviet, the highest organ of state power, and a member of its Presidium.

But he is still the same—charming, gay and full of life, a man of unaffected manners, completely loyal to his friends in the mountains, to his *aul* and his native Daghestan. Though 50 now, with graying temples, he is young as ever, and just as committed to life, love and truth as when he wrote his first poem.

Rasul Gamzatov wrote his first poems on the roof of this mountain home in Tsada. His father, the Avar people's poet Gamzat Tsadasa, was one of the village innovators. Left: At the Makhachkala Medical Institute. Opposite page, left to right: Celebrating Gamzatov's fiftieth birthday. The poet's books come out in huge editions. As of the turn of the year, the total printing was almost six million copies. They appear in translation in Yakutsk and Paris, Warsaw and Tashkent. The waterfall is in the mountain village of Cherkei.

THE PEOPLE ON THE

ROOF OF THE WORLD

On a physical map of the world the Pamirs are colored dark brown. A further look at the map shows that they rise more than 20,000 feet above sea level. Most of this mountain region in southeastern Central Asia is part of the Soviet Union. Here are located our highest peaks—Communism Peak, 24,590 feet, and Lenin Peak, 23,400 feet—and the Fedchenko Glacier, 44.2 miles long, the largest in the country. The Pamirs are distinguished for their rigorous climate; some 5,000 square miles of their area within Soviet borders is covered by ice. This mammoth natural accumulator of moisture supplies water to all the Central Asian republics.

The Pamirs were long unknown, though it was believed that they were populated by different tribes, the Scythians among them. The first mention of these mountains goes back to the seventh century. In the thirteenth century the famous Venetian traveler Marco Polo visited the area and left us the following testimony: "You reach what is reputed to be the highest place in the world. . . . You ride 12 days across this plain, which is called Pamir, and see neither dwelling nor grass. You must carry all your food with you. There are no birds because it is so high and cold. Because of the terrible cold, a fire does not burn as brightly and is not the same color as elsewhere, and food does not cook as well. . . ."

From then until the nineteenth century the Pamirs remained unexplored. Systematic studies of this region began in 1871, when it was visited by Alexei Fedchenko, a Russian traveler and famous explorer of Central Asia, who gathered the first precise data on the region.

The Soviet Pamirs comprise the Gorny Badakhshan Autonomous Region, which is a constituent part of the Tajik Soviet Socialist Republic in Central Asia. Here live over 100,000 people, mostly mountain-dwelling Tajiks and Kirghiz. Despite the severe natural conditions, the Pamirians do very well. High in the mountains they mine gold, copper, lead, iron ore and precious stones, graze sheep, goats and yaks, sow wheat and barley, and grow vegetables, melons and other fruits. Ecologists today are particularly interested in areas that are difficult to live in—alpine regions, deserts and the Arctic. Among other things, it has been established that the Pamirs and other isolated mountain regions serve as the world's initial suppliers of cultivated plants.

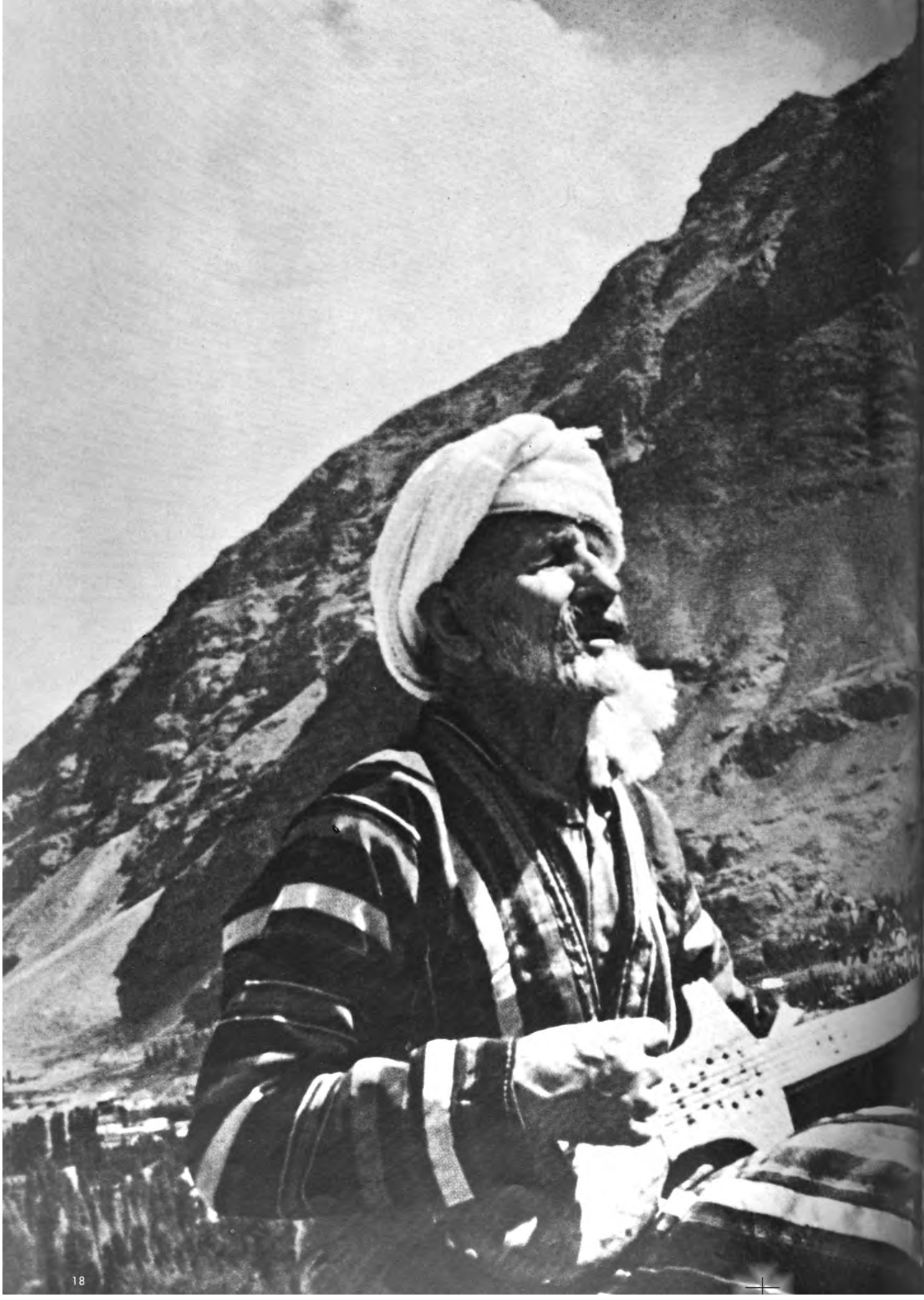
One of the most respected occupations in the Pamirs is that of driver. It's not enough to be a good driver here, you have to be an expert. Even the most modern roads in the area are subject to landslides, snowslides, blizzards and fog. Every 60 to 125 miles you see a sign featuring an exclamation point inside a triangle; that means "other dangers," of which there are no end here. Interestingly, drivers comprise the largest single category in the Tajik work force.

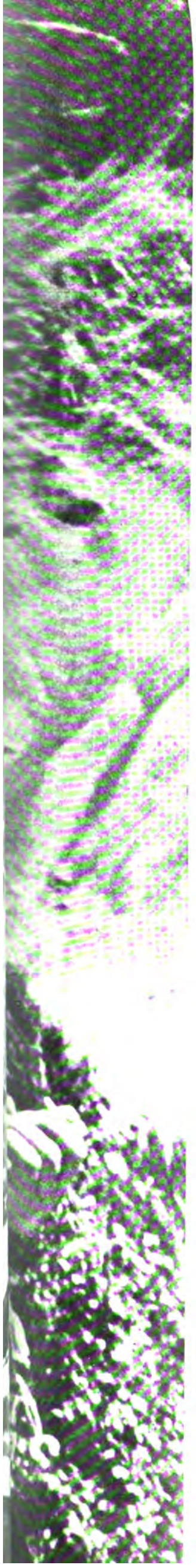
Airplane pilots also play an important role in the Pamirs. Much of the time, Pamirians depend on aviation for prompt medical care, for delivery of mail, even for the films they see. The airport in Khorog, capital of the Gorny Badakhshan Region, was built in 1929, and it has changed people's lives radically. Planes now leave twice a day from the Tajik capital, Dushanbe, for Khorog. The flight takes 42 minutes, but there are difficulties here too. The mountains distort radio signals, so that planes must be piloted visually. It is even more difficult for planes and helicopters servicing local lines that connect cities and settlements within the region. They frequently have to fly through narrow, winding corridors between huge cliffs, where thick fog, rain and snowfall lie in wait.

The construction of a huge power project has begun in Tajikistan on the Vakhsh River. Its dam will be more than 1,000 feet high. The first generating unit of the Nurek Hydroelectric Power Station began operating more than a year and a half ago, helping to further industrialize this region.

Besides driving cars and piloting planes along hazardous routes, boring tunnels through cliffs and building factories and plants, the Pamirians have performed small miracles in the way of cultural development. Carefully preserving their national traditions, they have mastered artistic forms and genres completely new to them. They have professional and folk theaters, adult education and music schools. Every fourth Pamirian is studying. The first doctors, teachers, agronomists, engineers and scientists in the area came there from Russia. Today this region has its own intelligentsia. More than 20 out of every 1,000 inhabitants have a higher education. About 20,000 pupils attend primary and secondary schools, and a considerable number go on to institutes and universities elsewhere in the country.

The airport in Khorog, the Pamirs, home of the Khorog Regional State Theater.





A THEATER BENEATH THE CLOUDS

By Larissa Makova

If your boots are warm, you need not fear the dimensions of the universe.

Pamir Saying

IN THE THEATER of the Pamirs I was told, not without a touch of reproach, that I was the first visitor from Moscow in years. The reproach was merely hinted at by these shrewd and tactful mountaineers. But it was there all the same, and obviously it was deserved. The road to the Pamirs is anything but smooth, as both the natives and the many visitors who have tried, and failed, to get there know. I, too, was warned that I'd never reach the place. These gloomy forecasts were made as far back as Moscow.

My encounters in Dushanbe, capital of Tajikistan, enhanced the romantic mystery of my journey even more. Most of the people I talked with had never been in the Pamirs, whose snowcaps can be seen from all parts of the republic. They also thought my trip visionary and had plenty to say about how impossible it was.

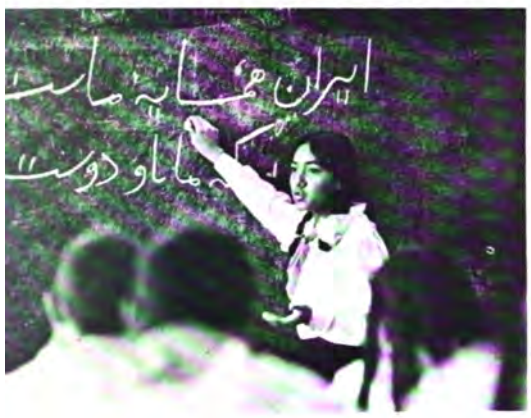
Their tales only made Khorog, capital of the Gorny Badakhshan Autonomous Region (where the USSR section of the Pamirs is located), more inviting and desirable. However, reality did justify the gloomiest prophecies. The city nestles high among the snowy summits. Before my arrival in Dushanbe, planes had not been flying to Khorog for two weeks. But the next morning I inquired—not too hopefully—at the airport whether a flight was available and heard the magic words: "It is." Still unbelieving, I found myself in the comfortable cabin of a Yak-40, whisked high above the peaks of the Pamirs.

The white summits and malachite-green veins of rivers beneath, and my brightly bedecked fellow passengers, were a splendid prelude to my acquaintance with the Pamir theater.

On the Frontier

Nowadays it's fashionable to determine a theater's status from the name of the street it is on. But I'm afraid the name of the street in Khorog says very little to the reader.

Top to bottom: The Nurek hydroelectric project and the station's control panel. Her name is Zarugul, which means Golden Flower. The Golden Cockerel Kindergarten in Nurek. Left: Muradali Safoyev makes Tajik musical instruments.



Imagine a gorge the width of an avenue, lined not by skyscrapers but by rocky brown inclines topped with snow. Down the middle, instead of a painted line, runs a rollicking, foaming river, the Gunt. The theater stands on its bank. On both sides of the river, between the sheer cliffs, lies the entire capital of the Pamirs. It lies in a partly opened stone hand, as it were, and its residents joke that when it rains, you can cover all of Khorog with a small oilcloth and keep the city dry. It is a loving joke, because they are very fond of this city which has risen in a mountain valley, vulnerable and irresistible as tender blades of grass pushing through cracks in the stone.

Four mountains surround Khorog. Three of them are Soviet, and they can be climbed by anyone who wants to test his legs and his stamina. The fourth is in Afghanistan. The frontier passes along the Pyandzh River, of which the Gunt is a tributary. They join right after the last houses of Khorog, and, when you leave town, you can ride along the Pyandzh for a long time, viewing both countries from your car window.

The Khorog Regional State Theater was founded in 1936, a merger of two amateur companies.

It now has a repertoire of more than 20 comedies, tragedies and musicals. Its chief treasures are the plays of Mirsa'id Mirshakar, one of the most popular writers of Tajikistan, himself a native of the Pamirs. They have been running for many years with invariable success. *The Golden Kishlak,* for example, has been a fixture since 1946.

One of the more notable productions of comparatively recent times is *We Hail from the Roof of the World,* written by the local playwright Gani Abdullo in 1964. Plays by dramatists of the other Soviet republics are also staged here. The classics have a special place: They include Ostrovsky's *The Girl Without a Dowry* and *The Innocent Culprits,* Schiller's *Intrigue and Love,* Goldoni's *Servant of Two Masters* and Molière's *Le Médecin malgré lui.* The Russian landowners, Germans, Italians and French all speak Tajik, and with a Pamir accent besides. But their troubles and joys agitate the audiences of this theater high in the mountains no less than those in any other part of the world. With the difference, perhaps, that emotions are expressed far more stormily here.

The residents of the Pamirs look more like Europeans than their neighbors down on the Tajik plains. Light-skinned, blue-eyed and gray-eyed, they resemble the natives of the Volga or Danube regions. But there are also a number of Oriental-

Top to bottom: Growing barley in the Eastern Pamirs. Persian language lesson in a Tajik school. Outdoor art class. The cocoon shop of the silk mill in Dushanbe. Right: A traditional dance. The Pamirians have also mastered art forms completely new to them.

looking people, swarthy and black-haired, with dark glinting eyes. The whole long history of the Pamirs is reflected in this ethnic mixture. Some millenniums ago, the restless Scythians reached this area. Then Tajiks climbed up from the valleys in the north and Persians from the south. At the cost of thousands of his soldiers, who fell off the cliffs, froze on the glaciers and died of thirst in the mountain deserts, Alexander the Great led his troops here. Many of the men settled in the hills and intermarried with the hardy mountaineers.

Natural selection also influenced the present ethnic mix. Only the strong and brave survived. It took daring, titanic labor and an indomitable love of freedom to win out against the towering cliffs, the barren soil and the avalanches. When, finally, this small, proud nation emerged, it was able to inscribe many glorious victories in the annals of its history.

The people of the Pamirs overthrew Bactria, a state set up in Asia by the Greeks. They repulsed the invasion of Tamerlane and for many centuries staunchly resisted the introduction of Islam. Instead they continued to worship fire—a god far more real and useful in the chilly heights of the Pamirs than the entire catalogue of deities.

The fortress created by frozen summits reaching to the skies guaranteed relative independence from all the subsequent empires. This and their constant struggle for survival against the grim environment helped form a strong, clear-thinking people. And when the region finally joined the free commonwealth of socialist nations, its progress was amazing even against the background of the country's unprecedented general prosperity.

The little Gorny Badakhshan Region now leads the world in level of education. In proportion to its population, it has produced more university and technical school graduates than any other place on Earth. Even more gratifying, on finishing their studies in Dushanbe, Tashkent or Moscow, the people of the Pamirs return home. I spoke to a teacher born in the mountain village of Darmarakht. She told me that some 15 to 20 people from her *kishlak* (village) graduate from institutes each year. This in a community of about 300 families! She herself teaches in the nearby village of Vonkalu.

"I can't see why they haven't trained their own personnel," she exclaimed with genuine, though somewhat rhetorical, indignation. "In our village we have specialists of all kinds, but Vonkalu keeps asking for experts from outside."

From what she said, I could see that there was a kind of mutually beneficial competition among the villages.

The people of the Pamirs have broken other records as well. For instance, the residents of Murgab are known as the most active subscribers to periodicals: 150 newspapers and magazines per 100 persons.

No wonder they are such enthusiastic theatergoers! To cite a few figures, as many as 71,000 people see the shows of the Khorog Theater annually—this in a region whose population is 100,000, including infants and the swarms of little boys and girls who cluster around when you walk down a village street.

High in the Mountains

It should be remembered that approximately half the audiences of the Khorog Theater have never been . . . inside it. They view the performances against the background of the most genuine and splendid scenery on Earth—snowy sumits, banks of frothy rivers, golden bowls of sandy valleys. The Khorog Theater has been to every part of the Pamirs. These tours are anything but easy. I traveled more than 600 miles along the roads of the Pamirs and know what these mountains are like. Dizzy heights from 5,000 to 16,000 feet, and shifts of pressure that make the unaccustomed faint. Endless sharp turns, when the front wheels of the car hang over an abyss and, with a sense of your own frailty, with supplication and awe, you gaze at the experienced drivers as at a god, a ruler of destinies. You undergo all the seasonal changes, experience searing heat and frost in a single day.

The roads in the Pamirs are a long ordeal of pits and bumps that toss you from one side of the car to the other, until you feel that not a single bone in your body is intact. Nor is the reason human negligence. The roads are being repaired all the time, but instead of submitting, the intractable Pamirs keep mutilating them with new landslides, floods, snow avalanches and even earthquakes. The mountains are always in movement, rearing up in formidable rocky folds that make it hard to keep the thin ribbon of road intact.

The roads of the Pamirs spell the unknown, and at the teahouses, where drivers rest, councils of war invariably form. These teahouses are few and far between, about one every 60 miles, and when the drivers meet there, they ask each other what the weather is like ahead, what the road is like, if there are any landslides. The information may be calming or frightening, but no matter what it is, they have to go on. Before gripping their wheels again, they will rest for a few moments in silent thought, warming their chilled fingers against the tea bowls. Their fixed eyes seem bottomless and unreachable: the narrow, glinting eyes of the Kirghiz, the inquisitive dark pupils of the Uzbek or the blue eyes of the Pamir dweller. There is something similar in their expressions—the thousands of miles of mountain roads have created a kinship whose sign is the look of fatigue, of knowledgeable pensiveness and the determination to surmount the heights ahead.

Everything is transported over the roads of the Pamirs: flour and coal, groceries and clothes, wines and fruit, books and schoolbags. Nobody is surprised that this freight turnover includes theatrical properties. The theater has become an integral part of people's lives. It is awaited with impatience, and each village welcomes the actors warmly. It is for these meetings that the cast valiantly surmounts heights, bumps and howling wind.

On tours there are other difficulties, too, of a purely esthetic nature. The performances sometimes threaten to turn into a kind of artistic tournament. The people of the Pamirs are very talented. They say that there is no home in the mountains without its singer or dancer. Therefore the exchanges between performer and spectator take peculiar forms here. After a professional dancer has finished her act, a mountain girl may rise from the audience and do the same dance in her own way, or a local virtuoso might begin playing the *rhubob,* producing an improvisation that would astound any music critic. But if this audience gives you an ovation, you may be sure you have the approval of real connoisseurs.

To their credit, the performers do their best to encourage as many "rivals" as possible. They organize amateur drama groups and devote a good deal of their time to them.

But even in this they must fight the austere Pamirs. For this year's republic festival of amateur performing arts Khorog prepared a large and varied program. After the first group flew off to Dushanbe, however, the second, waiting at the airport, was told that flights had been canceled because of bad weather. They were held up that day and for many days thereafter, and friends reported that the Pamirs had never known so many tears of despair.

It is easy to appreciate the pain felt by those artistic hearts. After spending a whole year preparing their program, they could not perform because of the rain clouds filling the canyons below. But the first plane that managed to get through to Dushanbe brought so many talented Khorog residents that the mountain city won first place at the festival anyway.

I arrived in the Pamirs on a sunny day in spring. Taking advantage of the first warm weather, the housewives had hung out their things to air. Even so prosaic an undertaking here assumes the stature of art. The carpets, quilts and covers embroidered in appliqué are so lovely that they could easily form a display at a Moscow museum.

Wandering enchanted from one yard to another, I was pleased to find that I was not the only admiring onlooker. Squatting in one of the yards was a painter sketching the remarkable exhibition on the clothesline.

When I talk in Moscow about the hard life of the people in those chilly heights, I'm sometimes asked:

"Why do they live there? They can go down into the valleys where it's easier, can't they?"

I could counter such common sense with equally sensible and weighty arguments. I could speak of the priceless mineral resources of the Pamirs which have to be mined, about the economic significance of yak breeding and, lastly, about the love of country that binds people to their birthplace, to the land of their ancestors.

But the Pamir people's fidelity to the mountains arises from still another unquenchable and splendid human quality: the tenacity that will not allow them to submit to the heights, the restlessness of pioneers and trail blazers that they express so jocularly and daringly in the old saying about warm boots and the universe.

Courtesy of *Teatr*

HOW DOES THE INDUSTRIAL WORKER meet the requirements of today's scientific and technological revolution? What changes need to be made in the system of vocational training? How do we develop the intellectual and creative sides of the modern worker?

These questions and others like it are widely discussed in the Soviet press, over radio and television, at conferences and congresses. The total number of workers in the USSR now exceeds 65 million. Let us examine some of the relevant comments in the Soviet press.

The **Ekonomicheskaya Gazeta,** a weekly newspaper, notes:

"At those of our enterprises which have been comprehensively mechanized and automated, the number of workers doing simple operations has been reduced from 80-85 to 20-25 per cent, while that of workers doing complicated operations has increased: from 5-6 to 40 per cent for adjusters, from 1-2 to 8-10 per cent for electricians, and from 5 to 25 per cent for repairmen. It means that the scientific and technical revolution and automation, in particular, is making for a new qualitative advance in the development of working people. With their qualifications raised to a new level, they become effective partners in the creative process. At the Moscow Komsomol auto plant, for example, the proportion of innovators among adjusters is twice as great as among other groups of workers—35 and 18 per cent respectively."

Between 1950 and 1971 the number of innovative suggestions made by benchworkers in the course of a year went up from 555,000 to 3,709,000, and the number of suggestions used increased from 455,000 to 3,478,000. Quoting these figures, the newspaper **Sotsialisticheskaya Industriya** notes that this impressive growth of creative initiative among working people is the result both of over-all intellectual development and of higher vocational standards.

Academician Ivan I. Artobolevsky writes in **Pravda:**

"I met Leonid Potapovich, a planing machine operator at the Minsk automated line plant, several years ago. And every time I talk to him or listen to him talk to workers, I admire his wide cultural interests. His fine general background helped him perfect his vocational skills. His breadth of knowledge and rich vocabulary make his conversation very interesting.

"I met quite a few people like Potapovich among our workers. Discuss painting with him or hear his well-considered views of art and you think he is an artist or art critic."

Technical progress is bringing changes for women workers too. The journal **Vestnik Statistiki,** basing itself on figures for 1955-1972, writes:

"Substantial changes are taking place in the vocational competence and composition of women workers. More and more women are in skilled jobs. Integrated mechanization and automation are giving rise to new trades (for example, equipment operators and automatic machinery adjusters) and producing qualitative changes in traditional trades (electrical-assembly fitters, automatic machine-tool operators). In all these groups the number of women workers is growing faster than the number of men. This is also confirmed by figures on the increasing proportion of women in trades involving mechanized and automated work, especially in trades related to the supervision and control of machines and plant. A distinctive feature of most of these jobs is the larger share of intellectual work in the total working time."

On the whole, changes for women workers in industry resulting from the scientific and technical revolution are progressive, both economically and socially, concludes the journal.

The onward march of progress brings its problems. The journal **Kommunist,** the theoretical and political organ of the CPSU Central Committee, writes:

"At present 66 per cent of Soviet workers have a secondary (complete or incomplete) or even a higher education. This, of course, is one of the great achievements of our social system. But it must be a source of concern to us that 34 per cent of our workers still have only a primary education and even less. With the most advanced equipment and technology being used in industry on an increasing scale and with automation, the worker's labor more and more approximates the engineer's in intellectual content. This level of professional skill can be mastered by the workers in a real way only if they have a sufficient background of general education."

The journal goes on to say that the present system of vocational schools has been in effect for dozens of years and has earned a good reputation. Today, however, it needs improvement. In particular, "It is urgent that we have more young people enrolled in so-called secondary vocational schools where training for a specific trade is combined with the 10-year general education curriculum." (Graduates of conventional vocational schools get an eight-year general education.)

The journal **Voprosy Ekonomiki** (a USSR Academy of Sciences publication) also deals with vocational training:

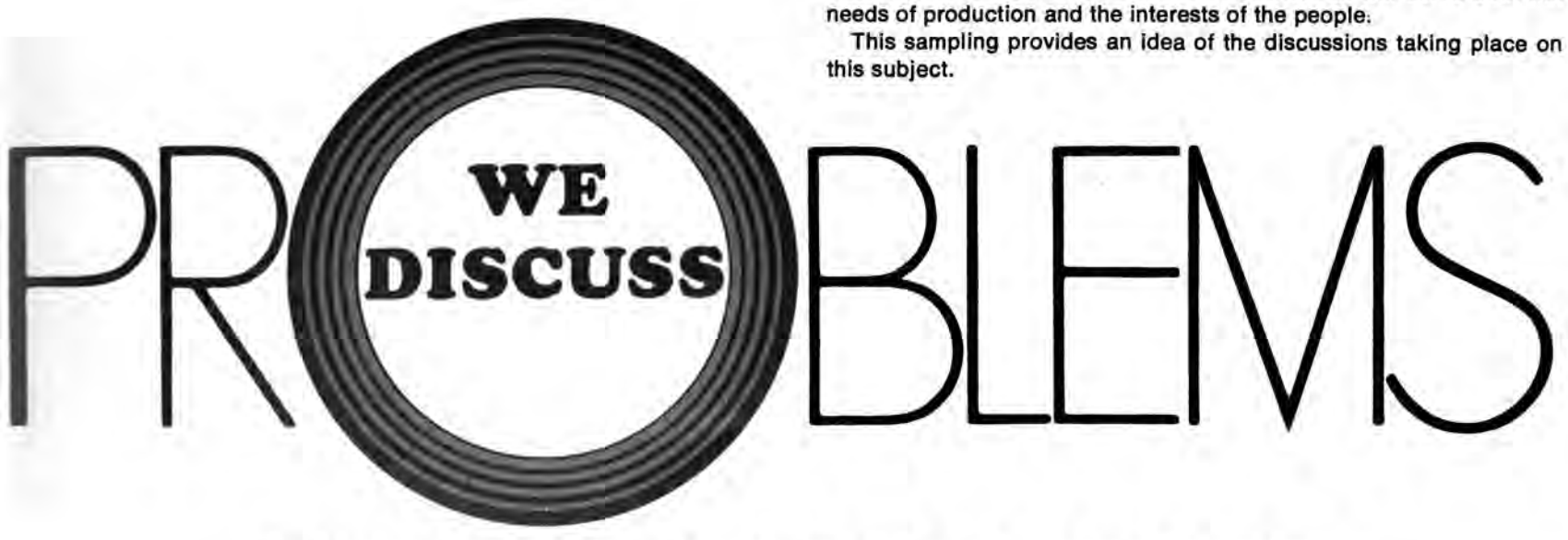
"To accelerate scientific and technical progress, it is vital that we have a better ratio between the various forms of vocational training. Now 75 to 80 per cent of the workers in the most numerous trades are trained right at the factories, and training periods do not exceed six months. Enterprises train workers in narrow fields and specialties to meet their current needs, while technical progress increasingly demands proficiency in broader areas. We must give more emphasis to the development of worker training in vocational schools of a higher type which provide, in addition to a specialty, a complete secondary general education as well."

Georgi Kulagin, director of a large machine-tool plant in Leningrad, contributes a long polemic article in **Trud,** central organ of the Soviet trade unions. "The country," he says, "despite considerable growth in labor productivity due to technical progress, is still short of manpower. One of the reasons is the general notion that vocations are divided into the creative and noncreative. Naturally, workers' trades are included in the second category. We must break down this very wrong subdivision of human knowledge. I, for one, am certain that Valentin Galochkin, a talented worker, an electrician in one of our shops, who can easily follow the intricacies of any complicated electric circuit and get a troublesome machine operating smoothly, is undoubtedly more creative than some designer who does not know his business well enough to make accurate drawings."

In the opinion of the writer, organizational efforts are needed to raise the prestige of workers' trades. In particular, he feels that some of the technical schools (there is a network of them throughout the country) should be merged with vocational schools and switch over to training highly skilled workers. He also suggests the stepped-up development of a higher type of vocational school and a sharp rise in the enrollment of graduates of eight-year general education schools. As the writer sees it, this should be done even if it means a reduction in the number of 10-year general education schools.

Millions of workers, engineers and scientists are involved in searching for the best solutions to the problems raised by the scientific and technical revolution. The solutions they arrive at will serve both the needs of production and the interests of the people.

This sampling provides an idea of the discussions taking place on this subject.



THE MODERN WORKER

ASTRONAUTS SEE FLASHES OF LIGHT

By Grant Demirchoglyan
Doctor of Science (Biology)

Drawing by Boris Sopin

Biophysicist Grant Demirchoglyan is a graduate of the physics department of Moscow University. His field of research is visual receptivity. He is presently director of the Laboratory for Visual Receptivity of the Armenian Academy of Sciences.

ACTUALLY, we should start with Wilhelm Roentgen and his X-rays. Physicists who studied X-rays noticed that they produced certain visual effects similar to hallucinations. When the atomic era began and nuclear research found extensive practical application, experts in radiation medicine wanted to know whether there was a sense organ in the human body capable of perceiving radiation.

The answer to this question seemed to be negative. People subjected to large doses of radiation reported during examination that they had felt nothing at the time. Some radiologists, however, claimed that evolution would eventually give man a more or less developed radiation sensitivity.

This evolution has been accelerated by the technical progress that put human beings into space.

During the flight of Apollo 11, Edwin Aldrin noticed strange flashes of light. They were so unexpected that he found it difficult to tell his comrades Neil Armstrong and Michael Collins about the apparent hallucinations. But the others reported having experienced similar sensations, thus confirming their reality. The strange phenomena were discussed with leading scientists, and observation of these flashes was included in all space flight programs.

Flashes in the eyes of astronauts have appeared fairly regularly. They are, it is thought, most probably caused by cosmic rays that penetrate the cabin walls and enter the eye tissues at the rate of approximately one, or sometimes two, flashes per minute. Here I should offer an explanation so as not to mislead our readers. There are, in fact, no flashes of light as such. The astronauts often observe this phenomenon sitting in their cabins in semidarkness with their eyes closed. Visual impressions that are not actually caused by light are called phosphenes. You can experience them by closing your eyes and pressing your eyeballs near the nose with your fingers. As a rule, phosphenes are observed in the darkness or when the eyes are fixed on the same colored background for a long time. Depending on their origin, the phosphenes are identified as mechanical (caused by mechanical stimulation), electrophosphenes and radiophosphenes (caused by electric and radiation stimulation respectively), and finally as cosmophosphenes (caused by cosmic radiation).

Nikolai Rukavishnikov is the only Soviet astronaut who saw luminous visions during the flight of the Soyuz 10 spacecraft. The singularity of this phenomenon is explained by the fact that the flight paths of the Apollo and Soyuz took them through two different areas with different radiation regimes. In circumterrestrial space, the dose of radiation from galactic sources is reduced considerably by the shielding effect of the Earth and its magnetic field. In interplanetary space, the radiation power is approximately 50 millirads per day. Moreover, at sea level cosmic radiation consists almost entirely of singly charged particles such as ions, electrons and protons, while beyond the atmosphere it includes a variety of multicharged particles, from hydrogen and helium to nitrogen, oxygen, carbon and even iron. The main reason for the dissimilarity of the observations made by the Soviet and American astronauts is the different radiation regimes experienced during circumterrestrial and lunar space flights. The astronauts were given special instructions, and their observations yielded the first quantitative data. They described three types of luminous impressions: starlike, bandlike and cloudlike flashes. Their observations also indicate that these sensations do not require complete adaptation to darkness.

After collecting the necessary statistical data and carrying out experiments with ac-

celerators on Earth, scientists offered several hypotheses.

One of them regards the astronaut's eye as a biological counter capable of recording Cerenkov luminescence, an effect caused by the passing of a charged particle through a given medium at a speed greater than the velocity of light in that medium. In this case, the substance is the hyaloid membrane of the eye.

Another hypothesis attributes the appearance of luminous impressions to the interaction between the ophthalmic medium and cosmic radiation.

Analyzing the work done by scientists in different countries and, particularly, that done in our laboratory, we can attempt an evaluation of these hypotheses.

The hypothesis which has the astronauts observing Cerenkov luminescence is as fascinating as the phenomenon itself. However, there are many facts that contradict this assumption.

Scientists are aware that Cerenkov radiation has a very short period of luminescence. Actually, luminescence appears with the penetration of the particle into the medium and disappears almost immediately after the particle has left it. It must be added that the perception of light is reduced by 50 per cent if the eye is not fixed on the point of its appearance, that since the luminescence is located primarily in the blue and ultraviolet parts of the spectrum, it can be perceived only in adequate darkness, and that the duration of Cerenkov luminescence is equal to 2×10^{-10} sec. All this clearly indicates that the probability of recording a similar flash is exceedingly low. Furthermore, it is known that our perception of light stimuli which are stationary with respect to the retina is extremely poor, and Cerenkov luminescence is in this category. Finally, the astronauts did not observe the phosphenes in complete darkness, so that another condition required for registering Cerenkov luminescence was absent.

All these facts cast doubt on this hypothesis, despite its attractiveness. There is still another consideration that makes the hypothesis questionable: Cerenkov luminescence occurs not only in the eyes but in other tissues as well. Consequently, natural radiation may cause the appearance of so-called proper luminescence, which should be fairly visible in the darkness. However, the astronauts never registered any luminescence of their hands or other parts of the body.

To analyze the possible effects of primary cosmic radiation on the retina of the astronauts' eyes, it is first of all necessary to determine whether these effects are reversible or irreversible. This is essential for an estimate of the potential hazards of space flight. The effect of heavy cosmic particles may lead to reversible changes in the ophthalmic media, for example, in the case of Cerenkov radiation, which does not alter the structure of the eye or cause irreversible damage to the retina as a result of direct effects of radiation, such as ions of extremely high density.

We believe the most likely cause of the luminous impressions experienced by the astronauts is direct excitation of the retina and the detrimental effect of radiation on it.

The study of this complex phenomenon is of tremendous practical importance. The fact is that traces of heavy charged particles have been found in the helmets of the American astronauts who piloted the Apollo spacecraft. This clearly indicates that the problem requires thorough investigation. The luminous impressions experienced by the astronauts are a warning that the cosmos is still full of mysteries, whose solution can be hastened by the cooperation of scientists of different countries of the world in the interests of all mankind.

DOWN ON THE

Nikolai Simonov (center), 1973 harvest champion.

He can run and service almost any kind of farm machine.

From the age of 12 on Nikolai helped his father on the grain harvester during summer vacations. That introduction to farm machines decided his choice of career:
After finishing secondary school, he entered a vocational training school and in two years was certified as an operator of any farm machine—a tractor, grain harvester, sower or cultivator.

FARM

By Stanislav Sergeyev

FOR 24-YEAR-OLD Nikolai Simonov, a grain-harvester operator at the Rossiya Collective Farm, the 1973 harvest season was literally a threshing contest: Vladimir Kostin, a friend in the neighboring Vostok Collective Farm, had pledged to thresh 770 tons of grain from an area of 345 acres and challenged Nikolai to match the feat.

Every day harvesters drove hard across the fields under the hot Kuban sun. People worked until long after dark. Even the machines themselves seemed to stumble. But still smiling, Nikolai kept pushing the truck driver: "Keep going, Vasya, keep loading the grain. Plenty of time to make up for lost sleep in the winter."

But just at the peak of the harvest the combine broke down. The situation was serious; it looked as if several days of good weather would be lost. The collective farm chairman and a mechanic hurried out to the field, and the three worked on the machine until they got it started again.

It was a rough 25 days, but the upshot was that Nikolai harvested over 870 tons of grain. He's very proud of the red ribbon stretching across an entire wall of his home. The gold inscription says: "To the 1973 Harvest Champion."

The Kadukhin hamlet has been home to Nikolai all his life. He's moved only once—when he married and built a place of his own on the same street, about 300 feet from his father's house.

Nikolai's grandfather was a collective farm agronomist in the thirties. His father, Pyotr Simonov, after recovering from World War II wounds, was a tractor driver and grain-harvester operator for 25 years. His mother still works for the collective farm. Alexander, his older brother, is an engineer at a machine and tractor station. Only their sister Yelena, the youngest, was not inclined to take up the family vocation—she is a student at a teachers institute. But even she is planning to return to her native home when she graduates, to teach in the new school.

Nikolai was only 10 when he helped out at his first harvest. Like all the village children, he collected ears in the fields that the harvesters had missed. The job assigned to the youngsters may not have added significantly to the total harvest, but educationally it had great value—it was a practical lesson in respect for the farmer's labor.

From the age of 12 on Nikolai helped his father on the grain harvester during summer vacations. That introduction to farm machines decided his choice of career: Finishing secondary school, he entered a vocational training school and, after two years, was certified as an operator of any farm machine—a tractor, grain harvester, sower or cultivator. Seventeen-year-old Nikolai chose the harvester.

Four years later the Simonovs celebrated a wedding. In the good old Russian tradition a cake was broken above the heads of the bride and groom, and peasant wine was drunk to the health and happiness of Nikolai and Natasha. She's a local girl, in fact they were school chums.

The collective farm board helped the young couple build their own house, gave them a half-acre of land and provided the building materials. They built most of the house themselves, and the head of this family team was Natasha, who had made it her business shortly before to take courses in plastering and house painting.

The substantial white house has the look of a prosperous little farm, with geese cackling around it, ducks and chickens adding to the noise and the kitchen garden and orchard bursting with everything from corn to walnuts. But the principal family interest is two little daughters, Ira and Tanya, aged 3 and 1 respectively. Although the young parents put in a full day's work, the care of the children is no problem—they love the collective farm's nursery and kindergarten.

The family is doing well. When Nikolai picks up his accordion, he usually starts off with his favorite song: "Hello, Russian field, I'm a little ear of yours. . . ."

The collective farm kindergarten looks after the two Simonov children. The parents pick them up after work.

Soviet Agriculture Today and Tomorrow

By Victor Pannikov
Vice President, USSR Lenin Academy of Agricultural Sciences, Moscow

THE SOVIET UNION, covering an area of 8.65 million square miles, is the largest country in the world. This fact gives rise to an impression some people have that the land resources available for agriculture are also enormous.

NATURAL CONDITIONS

The truth of the matter is that some 57 per cent of the total expanse is in northern areas where farming, because of the climate, is almost impossible. Another 14 per cent of the land is in regions where there is plenty of heat but hardly any precipitation—desert and semidesert areas where only with the help of irrigation can farming be attempted (the southern part of Kazakhstan, Central Asia and parts of Transcaucasia).

Climatic conditions, therefore, reduce to 30 per cent the arable land of the whole country. And even that 30 per cent presents manifold problems. For example, the eastern area (regions east of the Volga, the southern part of the Ukraine, the greater part of Siberia and Kazakhstan) frequently suffers from drought, while in the west (Byelorussia, the Baltic republics and the northwestern part of the Russian Federation) large sections are waterlogged or have too much precipitation.

Our farming conditions are, over-all, less favorable than those in many other countries, in particular the West European countries and the United States. In the opinion of experts, U.S. farm regions are 2.7 times more productive than those in the USSR because of the greater warmth and moisture.

Only 1.1 per cent of the Soviet Union's arable land is in districts with an annual precipitation of 27 or more inches, as compared with more than 60 per cent in the United States. Arid regions with an annual precipitation of less than 15 inches make up 40 per cent of the arable land in the USSR, as compared with only 11 per cent in the United States. In the past half-century the Soviet Union's main farm regions have been hit by drought 23 times.

Another important factor: Throughout our country's agricultural territory livestock is stabled an average 220 days a year—that is, 60 per cent of the time. This means having to stock large quantities of fodder.

Comparatively speaking, then, more labor and more funds must be expended for farm production in the USSR than in countries where the climate is more amenable to farming.

ROAD TO SUCCESS

Comprehensive long-term farm development was undertaken, especially after 1965, to control the natural factors and achieve a high and stable yield.

The effects of this program were felt especially in 1973, when the country harvested its biggest grain crop ever—245 million tons. The 1973 sugar beet crop came to 90 million tons, cotton, 8.2 million. Our country moved to first place in the world in raw cotton yield and

gross harvest, and in the total gross sugar beet harvest. Other branches of collective and state farm production also did well in 1973, evidence that our agriculture is on the upswing.

It was not too far back when our farming suffered from serious deficiencies. These were analyzed in depth at the Plenums of the CPSU Central Committee in September 1953 and in March 1965.

These weaknesses arose from objective as well as subjective causes. We must not forget, above all, what enormous damage the nazi occupation did to our economy, agriculture included.

After the war the job we had was first to rebuild our industry as quickly as we could; we were in no position to allocate the funds, material and technical resources necessary to restore, let alone develop, our agriculture. Machines and fertilizers were in very short supply. As a result, the farm operation was on a comparatively low level. This, in addition to everything else, limited the possibilities for a higher return on the labor of collective and state farm workers. These were the objective reasons.

Purely subjective ones were also a significant part of the picture, especially during the 1959 to 1965 period, when our agriculture was actually marking time. In his speech at the March 1965 Plenum of the CPSU Central Committee, Leonid Brezhnev said: "One of the weak points in the guidance of agriculture is that the economic laws for the development of the socialist economy were not sufficiently taken into account; at times they were even ignored." During those years arbitrary decisions were resorted to, especially in such spheres as farm planning, price setting and financing. Purchase prices for a number of farm products, for example, were lower than their cost of production, so that the collective and state farms operated at a loss. The great tasks assigned agriculture did not have the support of strong enough economic measures: Specifically, the necessary capital was not invested, the material and technical equipment of the collective and state farms was too slow in coming; very little was done to raise the efficiency of crop production and animal husbandry; there was too much centralization.

After the March 1965 Plenum, these deficiencies were gradually corrected. The economic relationship of the state to the collective and state farms was considerably improved. There was more flexibility in the centralized planning of agricultural production as it was combined with the initiative and independence of the individual collective and state farms.

Economic levers were simplified. Collective farms were given a quota for only one basic crop, as against multiple-plan assignments required up to then by higher administrative bodies for selling to the state. This figure, incidentally, is entirely consistent with the farms' potential: It assesses the real state of affairs (the soil fertility of the given district and other conditions). Proceeding from this plan, which covers several years and is not to be revised during the specified period, a collective farm does its own planning. What surplus it produces over and above the fixed plan it can sell to the state at a bonus price—50 per cent higher than the plan price. This gives the farms an incentive to boost production. Working with agronomists, collective farmers are utilizing the resources of their land and their equipment to better advantage.

GREATER ATTENTION TO THE FIELDS

Today the principal field jobs on collective and state farms are almost completely mechanized. All the plowing and sowing of grain, cotton and sugar beet crops and the harvesting of grain and silo crops have been mechanized. Potato planting is 91 per cent mechanized. Combines handle almost 84 per cent of the corn crop and 78 per cent of the sugar beets. Potato harvesting is 79 per cent mechanized and hay mowing 88 per cent.

The farms are getting tractors with more horsepower and the latest models of other equipment. A greater number of machines are being produced that operate more efficiently and at higher speeds. We have not yet, however, met the optimal requirements of our farms for tractors and other machines. The mechanization of livestock sections is especially slow. In short, our farm machine industry still has a big job to do. It should be borne in mind, at the same time, that both our collective and state farms cultivate very large tracts, thereby making better use of powerful modern machines, so we do not need as many machines as Western countries do; estimates of our requirements made by foreign specialists are generally overstated.

The main goal of the Ninth Five-Year Plan (1971-1975) for agriculture is to increase average annual gross output to 98 billion rubles from the 80.5 billion of the preceding five-year period (a 21.7 per cent increase). According to the plan large-scale capital investments and a considerable increase in the supply of machines and fertilizers are being made.

We hope for a sharp rise in crop yields. That in turn will make for significant development in animal husbandry. Milk, meat, egg and wool production, for example, is being streamlined by the introduction of big complexes of an industrial type to fatten cattle, pigs and poultry, as well as for dairy cattle management. During the ninth five-year period labor productivity in agriculture is expected to increase by 38 per cent and the power supply per worker by 60 per cent.

A steady supply of crop and livestock products will meet the requirements of the consumer for foodstuffs and of light industry for raw materials and still ensure a surplus for export.

As early as 1973 our farms had reached the projected 1975 level for some of the most important crops. During that year we not only met the plan figures but also made up the deficiency in farm produce resulting from the 1972 crop failure.

A word on the 1972 situation—it was the worst in the last hundred years. Bad weather was responsible. A snowless winter and summer drought produced damaged crops on considerable acreage. To make matters worse, bad weather during the harvest season threatened to ruin the good crops we had. But with excellent organization by the collective and state farms and help from the state and the towns, the crop was harvested without losses despite very difficult conditions. Some 185 million tons of grain were gathered in 1972.

So, although our farms suffered from a crop failure that year, we managed to raise enough to provide a normal food supply for our entire population.

THE PURCHASE OF GRAIN ABROAD

Nevertheless, we had to buy a certain amount of grain from other countries, the USA included. Western papers and magazines made much of the fact that the Soviet Union had to import grain—czarist Russia had always exported cereals. Let us take a careful look at this statement. In the first place, grain export in Russia before the 1917 Revolution was, in actuality, evidence of the country's industrial backwardness, not a sign of progress. Before the Revolution, even during the best periods (1908-1913), Russia's per capita grain production was 2.5 times lower than in the USA and 15 per cent lower than in Germany. Despite this poor record, Russia exported more than 14 per cent of its gross grain harvest, while the USA exported only five per cent. Germany imported Russian grain to fatten pigs and ensure its ham production; at the same time Russia's peasantry and working class were condemned to a vegetarian diet and to malnutrition and frequently went hungry. To put it plainly, czarist Russia's grain exports were, in fact, a calamity for its working population.

In 1913 Russia's per capita gross grain harvest amounted to 758 pounds, and it exported 17 per cent of its total cereal production. In 1972 the USSR produced 1,482 pounds of grain per capita and in 1973, 1,878 pounds. Still, we bought grain in other countries, contracted earlier to ensure our normal level of food and fodder, regardless of fluctuations in the yield.

Our nutrition pattern has improved considerably in recent years. The Soviet citizen's diet includes more meat, milk, eggs and fruit. Approximately half the gross grain harvest is used as fodder to develop our animal husbandry. As compared with the period before the Revolution (for instance, 1913), our per capita consumption of highly nutritious products has markedly increased: meat and meat products, almost double; milk and dairy products, 2.2 times; eggs, almost four times; sugar, more than five times; vegetables and melon crops, 2.6 times. Consumption of bread and potatoes has dropped. The per capita daily ration in the USSR is now 3,000 to 3,200 calories. Variety of foods provides for a normal ratio of proteins, fats, carbohydrates, vitamins and minerals. The Soviet Union today is one of the countries with the best-nourished population.

FARMS HAVE PROVED THEIR VALUE

All these changes are the product of socialism. The collective farm system took shape during the lifetime of my generation. On the basis of my own experience I can compare the life in the old and new village. I still remember my childhood and my native village. I remember my father telling me how often hunger visited us before the Revolution. Most of the peasants had small plots but no means to cultivate them properly. Naturally yields were low. To save the family from starvation, my father had to hire himself out as a farm hand to the landowner or a rich peasant.

The collective farm system, a voluntary arrangement, brought the peasants a new life, free from exploitation, poverty and perpetual insecurity. With socialism, everything in our village changed. The young people know hunger only from books and films. The collective farmers today are the masters of their land and of their lives. They elect their own leaders. When collective farm executives do not measure up, the farmers choose better people to replace them.

There is no division into farmers and farm hands on a collective. The personal interests of the individual farmers are the same as the interests of the farm, and the interests of the farm are the same as those of the state.

These large socialist enterprises make possible modern farming, new machinery, up-to-the-minute technology and the mass application of scientific findings.

Incomes of collective and state farm workers have been high in recent years. The difference in income level of farmers and industrial workers is narrowing every year. Collective farmers, like urban working people, are eligible for social insurance, pensions and related benefits. The collective farms assist their members in building homes. In the past 10 to 15 years many new houses have been built in our villages.

OF SUBSIDIARY FARMING

An additional source of income for a collective farmer is his personally owned plot, on which he raises vegetables, livestock and poultry. What is not consumed by the family is sold to the state or at the free collective farm market.

The Western press frequently exaggerates the share of this subsidiary farming in total output of farm produce in the USSR. It would appear, if certain Western papers are to be believed, that these subsidiary kitchen gardens are close to being the main suppliers of agricultural products. Absolutely not. The major output of all types of farm produce comes from the collective and state farms. For instance, state purchases from collective and state farms throughout the country in 1971 accounted for 100 per cent of all the grain, cotton, sugar beets and sunflowers produced,87 per cent of the potatoes, 94 per cent of the vegetables, 96 per cent of the milk, 87 per cent of the livestock and poultry, 90 per cent of the eggs and 85 per cent of the wool. One can easily see what an insignificant portion comes from subsidiary farming.

Finally, subsidiary farming does not constitute a private sector, the description foreign writers habitually use. In the first place, the land given to such farming, like the land of collective farms, belongs to the entire people and is not private property; a family receives a plot free of charge and in perpetuity. Secondly, there could be no subsidiary farming without a collective or state farm: The plot is cultivated with the farm machines, the collective farmer gets the fodder for his livestock and poultry from the collective farm; and so on.

It is interesting to note, in this connection, that subsidiary farming is a temporary measure. When the collective farms meet all the foodstuff requirements of their members from their own resources, subsidiary farming will be outmoded. It will disappear, not for administrative, but for economic, reasons. Even today there are any number of collective farms whose members do no farming on their own since the farm supplies all the produce they need.

In a nutshell, the vitality of the collective farm system has stood the test of time. It has proven to be the most profitable type of farming, both for the state and for the farmer himself.

Despite the accomplishments and changes, we are well aware that our farm problems are far from solved. To accelerate the rate of growth of agricultural production, as was pointed out at the July 1970 CPSU Central Committee Plenum, we first have to end the shortage of farm machinery, transportation facilities and mineral fertilizer.

No less important is the job of expanding land reclamation in order to reduce the areas that have unreliable farming conditions. The findings of science and technology, as well as of practical experience, must be more speedily applied to farm practice.

All the problems will be solved in the relatively near future. The scale of our farming is large enough to guarantee everyone a nutritious diet, to meet all the requirements of industry for agricultural raw materials and to reserve for export.

Agricultural production, on much the same areas of arable land as are used today, will double in the coming 15 years as a result of the comprehensive application of scientific and technological findings. In the same period the number of workers will be reduced by 50 per cent, with labor productivity increasing fourfold. Nor will a reduction in the number of people working in agriculture bring unemployment; under socialist conditions there will be a simultaneous need for more workers in industry and in the service areas.

By 1985, 23 per cent of the total arable land will be irrigated and drained, and sometime after 1990 this figure will increase to 37 per cent. To put it another way—some two-thirds of the arable land in sections with the most unreliable farming conditions will become guaranteed high-yield areas. These fields will be the first to get mineral fertilizers in optimally prescribed quantities and with the maximum combination of nutrients. As a result of reclamation, chemicals and the introduction of new high-yield varieties of basic crops, the crop will increase two to three times. This will serve as the base for meeting all our agricultural goals.

American School Ar

By Marina Khachaturova

Veronika Sukayan (left), 15, was most attracted to the mixed media. Ira Bobrikova was impressed by the Americans' originality. Below: Seryozha Prisekin also commented on the "distinctiveness" he found.

IN NOVEMBER of last year Moscow Friendship House held an exhibit of works by 30-odd students of Lincoln High School in Manitowoc, Wisconsin. The 16- and 17-year-olds, not necessarily art majors, themselves selected 55 pieces which had been done in their regular class hours.

The show aroused considerable interest—we rarely see drawings by American teenagers—particularly among "professionals." I put the word in quotes because I'm talking about not just Soviet professional artists but art students as well. Thirty of them, 13 to 16 years old, visited the exhibit with two of their teachers, Natalya Tuchina and Konstantin Molchanov. Their institution is a preparatory school for the Surikov Institute of the USSR Academy of Arts—one of the Soviet Union's largest higher art schools. Along with general education subjects students take courses in all fields of the fine arts.

After seeing the show, they gave me their reactions.

Katya Sokolova, 16: I like the diversity of technique. The color in many works is beautiful; for instance, Cindy Hack's linoleum print *The Butterfly*. However, I thought some needed more development.

Lena Patlazhanova, 16: Judging them purely esthetically, I can say I like many of the works. But most of all the industrial graphic art interested me, like Dennis Schultz's cover design and Julie Shimek's silk-screen print.

Sasha Valdman, 16: The drawing seems on the weak side to me. The decorative and applied approach predominates. What I liked? John Dramm's purple vacuum-form plastic.

Veronika Sukayan, 15: They're very good, the different styles and media! There is so much variety. I was most attracted to the mixed media, like Marilyn Kummer's collage and pencil.

Seryozha Andriyaka, 15: Most interesting at the exhibition is the industrial graphic art. The water colors had less appeal for me; they are not expressive enough.

Anya Brakovskaya, 16: I found most beautiful the silk-screen prints by Claran Holschbach, Debbie Carstens and others.

Lena Anosova, 16: I'm glad to have been able to see this exposition; it's always interesting to learn something about another country, and art reflects both the times and the place. I personally liked Bill Mrotek's head most of all.

Polya Inokentyeva, 14: I like Joan Krueger's playing card queen very much. Generally it was the different techniques that intrigued me, in particular, the vacuum-form plastic.

Alyosha Begak, 13: I think the artists have a rich imagination. I liked the portraits most of all, especially those by Vicki Wotruba and Louis Mansilla.

Seryozha Prisekin, 14: The distinctiveness of the works, to my mind, is what's best about the exposition. There are many very good purely decorative works. But I particularly liked Sally Kocourek's light touch in her caricatures of people.

Nika Stenberg, 15: I was mostly attracted by the vacuum-form plastics and silk-screen prints. I liked Scott Martin's head.

Andrei Kazakov, 13: I liked Louis Mansilla's portrait most of all. In general I liked the portraits, particularly those done in mixed media.

Natasha Shutkina, 13: The

The favorites of Anya Brakovskaya (right) were silk-screen prints by Claran Holschbach, Debbie Carstens and other American students.

Nika Stenberg, like the other Soviet students, was attracted by the Americans' considerable variety of techniques.

Polya Inokentyeva thought that Joan Krueger's playing card queen was one of the show's most successful paintings.

Gennadi Provotorov commented that American art schools place less emphasis on drawing than their Soviet counterparts, and more on design.

Seryozha Andriyaka (right) liked the industrial graphic art but found the water colors not as good. He said they were not expressive enough.

Lena Anosova (left) felt the exhibit helped her get to know Americans better. Katya Sokolova thought some of the works needed more development.

Lena Patlazhanova (left) and Oksana Krivonogova (right) in the graphics section. Far left: Andrei Kazakov (left) and Alyosha Begak were interested in the portraits.

Natasha Shutkina's particular interest was the decorative arts, including collage and ornamental patterns.

most interesting thing here is collage and the designs and ornamental patterns.

Volodya Ananyev, 16: The more realistic works did not appeal to me—they are professionally weak. The designs are much better—the color is interesting.

Ira Bobrikova, 16: I'm impressed by the originality. Varied and mixed media can inspire good design.

Gennadi Provotorov, 15: It seems to me that the students in that school are taught different techniques, but they are not taught drawing. Designs and ornamental work of course are important, but realistic art is also needed.

Oksana Krivonogova, 16: Many of my classmates liked the color; I, for one, did not. Most interesting is the industrial graphic art. There are some works that are good enough to be published.

The teenagers said a great deal more, of course. I've just quoted the most important thing each had to say. The following conclusions pretty much sum up their discussion:

All pointed to the diversity of technique: On display were pencil drawings, silk-screen prints, water colors, etchings, linoleum prints, woodcuts, works in acrylic, vacuum-form plastic (which attracted particular attention), mixed media, photomontage and even a drawing in thread. Preferences divided along these lines: The boys were especially attracted to the portraits, the girls had an eye for beauty and decorative quality. Industrial graphic art won general approval.

Most popular were works by Louis Mansilla (portrait in collage), John Dramm (a vacuum-form plastic), Marilyn Kummer (a woman's head in mixed media), Julie Shimek (a silk-screen print) and Kathy Kelliher and Debbie Free (engraved ornamental patterns).

As Lena Anosova put it, one can't approach this exhibition with the same criteria we apply to the work of Moscow art school students. The point is that the guiding principles at the Moscow school are different. A great deal of attention is devoted to drawing—the fundamental of fundamentals—as well as to the traditional techniques—water color and oil. For that reason alone our teenagers found in the exhibited works an opportunity to compare the approaches of the Wisconsin students with

Volodya Ananyev (above right) was not impressed by the more realistic works. He preferred the designs, unlike Sasha Valdman (below), who said he found the drawing "weak."

QUERIES FROM READERS

QUESTION: There should be more on cafés to show that Soviet citizens really enjoy themselves. (E. Schwartz, Chicago, Illinois)

ANSWER: Cafés in our country are not privately owned. They are run by the state and prices are fixed. We have many types. Some are of the usual quick meal or soft drink variety, others have their own special flair and menu. On Vasilyevsky Island, in Leningrad, for instance, the Frigate Café, which traditionally caters to seamen and shipbuilders, offers a dinner menu of dishes favored by Peter the Great. Plates and cutlery, as well as the furniture, are replicas of those used in his time. In the Little Tub Bar, also in Leningrad, you can get smoked Caspian roach, boiled lobsters and small sausages. In Moscow's Russian Tea Café they serve tea from a samovar, with pirogen and pancakes.

The cafés in the various republics often have a national flavor, reflected in the architecture and interior décor, as well as in the local dishes. The Ukraine, Moldavia, and the Transcaucasian and Baltic republics are especially famous for such cafés.

Cafés also cater to specific age groups. You can find youth cafés everywhere in our country. They give the floor to amateur music groups, hold contests between musical companies and conduct discussions on a large variety of topics. Many towns have annual competitions for the "best youth café," scoring on the basis of menu, service and repertoire of the performing vocal and instrumental groups.

Children's cafés like Cheburashka are popular. Cheburashka, named for a favorite cartoon character, is in Kaluga, Central Russia. In Kaunas, Lithuania, children are very fond of the Pasaka (Fairy Tale). These children's cafés are fine for eating, playing and even reading. There are books and toys on the tables. The salads have intriguing names like Speckled Hen and Three Little Pigs, and milk cocktails are called Naughty Boy, Little Berry and Fairy Tale. Parents can leave their children there for a while; members of the staff play with them and tell them fairy tales. On Sundays puppet shows are given by schoolchildren.

A good many cafés have been opened—about 70 in Leningrad alone—in the past two years. You have your choice of a restaurant with fancy décor and prices or a plain café with the bill coming to 50 kopecks. You can spend an evening in a café listening to music, talking or playing chess. There are cafés in our country to suit every taste and mood.

QUESTION: I would like to read about Russian violinists, old and new. (J. Brown, Detroit, Michigan)

ANSWER: Ivan Khondashkin (1747-1804) founded the Russian school of the violin. A great virtuoso, he was the leading violinist in the court orchestra and taught the instrument at the Academy of Arts. He left numerous violin adaptations of Russian folk melodies.

The next important Russian violinist was Alexei Lvov (1798-1870). The string quartet he led was considered one of the best in Europe.

Then there were such outstanding violinists as Leopold Auer (1845-1930). He was not only a brilliant musician but a superb teacher. Auer's classes at the St. Petersburg Conservatory attracted musicians from many countries. His pupils included Lev Tseitlin (1881-1952), Miron Polyakin (1895-1941) and Jascha Heifetz.

Mikhail Erdenko (1886-1940) was a popular violinist whose playing was much admired by Leo Tolstoy.

Pyotr Stolyarsky (1871-1944) did much to develop violin study in Soviet times. It was on his initiative that the country's first 10-year music school was organized. It was named after him. The famed David Oistrakh was one of his students.

The school of another master—Abram Yampolsky (1890-1956)—produced the well-known Leonid Kogan.

Soviet violinists are esteemed abroad. Mikhail Sekler and Bogodar Kotorovich, for instance, were winners in the Niccolo Paganini International Violinists Competition in Italy (1972). Alexander Kramarov won first prize at the same competition in 1973. At the Jacques Thibaud International Competition in Paris in 1973 the first two grand prizes went to Rusudan Glasalia and Mikhail Kopelman.

QUESTION: How do Eskimos live in the Soviet Union? (Mr. Sauter, Upper Nyack, New York)

ANSWER: Eskimos in the Soviet Union live mainly on the shores of the Bering Sea, in the area between Dezhnev Cape and the Bay of Krest. This territory is part of the Chukchi National Area, Magadan Region, in the Russian Federation. Some live on Wrangel Island, in the Chukchi Sea, where they first came to settle with their families in 1926 at the invitation of Arctic explorer Georgi Ushakov. He helped them found a fishing settlement that later increased in size.

The Eskimos, like other small nationalities of Russia's Far North, led a primitive life before the Socialist Revolution. They were illiterate, had none of the benefits of civilization and were dying out. All this changed radically in Soviet times. The policy of equal rights for all nationalities, large and small, had a favorable effect on the life of the Eskimos.

Soviet trading posts were set up in the North. Here furs, pelts and skins were bought at fair prices from local trappers, including the Eskimos, and food, manufactured goods, fishing tackle, hunting gear and other necessities were sold at low prices.

The Eskimos formed collective farms and with the aid of state loans bought snow vehicles, whaleboats and speedboats. Their main occupations are still fishing and fur trapping. The animals found here include fox, polar fox, squirrel, ermine, otter and other precious fur animals.

Following the example of the Chukchi, the Eskimos began to breed reindeer. Some of these animals were brought to Wrangel Island for the first time in 1947. Now the herds grazing on the island's pasturelands number in the thousands.

The living conditions of the Eskimos have changed in these years. They live in houses, not in *yarangas* (tents made of animal skins) as before. Their settlements have boarding schools, hospitals, shops, houses of culture, movie theaters. Medical care and education are free, as they are for all Soviet citizens. There is also no charge for tuition and living expenses of children in boarding schools.

The Eskimo language is used in the first and second grades. A written language was created, and many books are published in it. Local radio studios in Magadan and Anadyr, capital of the Chukchi National Area, broadcast regular programs in Eskimo.

After graduating from secondary school, many Eskimos continue their studies at institutes and universities in cities of Siberia and the Far East, as well as in Moscow and Leningrad. Eskimos are now trained for occupations previously unknown to them. They are ship captains, mechanics, electricians, radio operators, teachers, doctors.

The Eskimos are traditionally fine bone carvers. The work of Vukvutagin and Khukhutan, Honored Artists of the Russian Federation, has won many gold medals at international exhibitions.

People in our country know the Eskimo songs and dances performed by the Chukotka Ethnographical Company, headed by Eskimo Alexandra Parina, Honored Cultural Worker of the Russian Federation. Parina is also the author of the lyrics for the company's songs.

QUESTION: Can you give me some information on Omsk? (P. L. Sladkoff, Belmont, California)

ANSWER: Omsk is situated in the middle reaches of the Irtysh River, which is a tributary of the Ob (Western Siberia).

Founded in 1716 as a fortress, it is one of the oldest cities in Siberia. In the second half of the eighteenth century suburbs grew up around it, and in 1782 Omsk acquired the status of town. When the Siberian railroad line reached Omsk in 1894, the town became a storage depot for goods brought to Siberia from the European part of Russia. At the beginning of the twentieth century Omsk already had plow, cloth, leather and brick factories and sawmills, and was a large Siberian trading center. Its exports included oil, livestock, wool and wheat.

Omsk today (population 900,000) is one of the country's largest industrial centers. It specializes in petrochemicals and machine building, makes auto tires, parts and components for tractors and farm machinery, as well as various types of fuel. Omsk's industrial development was accelerated by the recent drive to tap the very rich oil and gas regions of Western Siberia.

Omsk is a large cultural center, with automobile and highway, engineering, agricultural, medical and teachers institutes, among its other educational facilities. All told, there are 11 schools of higher education in Omsk; prior to the Revolution all of Siberia had only one. Omsk has 135 libraries; drama, musical comedy, children's and puppet theaters; a state philharmonic orchestra and a circus.

The natural setting of the city is very beautiful. There are black grouse, capercaillies, partridge and hare in the surrounding taiga. Bears have been seen frequently. Cedar nuts, mushrooms and berries are abundant. Pelts of local squirrels, kolinsky and ermine are much valued at international fur auctions. Siberian sturgeon caviar and white salmon *balyk* (smoked fillet) are famous all over the world.

The white ballroom.

TREASURES OF THE OLD KUSKOVO ESTATE

By Olga Baranova
Director of the Kuskovo Museum

Lady in a mask.

A vase from the Guryev service.

Maya Plisetskaya as Carmen by N.A. Malysheva, 1967. Dulyovo Porcelain Factory.

Pygmalion and Galatea by E.M.Falconet. Sèvres. 18th century.

Plate from the Egyptian service. Sèvres.

TREASURES OF KUSKOVO

KUSKOVO is a magnificent Russian estate some six miles from the old city limits of Moscow. It was built by the boyar Boris Sheremetyev, a favorite of Peter the Great, who presented him with the baton of a Field Marshal and several estates. Kuskovo was built more than 200 years ago. With his father's fabulous wealth, Boris' son Pyotr made it a luxurious summer residence whose beautiful architecture and richly decorated interiors dazzled his contemporaries.

In 1919 the Soviet Government declared Kuskovo a museum and its grounds and parks a wildlife sanctuary. It still has the flavor of the bygone epoch, a tribute to the skillful restorers.

The palace, the church and the wooden bell tower are usually equal elements in the main ensemble, a characteristic feature of eighteenth and early nineteenth century Russian architecture. The Kuskovo palace, however, is very much the main building, both for size and location. At first sight it appears to be built of stone. Its majestic porticoes with pediments are decorated with intricate carving typical of stone buildings of the period. Actually the palace is a wooden structure with whitestone ramps that allowed carriages to drive right up to the front entrance.

The interior is a carefully designed complex of state rooms and small chambers. The luxurious drawing rooms hung with the exquisite tapestries of the late eighteenth century Flemish masters, the music room with an old harpsichord and music stands evoke visions of the concerts and gala celebrations for which Kuskovo was famous.

Elegant carved furniture, gilt pier-glass tables, sparkling crystal chandeliers and wall lamps, Chinese porcelain [g]... the deep crimson silk of [t]... tapestries and upholstery [c]... ate the striking color sch... of the crimson drawing ro... Its walls are hung with the [g]... cial portraits of the Shere... yevs, most of them painted [b]... the talented serf artist [I]... Argunov. The exquisite w... carvings, including the su... pieces by Pavel Spol, a w... known Moscow woodcar... the carved wooden case of [t]... little organ (a musical inst... ment reminiscent of a ba... organ) show the artistic ta... of the Russian craftsmen. F... time to time the strains ... graceful melodies by Fre... composers who were ... popular in eighteenth cent... Russia break the silence of t... museum rooms.

The splendor of the pala... interior reaches its climax ... the white ballroom. It breat... an atmosphere of light, spa... air. The dominant colors a... white and gold. The ev... rhythm of the windows is r... peated by the apertures fill... with pier glass on the opp... site wall, which are the sa... size as the windows. The m... rors reflect the park and ma... the ballroom look even mo... spacious. The huge, elabora... ly designed ceiling portra... the Sheremetyevs as patro... of the arts emphasizes t... impression. The *plafond* w... painted by Louis Jean Franç... Lagrainer.

The artistic parquet of t... hall executed by the Russ... serf masters is worth spec... mention. The rhythmically r... peated circles of its merg... pattern seem to invite you ... dance.

The Big Stone Conservat... into which official recepti... and dinners usually overflow... leads out from the ballroo... along the main axis of the ... chitectural composition of t... Kuskovo ensemble. It is ...

A suite of rooms in the palace.

TREASURES OF KUSKOVO

A room in the Italian house.

A room in the Dutch house.

The crimson drawing room.

exact opposite of the palace—as striking for its simplicity as the palace is for its luxury. Its glass gallery is woven of light, air and sunshine. It was designed by Fyodor Argunov, a serf architect. He also created the most richly decorated building of the estate, the Grotto, around the underwater cave motif, Neptune's kingdom. The broad whitestone stairs leading from the landing stage of the pond invite you into the cool halls of the Grotto, whose walls and ceilings are decorated with an intricate pattern of pearl shell, stained glass and tufa, the work of Russian artists. The Grotto columns, broken into rectangles, give the building a rippling quality, imitating its reflection in the water of the adjoining pond.

The Kuskovo Museum is famous not only as a unique eighteenth century architectural and park ensemble but for its ceramics museum. It contains a superb collection of Russian and foreign porcelain, faience and glass, the only one of its kind in the Soviet Union.

The collection includes products from all of Russia's factories. Among them are the first figurines of the Imperial Porcelain Factory—the porcelain chess set, Chinese figurines, characters from the famous series "The Peoples of Russia," executed by Russian masters under the guidance of Jean Dominique Rachette, a well-known French sculptor who worked in Russia in the second half of the eighteenth century. The fine series "Handicraftsmen and Hawkers," which were, actually, the first Russian genre sculptures, demonstrate the power of observation and imagination of the Russian sculptors. The porcelain figurines portraying the common people were most

pular. Almost every ceram- factory made its own figu- es, often very interesting d original.

Articles commemorating the tory in the Great Patriotic ar of 1812, particularly a ries of cups with caricatures Napoleon executed from e drawings of Ivan Terebe- ev at the Gardner factory, e always a center of interest. o are the products of the usupov factory which was, ctually, a studio where serf rtists painted the ready-made hite porcelain articles ac- uired from other factories.

The Soviet potters made esh use of the Russian folk rt heritage—the luscious col- rs, clear shapes and expres- iveness of the old craftsmen. Porcelain and faience pro- luced by Soviet factories are n display at Kuskovo.

The museum treasury would not be complete without a col- ection of foreign porcelain. It contains, among other things, the famous Egyptian set made n 1805-1808 in Sèvres on Na- poleon's order. It was meant for his personal use in the Tuileries Palace, but after the Erfurt peace agreement, Na- poleon presented it to Alexan- der I.

The gem of the English col- lection is the famous Wedg- wood porcelain. The Flora of Denmark set ordered by Cath- erine II is especially interest- ing because the design was worked out not only by the best Danish sculptors and painters but by botanists as well.

There are beautiful articles crafted in France, Germany, and a very rare collection of Italian majolica and Spanish- Moorish ceramics.

Some exquisite samples of Italian, German and French glass and a rare collection of Russian artistic glass are the special pride of the museum.

Field Marshal Kutuzov.

Wedgwood vase.

Egyptian service sugar bowl.

Commemorative plate. State Porcelain Factory, 1922.

The Grotto.

Peasant Woman. Gardner Porcelain Factory.

Pushchino, where biologists study nature on the molecular and submolecular levels, is, appropriately enough, set in virgin country.

Photographs by Vsevolod Tarasevich

PUSHCHINO, CITY

Pushchino is 60-odd miles south of Moscow. This city, the site of the Biological Center of the USSR Academy of Sciences, is not much older than a decade. The vigorous development of the biological sciences in the mid-twentieth century was due largely to the use of new research methods, many of them borrowed from other fields of study, notably chemistry and physics: electron microscopy, X-ray structural analysis, ultracentrifugation, chromatography. The new methods have literally revolutionized biology. Add mathematical models, cybernetics, simulation of biological phenomena, all of which have also played a role. The tendency of modern biology is to investigate thoroughly, to strive for a comprehensive understanding of the interrelationships of biological phenomena. That requires the interaction of a variety of disciplines and the coordinated efforts of large research teams. A biological center like the one at Pushchino therefore merits attention, if for no other reason than that it is a pioneering undertaking. The organization of scientific investigation itself is an important area of interest. Before the Revolution, biological studies in Russia, given world stature by the work of such authorities as Ilya Mechnikov, Ivan Sechenov and Ivan Pavlov, were conducted almost exclusively by university departments. On the eve of the Revolution, the Academy of Sciences had three laboratories, two museums and one biological station with 28 researchers. When scientific institutes began to spring up soon after the Revolution, the leading role in developing basic research in biology passed over to them. Incidentally, the first institution of this type was the Biophysics Institute set up at the initiative of Academician Pyotr Lazarev. The USSR today has more than 200 biological research institutions staffed by more than 30,000. It is scarcely necessary to say that changes have not been quantitative alone. Brilliant schools have emerged in the last half-century led by such distinguished figures as Nikolai Vavilov, Alexei Bach, Leon Orbeli, Nikolai Koltsov, Ivan Smalhausen, Dmitri Prianishnikov, and Ivan Beritashvili.

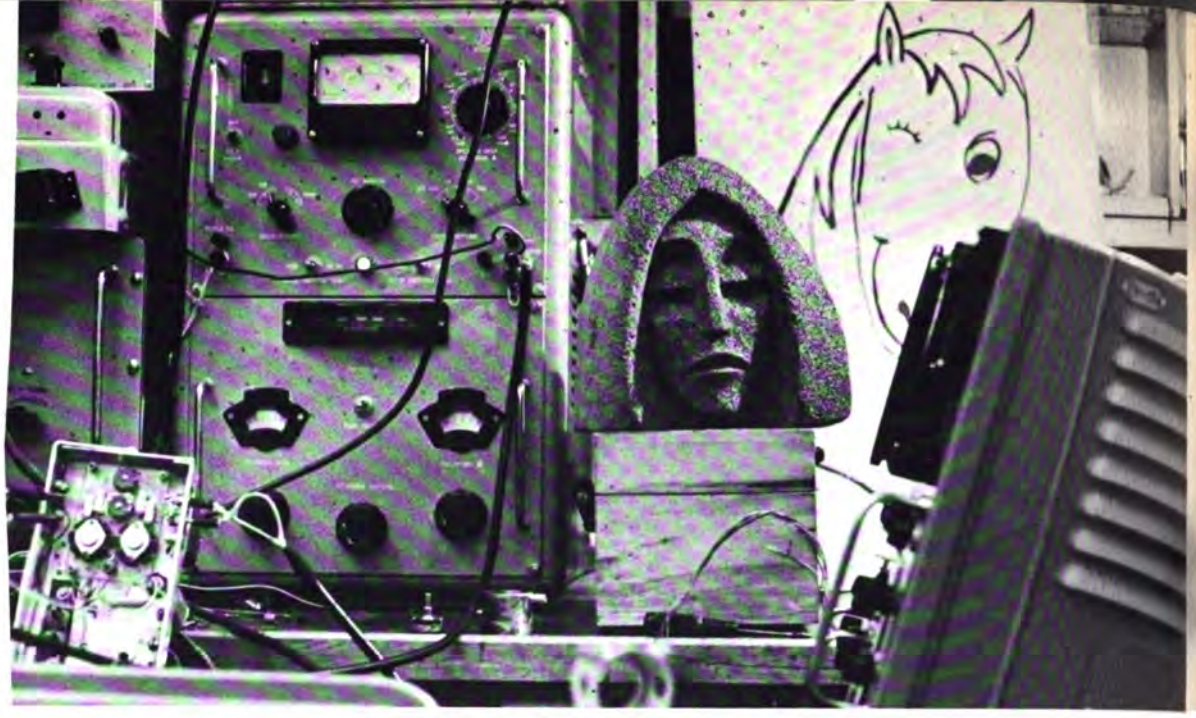
ON THE OKA RIVER

On the 250th Anniversary
of the
USSR Academy of Sciences

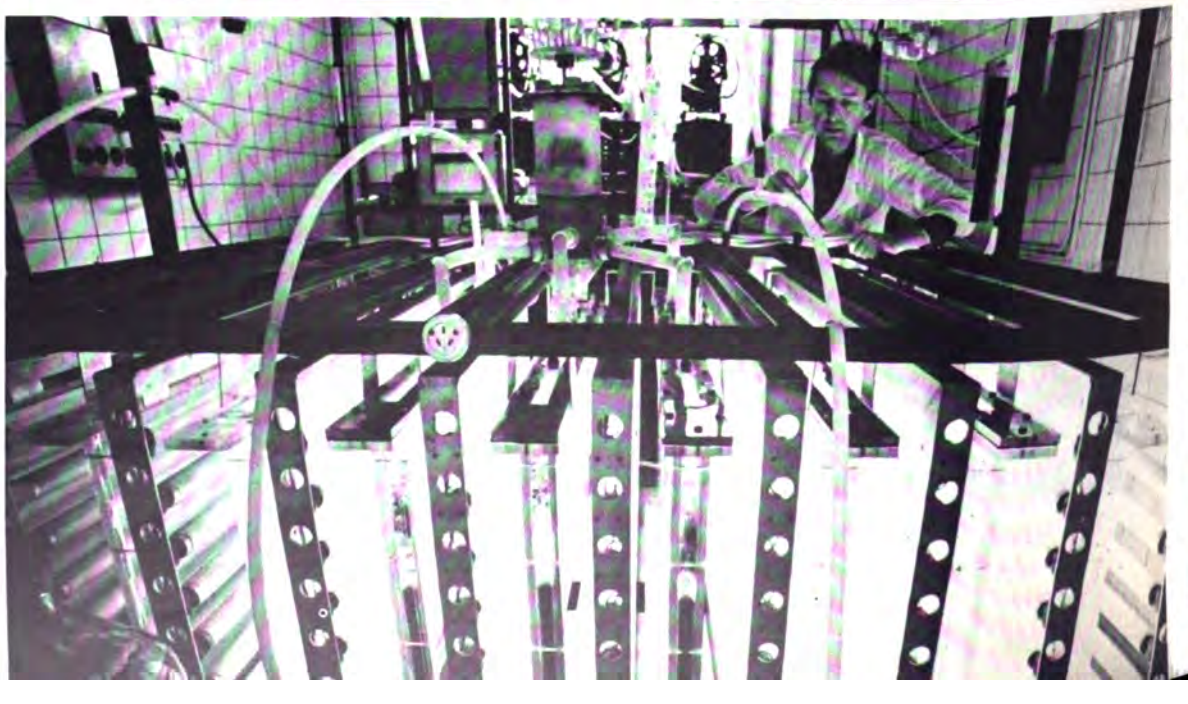
Independent scientific directions—they are not yet called scientific schools purely out of modesty—are arising at the Pushchino center. They are led by such people as biophysicist Gleb Frank, recently deceased microbiologist Nikolai Yerusalimsky, physiologist Mikhail Livanov and biochemist Alexander Spirin, all well-known academicians. Each began, as a rule, when the teacher, an active researcher, set up at a new place with a group of young disciples, mostly recent students. The combination of experience and youth, enthusiasm and wisdom promised abundant fruits. Any number of such promises have been fulfilled in the laboratories of Pushchino's institutes. Let us not forget that the kilogram of gold offered by the Academy of Sciences of France in the last century to anyone offering a solution for the problem of the functioning of proteins and enzymes in a living system has not been claimed. Perhaps it will be in the not too distant future by one of the teams of scientists working at the Pushchino center.

For the most part they are young, these biochemists, biophysicists and researchers in a dozen other fields. Many of them are founding fathers of this ten-year-old town. Pushchino's current crop of high school seniors were already on the scene when the town was founded. They remember when they went to school in the neighboring village of Balkovo and when all the research institutes were in the one building.

To get some sense of the changes that have occurred in this short and very busy decade, one need only look into the laboratories with their electron microscopes, computers, ultracentrifuges, multichannel oscillographs and other such tangible factors of intellect. But scientists accept all that as a matter of course these days. They use other criteria by which to assess the scientific level of an institute or an individual. They keep a close eye on the current literature in the field and judge the activity of colleagues by their output. The publications of the laboratories at Pushchino are read widely by the scientific community.



The work area of Armen Sarvazyan, senior researcher at the Biophysics Institute.



Above: Pushchino street scene. Right: Engineer Vladimir Sofronov is in charge of the installation for the cultivation of Chlorella algae at the Biophysics Institute.

Biological Center in Pushchino

SCIENTISTS OF OUR CENTURY

In the early Soviet years most research institutions were set up in Moscow and Leningrad. Then the republics opened branches of the USSR Academy of Sciences and later their own academies. In the fifties new research centers began to appear on the science map of the USSR. Many of them have since become world famous: Dubna, the nuclear physics center on the Volga; Akademgorodok, near Novosibirsk, with a whole complex of institutes, the Siberian Branch of the USSR Academy of Sciences; centers in the Urals, the Far East and other parts of the country. In the past decade two additional centers were opened: one in the suburbs of Moscow—Protvino—a town of physicists, and Pushchino, a town of biologists.

By Lev Kokin

PUSHCHINO is hardly 10 years old. Many of its residents still remember when all the institutes were housed in one building.

Today the Pushchino laboratories are equipped with all the high-power machinery of modern science: electron microscopes, computers, ultracentrifuges, multichannel oscillographs, to name a few. Pushchino has contributed many important studies to life-science research.

What is a scientific center, and why are towns exclusively for scientists an ongoing phenomenon in the USSR?

The concept of a cultural center is old, traditional, comprehends a great city with a university, research laboratories, public libraries, theaters and museums. In a word, it is a center of enlightenment. Moscow, Petersburg (Leningrad) and a few other cities belonged to such an elite in Russia. The characterization is no longer exceptional. There is scarcely a regional center or good-sized city that does not have its university or at least one or more college-level institutions, its libraries, theaters and other cultural facilities.

As for science, following the October 1917 Socialist Revolution it became a primary government concentration and began to expand its parameters, stretching out from traditional centers to districts where new industrial areas were emerging. Many research and educational institutions were set up in industrial cities; branches of the USSR Academy of Sciences in the republics grew into national academies that focused on fundamental problems in the natural and social sciences, the solutions for which would have application to local industry.

As early as the fifties opportunity and sheer necessity brought about a pooling of the efforts of many investigators, in concrete terms, the development of research centers for work on basic problems whose solution would stimulate both science and the economy. The combined talents of physicists and power engineers were responsible for the construction of the world's first atomic power station in Obninsk (near the city of Kaluga). Soon afterward the new town of Dubna sprang up in the area north of Moscow, where physicists of both the USSR and other socialist countries are engaged in nuclear research. Dubna is now one of the most important scientific centers of the world; among other things, some of the transuranic elements were discovered there. Later on the world's largest proton accelerator was built in Protvino, near Serpukhov, an accomplishment which gave birth to another physics research center.

Where initially Soviet science had to develop along broad lines, today it has moved into a qualitatively new stage: focusing the efforts of many scientists on major problems.

One of these problems, the mystery of life, is the subject of investigation by the five research institutes which constitute the Pushchino center—the Institute of Agrochemistry and Soil Sciences, the Institute of Protein, the Institute of Biophysics, the Institute of the Chemistry and Physiology of Microorganisms and the Computer Center. "The basis of life, the foundation of it, remains well hidden from man as yet. To unlock the mystery, high intellectual power and great endeavor of men of genius will be required," said Ivan Pavlov, the Russian physiologist, some 40 years ago.

The age of electricity began with the opening decades of the twentieth century and the atomic age with the fifties. Scientists believe that the end of the century will see the mystery of living matter revealed, its origin, structure and functioning system.

Is there a short cut to the answers? Academician Gleb Frank, director of the Institute of Biophysics and one of the founders of the center, in a recent speech to a scientific gathering said that solutions of the future would come from mechanical physicochemical biology.

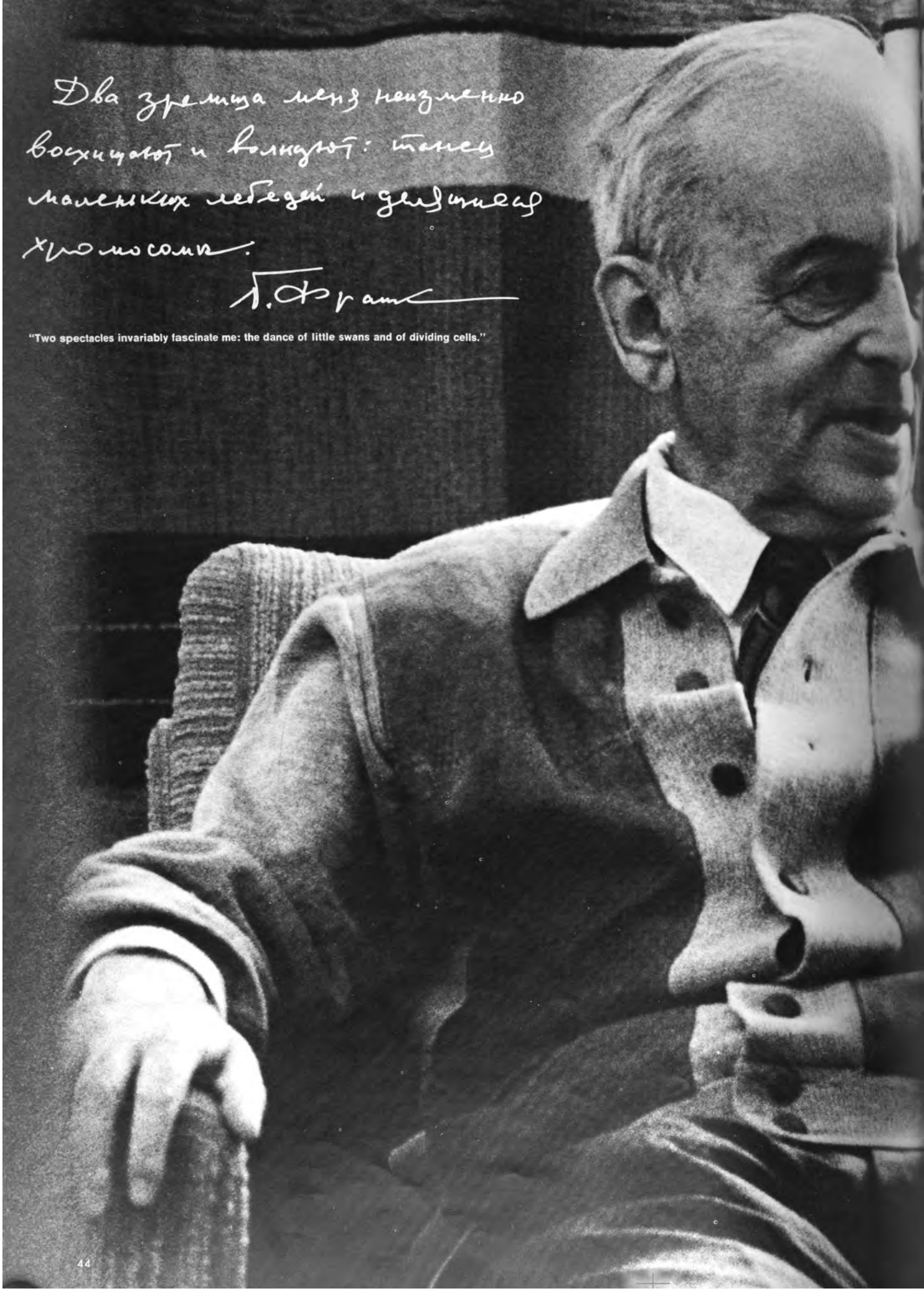
Even a quick look at some of the problems now being tackled in Pushchino gives a good idea of the scale and range of the research going on there. For example, the secrets of protein, the building material of living tissue: How do the intercellular factories of protein function? How do comparatively simple molecules of organic substances assemble and interweave to produce molecules containing thousands of atoms? By what process do these gigantic molecules organize themselves? How do they function in a living organism? There are also problems of photosynthesis of protein and microbiological synthesis, which makes it possible today to start commercial production of protein nutrients by refining oil. Then, there are questions regarding the structure and function of the living cell, which is frequently compared to a building brick. It is that, but it is also a multifaceted and perfect structure, for all its microscopic size. These problems also involve complex manifestations of vital activity, such as mobility and biological rhythms and memory, probably nature's most interesting and most deeply hidden secret.

We could liken the mechanical physicochemical biology Frank was speaking about to a ship its crew can rely upon in the infinite Ocean of Problems. Or perhaps a better figure—not a ship but a sailing direction for today's biologists, whose fleet is made up of many ships.

The crews at the institutes in Pushchino consist of researchers from different branches of knowledge: pure biologists, biophysicists, biochemists, physicists, chemists, physical chemists, mathematicians and engineers. The mechanical physicochemical science of living nature involves comprehensive research into the phenomena it deals with, and in this community of different scientists there are neither leaders nor followers. In a body of scientific workers the contribution of each one is important, and the sum total is something to which the rules of arithmetic do not apply. Take, for instance, the laboratory of physical biochemistry at the Institute of Biophysics in Pushchino or the laboratory of physicochemical and physiological fundamentals of memory at the same institute. The integrated studies of five or ten scientists take on a new dimension. Similarly the institute's laboratories are not just components of a single whole, but show a problem as multidimensional, to be seen from different angles. In short, the biological center is no accidental conglomerate of adjoining institutes; it is a complex organism whose life source is the interaction of these institutes.

The youth of its residents is a distinctive feature of Pushchino. The Institute of Protein is headed by biochemist Alexander Spirin, one of the youngest members of the USSR Academy of Sciences. He has already won international recognition for studies of nucleic acids which he began as a student; that was not so long ago. The studies resulted in the discovery of a specific, so-called messenger ribonucleic acid (RNA), which acts as an important mediator between the genetic brain of the living cell and its protein factories (ribosomes) in the biological synthesis of protein.

While in Pushchino's institutes life is being divided into the smallest molecular particles, the town of biologists lies surrounded by nature whole and untouched. The high right bank of the Oka presents a view of the forest spreading beyond the river up to the horizon. This is the Oka Terrace Preserve, where nature remains primeval, its plants and animals, birds and insects protected by law. What more natural home for a biological center?



"Two spectacles invariably fascinate me: the dance of little swans and of dividing cells."

Academician Gleb Frank, director of the Biophysics Institute and founder of the Biological Center.

Biological physics is a new science. When Gleb Frank was making his beginning studies, it was a rather vague field of investigation, even though it had a long prehistory by then. As early as the middle of the eighteenth century Lomonosov offered a hypothesis for color vision. Biophysics is also linked with the names of such Russian men of science as Euler, Sechenov and Timiryazev.

As for its current history, that began with the efforts of scientists of Frank's generation. "Pure" physics itself had to mature enough so that its ideas and methods could provide a key to the secrets of living nature. The complex nature of the processes in living matter persuaded investigators to believe that the laws governing it differ critically from the laws governing nonliving nature. And this, too, put a brake on the development of biophysics.

Now all this is in the past. It is generally recognized today that physics and chemistry open the only fruitful direction for the study of elementary phenomena in living nature, the only way to an understanding of primary life. The affirmation of biophysics as a science was in great measure a result of studies of the effect of radiation on the living organism, a critical scientific problem of our century.

During his 40-odd years in science, Academician Frank has investigated the biological effect of ultaviolet and ionizing radiation, as well as the basic physical principles of such important life processes as nervous excitation and the contraction of muscles. He has made a substantial contribution to photobiology, radiobiology and the biophysics of elementary life processes.

Academician Frank devotes a good deal of his time and effort to the organization of research. The Biophysics Institute, the first of the Pushchino science center institutes, owes much to him as its director and one of its founders. It is to his particular credit that a special department for the design of biological equipment was set up at Pushchino to supply the laboratories with the unique devices they need for their experiments.

When Academician Frank compares the "dance" of separating chromosomes during the division of a living cell to a dance from Swan Lake, he makes us see the beauty of nature hidden from the unaided eye and revealed to humans thanks to the powers of our contemporary physicochemical biology.

Cell division. The separation of chromosomes and

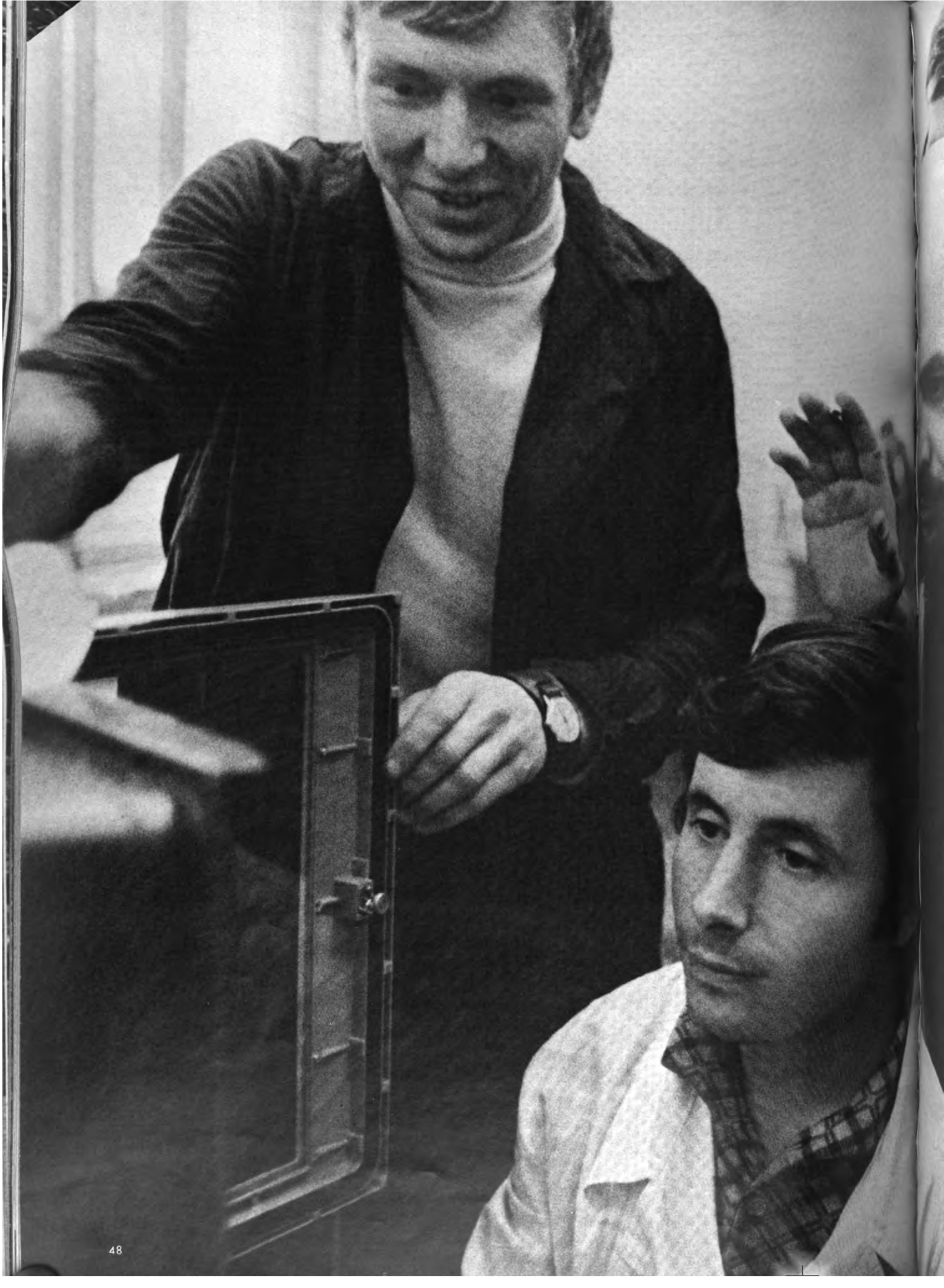
Right: Seminar at the Protein Institute. Center: Computer room of the Biophysics Institute. Far right: A frustrating moment for biophysicist Simon Shnol. Above: Senior engineer Valeri Yashin and biophysicist Vera Topleva gathering mollusks in a local lake for study.

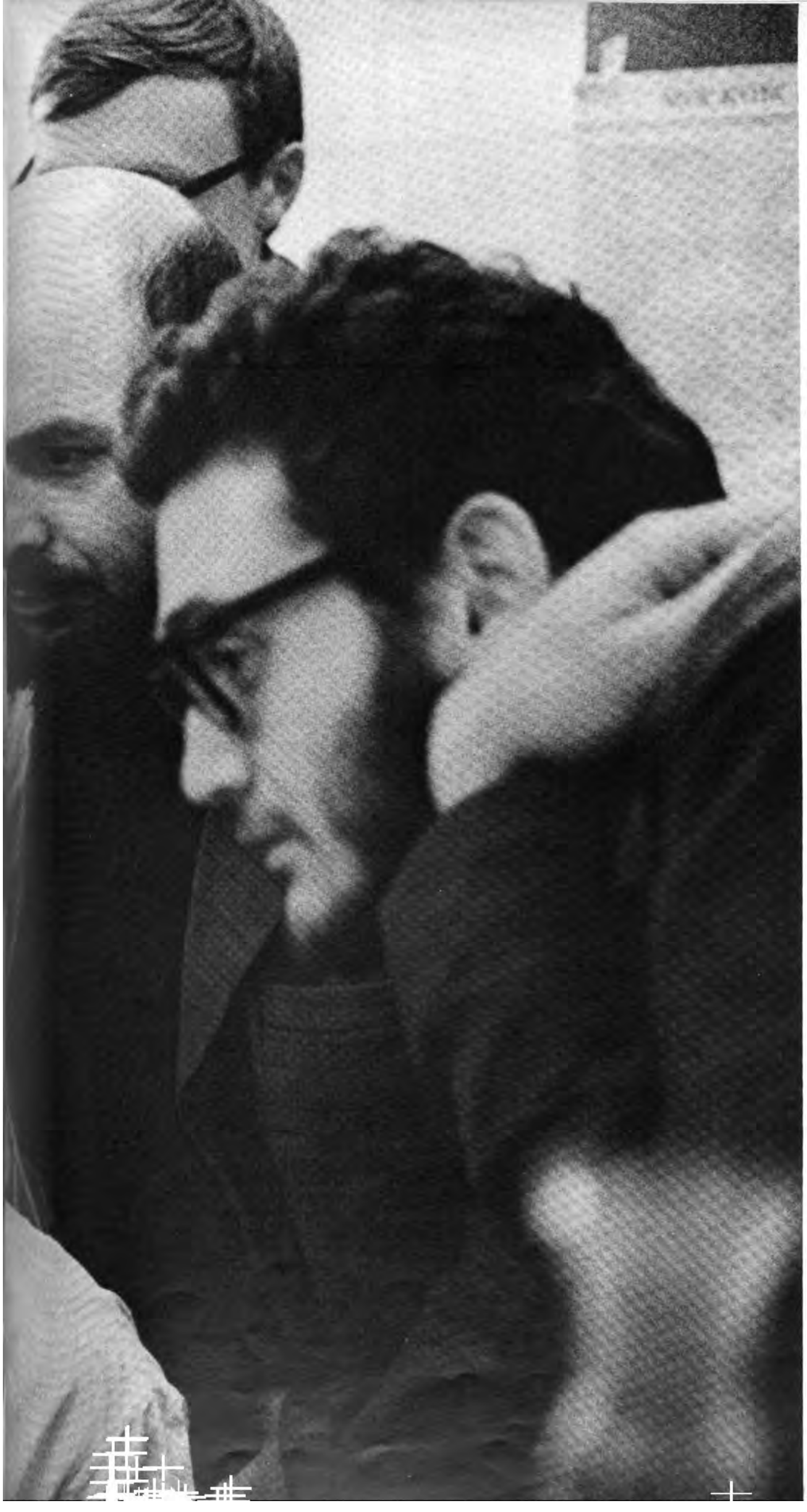
One of the pillars of modern biology said, not without irony, that life is what we lose in the test tube. Some such thing does really take place at the subcellular, molecular and submolecular levels of biological study. Paradoxically enough, the investigator, in his attempt to gain an insight into the secrets of life, is compelled to kill the object of his investigations.

Perhaps the fascination of this biologists town is the fact that once outside the laboratory, the scientists are surrounded by nature in all its living glory, undissected and unspoiled. Pushchino people say that theirs is the ideal mixture of urban and rustic living.

However, even for the most "ultramodern" of biologists nature is not just an environment in which to live, and it is not simply for the sake of relaxation and a change of impressions that staff members of the Biophysics Institute are taking an outing in the country. They are catching mollusks, which have relatively large nerve cells. It is easy to understand that the size of the object under study is not an unimportant factor. While making use of the most intricate devices to refine the methodology of microminiature investigations and reach into the innermost depths of the living cell, the researcher dreams at the same time of finding a bigger object. The bigger the cell under study, the more convenient it is to work with it and the more information it can supply, other things being equal.

Nerve cells of pond snails found in the neighboring river backwaters measure a quarter of a millimeter, five times the size of the human nerve cell. When it was surmised that a distant relation of these snails, marine mollusks, must have much larger neurons, the Pushchino biologists fitted out an expedition to the Pacific. There, not far from Vladivostok, with the help of local fishermen, they brought up from a depth of about 1,000 feet the queen of neurons, the mollusk triton.





Those who are not involved in science themselves tend to measure its achievements by the degree of its effects on everyday life. But it is not always the studies intended to solve immediate practical problems that have the greatest impact on practice. Nuclear physics research in the thirties is a classic example.

What do we have to gain from an understanding of the complex mechanisms underlying the life processes in the living cell? How can humanity today profit from the unraveling of the secrets of living matter?

We can only speculate about the possible consequences of some present strictly theoretical research in genetics, biochemistry, microbiology. The possible applications of basically new knowledge are limitless.

"We live in an age when what would seem to be the most abstract science is required for improving existing industries," said Academician Nikolai Semenov, Nobel Prize winner in chemistry. "As a matter of fact, this science gives birth to fundamentally new technologies and lines of production previously unheard of."

With reference to biology, this statement can easily be supplemented: New knowledge in the science of life, an insight into the essence of life phenomena will inevitably lead to improvements, not only in production—in food production especially—but also in combating disease and in environmental protection. It will serve to increase the productivity of farm plants, animals and useful microorganisms.

"Great discoveries both in art and science cannot be evaluated in terms of money," says Mstislav Keldysh, president of the USSR Academy of Sciences. "Can we estimate the profit from Albert Einstein's theory of relativity? Or what fee mankind should have paid, say, to Beethoven? Contributions of that kind are incalculable."

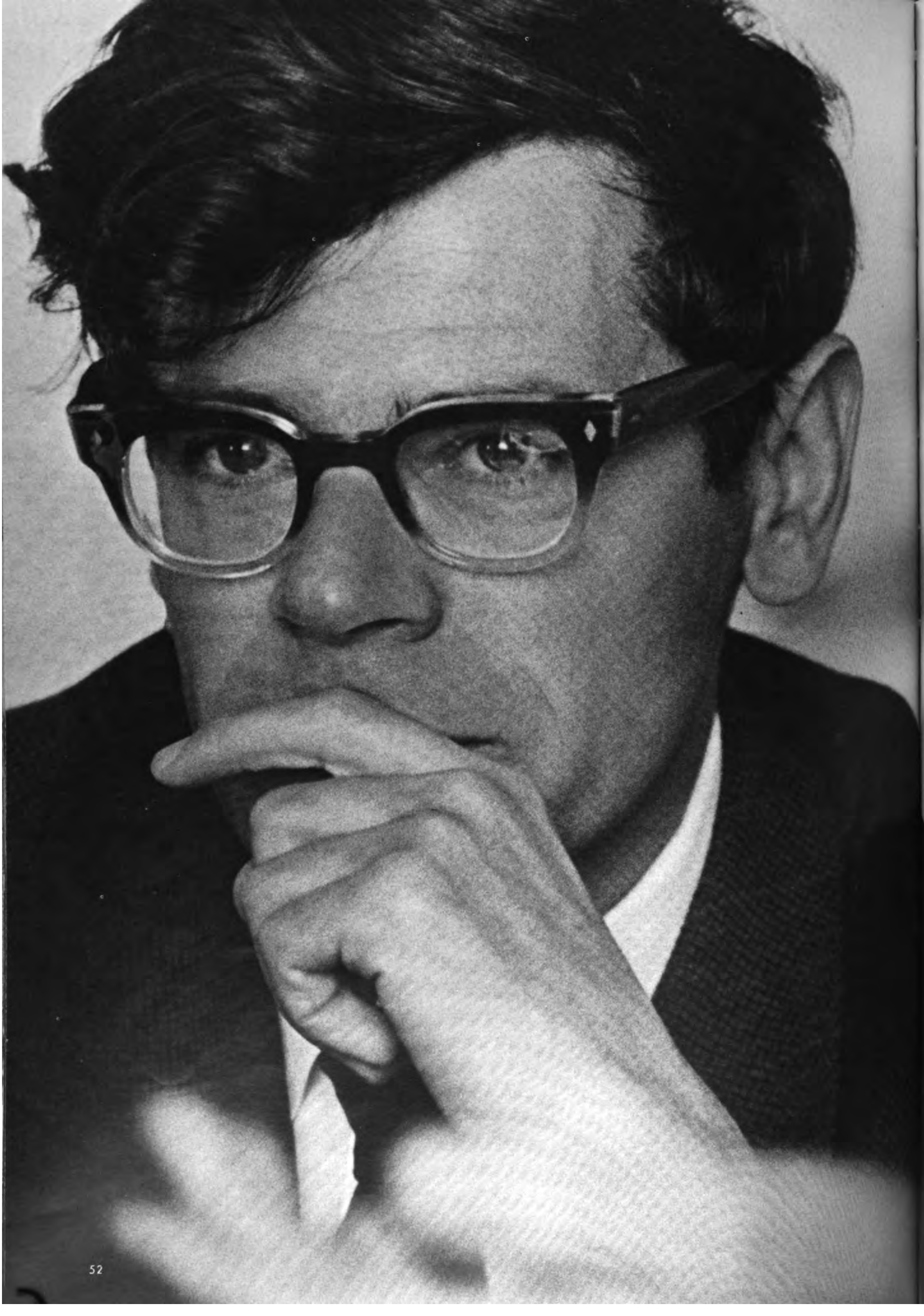
One function of the USSR Academy of Sciences is the proper distribution of work on fundamental problems in the natural and social sciences, on the one hand, and on practical problems of more pressing and immediate importance, on the other.

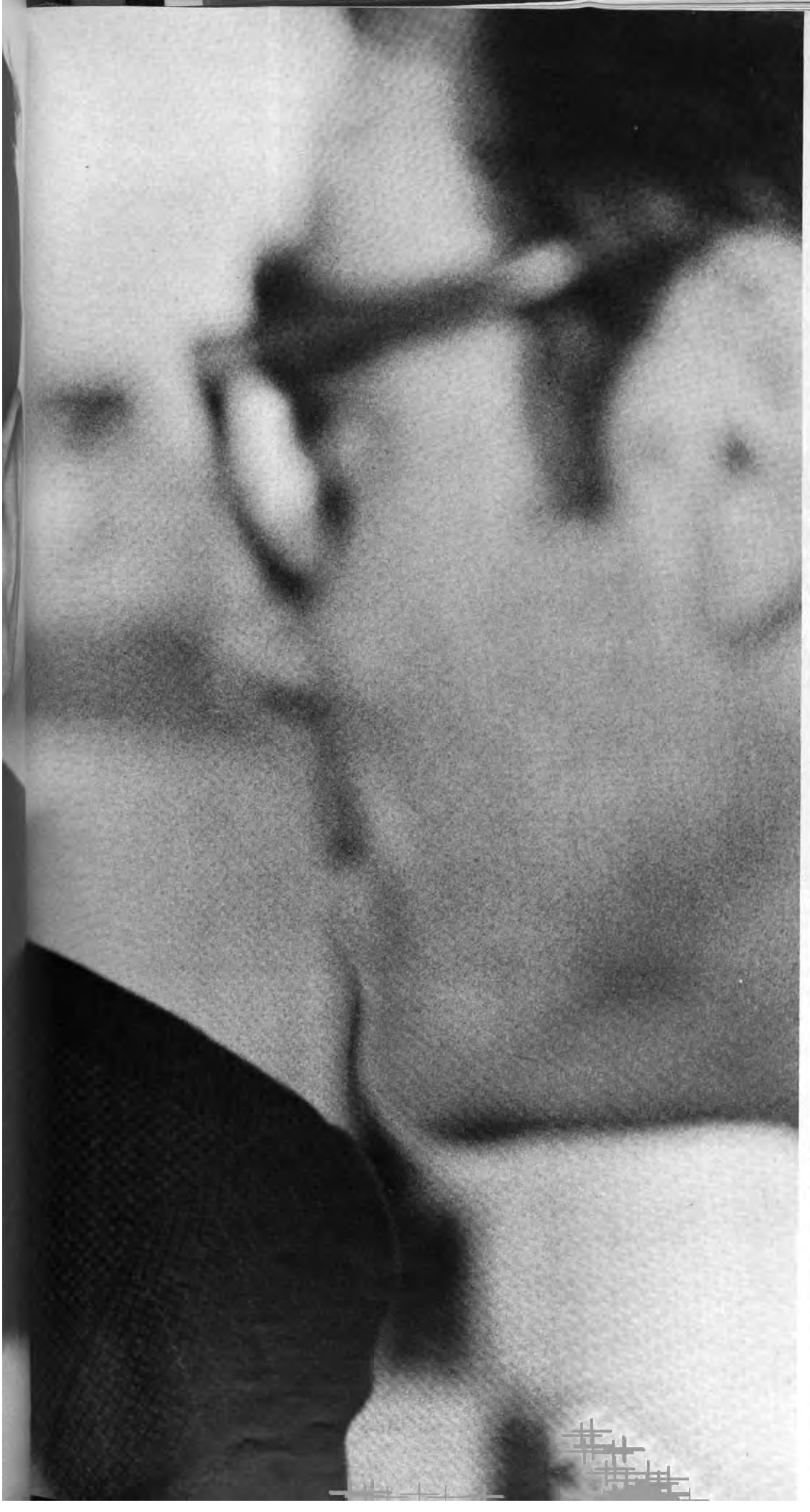
Research team led by senior researcher Armen Sarvazyan (center) at the Biophysics Institute.

For biophysicist Alexander Zamyatin music is not only the pastime it was for men like Planck and Einstein. He has tried his hand at composition and found no impassible wall between his vocation and avocation. His predilection for music helps his research. Back at the university as a student, he used his own compositions for the piano to determine the effect of sound on the division of yeasts. And at the Hypotesa, a club for scientists, Alexander Zamyatin played his "Improvisation on a Glycolosis Theme," illustrating in this way the hypothesis of his teacher Simon Shnol that there was such a thing as an acoustic biological field.

There is a singular feeling of creativity in the atmosphere of Pushchino. Among other things, its residents are inclined to mention off-handedly that their city has sprung up in a place that is indigenous to Russian literature. And, demonstrating their partiality for methods used in the exact sciences, they will proceed to prove their point in the language of figures. It is some 60 miles from Yasnaya Polyana, the home of Leo Tolstoy, 125 miles from Spasskoye-Lutovinovo, the birthplace of Ivan Turgenev, and only a bit more than 30 miles from Melikhovo, Chekhov's home.

An evening of talk at biologist Larisa Zykova's apartment. Left: Staff members of the Microbiology Institute back from an outing. Those baskets are full of mushrooms. Far left: Wrapped in musical or scientific thought? Below: At the Azimuth Club.





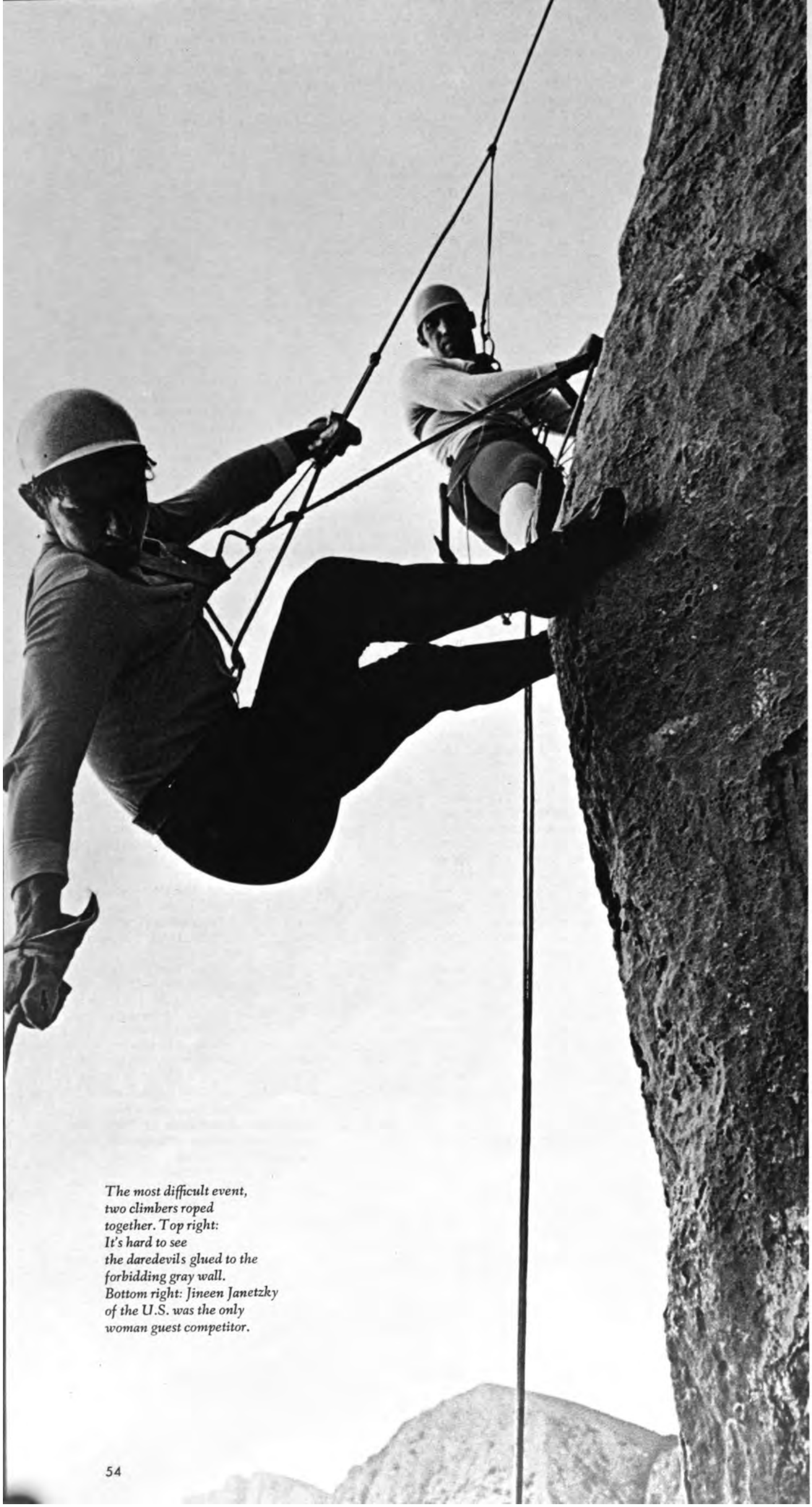
Alexander Spirin was born after Gleb Frank made his first studies in biophysics.

The object of investigation at the Protein Institute, which Academician Spirin directs, is approached from many angles. Biochemists and chemists, theoretical physicists and experimental physicists put questions to nature in the languages of their scientific methods and get relevant answers. The strength of the institute, in which scientists of different specialties have combined their talents, derives from the fact that while these scientists address nature in different languages, they evaluate its answers as a cohesive group.

Although Spirin directs the institute, it does not occur to him to slow down on his own research in the protein biosynthesis laboratory. A student and associate of the late Academician Andrei Belosersky, he investigated the part played by nucleic acids in protein synthesis within the living cell. He was the first to find the specific so-called messenger ribonucleic acid, mRNA. It had by then been shown that protein synthesis was controlled by molecules of nucleic acid called DNA. These molecules are situated in the cell's nucleus. However proteins, those building blocks of living tissue, are not synthesized in the nucleus, but in the surrounding cytoplasm, in the numerous small granules, ribosomes. In some uncanny way the ribosome learns what protein it should produce. It is the mRNA found by Spirin that plays the role of intermediary. Receiving information from the DNA, it delivers the information and dictates the working procedure to the ribosome.

But how does the ribosome itself, that intracellular "protein factory," operate? Spirin has worked out a hypothesis to explain the activity of the ribosome, has suggested a scheme of its working cycle, and has even built a working model of it. He says the working process of the ribosome is ensured by the alternate opening and closing of its two halves, or valves, and this periodic movement triggers the entire multilink mechanism of conversion of nonliving into living matter.

Alexander Spirin, director of the Protein Institute and professor at Moscow University, is one of the country's youngest academicians.



The most difficult event, two climbers roped together. Top right: It's hard to see the daredevils glued to the forbidding gray wall. Bottom right: Jineen Janetzky of the U.S. was the only woman guest competitor.

AMERICANS TRY ROCK CLIMBING IN THE SOVIET UNION

By Arii Polyakov
USSR Moster of Sports

IF THE HOME of soccer is England, of basketball, the United States and of ice hockey, Canada, then the Soviet Union could be called the birthplace of competitive rock climbing.

The first contests were held in 1949 in the Crimea. In 1952 the Committee for Physical Culture and Sports of the USSR Council of Ministers approved the regulations for rock-climbing contests, and the new sport acquired full citizenship rights. The first national championship was held in 1955 near Yalta, the Black Sea resort, on a cliff some 260 feet high. From that time on every autumn sees a breathtaking struggle on the cliffs of the Crimea's southern shores.

There are several events in rock-climbing programs: a two-man race, individual scaling and two climbers roped together. The first contest is the most spectacular. Each of the climbers has to cover his own route first, then descend by rope and start on his competitor's course. Total time covering both distances determines the winner, who goes on to the next event on the program—individual rock scaling. The over-all distance of the pair racing is 260 to 300 feet; in the individual scaling it is 300 to 330 feet.

When the signal to go is given by the waving of a red flag, three stop watches are switched on. The climber rushes to attack the cliff, smooth and unconquerable, but only to the inexperienced.

From the bottom it is hard to see the daredevil against the gray wall. In some places he seems to be pressing himself into the rock, in others he pushes his body away from it. Very quickly the climber finds barely noticeable cracks and edges, but he cannot stop long in one spot or his control time will be up and he will be disqualified.

Making a good time showing is by no means the whole story. There is technique to take into account. Penalties for errors can keep you out of the prize-winning group. Most mistakes and violations of the rules occur in the event where two are roped together—the most difficult feat on the program. The two mountaineers, a nylon rope between them, have to negotiate a most difficult route that they have earlier picked and marked out on a photo. The partners must have a thorough knowledge of climbing technique and position themselves always to guarantee support for each other. Scalers are permitted to use rock *pitons,* rope ladders with Duralumin steps and hanging platforms. In ascents they have to change places so that each one leads in a specific sector.

The pair reaching the greatest height and with the fewest penalty points, in the control time of 30 minutes, wins the climb; the height is measured by the lower partner. The climbers have to lift their backpacks to the same height; these weigh between 25 and 30 pounds, depending on body weight.

The race against time involves some risk, of course, and to prevent accidents, the scalers are protected by a steel cable operated by experienced mountaineers, who watch out for their safety. If climbers slip and hang on the cable, they drop out of the contest.

Rock climbing is fascinating and attracts crowds of spectators. The only time you can see a mountain climber in action is at such championship meets: High-altitude mountain climbing is geographically and physically outside most people's experience.

The USSR championships are held in odd years, with teams representing republics and cities taking part.

Usually 15 to 20 teams of five people each (three men and two women) enter the events. The challenge team award, the Grand Cup of the USSR Sports Committee, is presented to the team showing the best clocking with the least penalty points in all the events of the program, for both men and women. Simultaneously at stake are the championship titles in the separate events, as well as the over-all championship titles.

Foreign mountaineers first became acquainted with our rock climbing during the 1971 USSR championship. Attending as observers were representatives of mountaineering clubs from Austria, Czechoslovakia, the Federal Republic of Germany, Hungary, Italy, Japan, Mongolia, Poland, Spain and Yugoslavia. Manfred Sturm, the experienced 36-year-old mountain climber from Munich, said after the contest: "If I hadn't seen with my own eyes how your climbers cover 330 feet along a sheer wall in six to eight minutes, I wouldn't have believed it."

The guests were somewhat surprised by the footwear of our rock climbers—ordinary rubbers. They called them secret weapons. One of the guests tried his skill on the rocks with these same rubbers, but he couldn't make it.

The last national championship was held in the Crimea in the autumn of 1973 on a huge cliff named after Mikhail Kherghiani, the outstanding Soviet mountaineer.

This time devotees of the sport came from Bulgaria, Czechoslovakia, the German Democratic Republic, Hungary, Japan, the Netherlands, Poland and the United States.

Before the scheduled events started, the foreign guests made an ascent of the Crimean rock fortress Mount Ai-Petri. On the second day of the contest those who wanted to had an opportunity to take part in the pair racing. The first to tackle the rock was Hungary's Istvan Szenthe and John Griffith, from Oregon. There were shouts of "Keep it up, Istvan!", "Come on, John!" but they did not reach the finish. The same fate befell the Dutch, Japanese and two other scalers from the USA—John Waterman, of the American Alpine Club, and the one woman among the guests, Coloradan Jineen Janetzky. Only the alpinists of Poland, Czechoslovakia and the GDR were able to make the climb.

After a fierce six-day battle the team Honor Prize was won by the rock climbers from the Siberian city of Krasnoyarsk. The Leningraders took second place, and the Georgian squad was third. The women's over-all title was captured by Leningrad engineer Olga Markelova and the man's by Alexander Dyomin, a Krasnoyarsk teacher.

The championship events wound up with some brief talk between the organizers of the contest and the foreign guests, followed by a farewell dinner at which Jineen Janetzky was presented with a souvenir—old Russian galoshes which more than once had brought success to Leningrad scaling star Alevtina Pakhomova.

Before their departure the Americans shared with the other guests their impressions of the USSR and the events they had taken part in.

John Waterman: "I found the Russian system very new and hard for me to take to, at first. But I think it has much value. In the United States there is more emphasis on making the first ascent of a mountain. Speed is developed only by the elite. But I can see it as a great help to any climber to learn to climb quickly.

"I was very glad to have been able to witness the competition, even to play a small role in it. Once again, I want to thank the sports committee for making this opportunity available. I'm only sorry I couldn't offer more competition to your fine climbers. But I very much hope I will be able to return sometime, possibly to train here for another competition."

John Griffith: "It was a very long trip here, but we are happy that we could participate and proud to be the American representatives. The competition, I feel, is valuable to mountaineering although totally a new concept to me. I wished very much I had known earlier that I would come to Yalta so I could have trained and been able to provide better competition, but then they tell us that it takes five years for a climber to become good enough to compete.

"Still, I didn't feel that the climb I did was hard. It becomes difficult when you try to go fast.

"I learned much about Russia and its people. I hope that this kind of exchange can be continued."

Jineen Janetzky: "The Black Sea looked really delightful. I only wish I could have had more time to enjoy it.

"The rock here is good. There are many new and exciting routes yet to be discovered.

"I will tell whoever is interested in America exactly what I have seen. Many young climbers enjoy competition, and possibly we can develop a fine nationwide sport, as you have so nicely done here.

"What can I say about the Russian people? Judging from those I have met, I can say they are a warm, generous and extremely hospitable people. I mean this from my heart.

"I must thank you once again for the invitation and the pleasant 10 days here in Russia."

Soon after this championship a session of the General Assembly of the Union Internationale des Associations d'Alpinisme (UIAA) was held in Tbilisi, capital of Georgia.

It was no accident that representatives of the alpine federations of 24 countries were invited to that particular republic at that time. The reason was a jubilee plenum of the Alpine Federation of the USSR and the Georgian Federation to commemorate the fiftieth anniversary of Soviet mountaineering. Some 200 distinguished Soviet mountain climbers, many of them famous veterans of the sport, came to Georgia for the occasion.

Among the delegates to the assembly was the official representative of the American Alpine Club, John Hart, and his wife. This was not Mr. Hart's first visit to our country.

"When we visited Itkol in 1972," he said, "we heard how beautiful Georgia is and hoped we could go there on our next trip. Now that we have seen Georgia, we find it surpasses all our expectations for the charm and hospitality of the people and the historical interest of the area. We feel we have made many friends in the USSR and look forward to seeing them again."

Around the Country

CITY ON THE RAPIDS

Twenty years ago the first tents for the builders of the Bratsk Hydroelectric Power Station were set up on the bank of the Angara in Eastern Siberia, at the Padun rapids. That tent settlement has grown into an industrial city with a population of over 200,000. Today's Bratsk has a large aluminum plant and a timber industry complex, among other enterprises, as well as fast-spreading farmland on the outskirts of the city.

With its capacity of more than four million kilowatts, the Bratsk station easily meets the power needs of this newly developed area.

NURSES' PRIZE

A contest for best nurse was held in Irkutsk, Siberia; the idea was to publicize the most advanced nursing methods.

The competition consisted of five rounds. Nurses not only had to display their practical skills and answer difficult questions on first aid in infarction and splinting but also list books and films on ... cine and medical workers.

Nurse Galina Baranov... first prize.

ENVIRONMENTAL PROTECTION

The new smokestack ... the thermal power plant ... West Siberian city of Omsk ... taller than the local TV ... Over 800 feet high, its upper ... is as large in diameter as a ... ring.

Superhigh smokestacks are ... going up at many Siberian ... to minimize pollution. It has ... found that smoke and gas ... treated for the removal of ... admixtures and then discharged ... a great height disperse in the ...

FLYING BOAT

Moscow's Central Laboratory for new types of salvage facilities has designed a winged craft to carry rescuers to accidents at sea—a two-seat amphibian called an Ekranolyot. At low altitude an air cushion forms under the wing, and less engine power is needed. The boat can develop a speed of up to 80 miles per hour.

A PRESERVE FOR BEES

The first entomological preserve in the Soviet Union has been established in the small West Siberian town of Isilkul. Its basic population is bumblebees and wild bees, pollinators of alfalfa, clover and a number of other fodder grasses.

The Siberian Institute of Agricultural Chemistry is already conducting studies at the new preserve on bee development and breeding patterns.

LASER BEAM CLEANS THE SEA

The Lebedev Physics Institute, USSR Academy of Sciences, has evolved a technique for ... petroleum, kerosene and oil ... the surface of water bodies ... means of a laser beam.

When it was learned that ... emission (in the infrared spectr... will evaporate any liquid, ... tists tried using a laser beam ... burn out oil blotches floating ... water. The experiment was ... ducted in two regimens—con... ous wave and pulsed. The ... film evaporated rapidly in ... procedures.

PROVERB COLLECTI...

Nikita Astapenko, of Mo... Byelorussia, has col... more than 300,000 folk sayings ... proverbs of 273 nationalities ... all over the world.

TULA GUNS ON DISPLAY

Tula gunsmiths are planning to participate in the international exhibition of sporting guns to be held in Moscow this year. The Soviet display will include 20 guns by Tula's masters, several of them new types. The TOZ-34, which won a Gold Medal at the Leipzig Fair, will also be on exhibit.

A FILM ABOUT SCIENTISTS

A new feature film, *Choice of Goal*, will be on location in the USSR, the USA, the German Democratic Republic and Denmark. Directed by Igor Talankin, its theme is the scientist's responsibility to society. Academician Igor Kurchatov, eminent nuclear physicist, is played by Sergei Bondarchuk, People's Artist of the USSR.

KOMSOMOL PRIZE WINNER

Among this year's winners of the Young Communist League Prize, awarded to young ... for achievement in literature ... the arts, is S. Chokmorov, ... painter from Kirghizia.

The young artist is a graduate ... the Leningrad Institute of Pain... Sculpture and Architecture. ... Chokmorov is a name film fans ... ognize: He has played the ... in three Kirghiz films.

f the atmosphere without
the air below.

SPREADING TAIGA'S SEEDS

y of Dalnerechensk, in the
t Far East, ships a product
ds no processing but comes
m the Ussuri taiga—it is
nts.
eds of Aralia, eleutheroco-
fruit trees and shrubs are
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t to more than 200 ad-
in the United States and
the German Democratic
, the Federal Republic of
y, England, Denmark and
untries. The Ussuri taiga's
e adorns parks, botanical gardens and orboreta all over the USSR, as well as abroad.

STAR CATALOGUE

The Kazakh Republic's Astrophysical Institute of the Academy of Sciences has compiled a catalogue of stellar photometric and color standards. It is intended to help astronomers determine star color and brilliance quickly and precisely.

Scientists measured the brilliance of 250 stars, as shown in 10,000 photos, enabling them to fix standards. Photos were made with a meniscus (Maksutov) telescope of special design.

NATURE'S ORGAN

Yuri Vasilyev, who works at the Verkhny mine, in the Far Eastern Mining and Metallurgical Complex, heads a group of speleologists in his native village.

His cave explorers came across something special on one of their recent expeditions. In the mountains surrounding the village they found a crevice in the cliffs. Descending by rope into the stone well, they discovered it to be a small room. Cascades of white stalactites glittered from every facet, as if carved by some master hand. Further on was a sloping passage, in the middle of which sinters had formed a kind of undulating column. When the column was tapped with a metal object, it emitted organlike sounds, turning the subterranean cavern into a veritable concert hall. As the stalactites were tapped successively, sounds of different pitch combined and followed one another, creating the illusion of an integrated musical composition.

The cave was named Dalnegorskaya, and the territorial speleology department registered the eighty-seventh cave in the Maritime Territory.

AMUR VENUS

Conducting excavations of neolithic dwellings on the Amur island of Suchu, archeologists came upon a ceramic figurine of a woman. They named the skillfully crafted find Amur Venus. Other pieces created by ancestors of the Soviet Far East's indigenous peoples—figurines of animals and stone tools—show their advanced cultural development.

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st writers, editors and liter-
achers draw on Astapenko's
he collector himself fre-
publishes thematic selec-
f aphorisms in newspapers
agazines. His book of Rus-
roverbs is titled *Pearls of
isdom*.

L SEA EXPEDITION

azakh combination scien-
fic and sports expedition
g in seven inflatable row-boats and sailboats moved 85 miles down the Amu Darya and across the Aral Sea. The scientists and sportspeople carried out a program of experiments developed by the Moscow Medicobiological Institute. Among other things they tested a diet of water and raw fish.

ETHNOGRAPHIC FINDS

A collection of songs about 300 years old has been given by ethnographers to the Chernigov Regional Archives in the Ukraine. The melodies in this collection are written in ancient Russian notation—signs which were used prior to the note and staff system.

Historians and ethnographers visiting various corners of the republic brought back to Chernigov many ancient books, both handwritten and printed.

WOMAN SEA CAPTAIN TURNS AUTHOR

The world's first woman sea captain, Anna Schetinina, has sailed most of the world's seas and oceans on all kinds of vessels. Her book *On and Beyond the Seas*, just issued by Far Eastern Book Publishers, is about the captain's many years at sea, the development of the Soviet fleet in the Far East, her fellow seamen and her experiences abroad.

STUDENT CLUBS JOIN HANDS

A student association has been founded in Kiev, which has a student population of over 160,000.

All kinds of clubs are affiliated. One, the Globus (Globe), is for young people with a special interest in international affairs, the Myslitel (Thinker) members are young men and women graduate students, the Orpheus is for those devoted to esthetics.

UDMURTIA'S OIL

Geologists in Udmurtia, an autonomous republic of the Russian Federation in the Ural area, have added another oilfield—the thickest so far—to their maps, a 2,000-foot thick oil-bearing bed.

A total of 22 liquid fuel deposits have been found so far in Udmurtia, and prospecting continues.

Plans for this year foresee the extraction of close to three million tons of oil at local oilfields and over 500 million tons throughout the country.

DENT SCIENTISTS

exhibition of original scien-
ific and technical projects
ped by students of the Rus-
ederation opened in Novosi-
ecently.
of the experiments submit-
Novosibirsk State University
ts provides an answer to
uestion: How do individual
osomes affect the strength of
eat stem?
ialists think the data will be
le to plant breeders in de-
g Siberian lodge-resistant
varieties.
is just one of the 2,000 ex-
ubmitted by students from
tutions of higher learning
ussian Federation. The proj-
ntist's report will have a
many practical applica-

GOLDEN PENCILS

Youngsters from the Soviet Baltic republic of Estonia won three awards, including a Gold Prize, at a children's national Golden Pencils drawing contest.

The competition was sponsored by the Bulgarian Red Cross, which offered 30 prizes. About 15,000 children from 26 countries submitted drawings.

SONGS AND STORIES FROM LONG AGO

A new professional ensemble called Alma-Ata Melodies, based in the capital of Kazakhstan, brings audiences Kazakh vocal and instrumental folklore. Concert programs include original creations of folk singers and storytellers.

The company's repertoire is continually replenished with musical folklore collected in the republic's villages and hamlets. Musicologists have already recorded some 3,000 ancient songs and tales performed on the two-string *dombra*, a traditional Kazakh instrument.

FRESH WATER IN . . . THE OCEAN

Sea bays filled to the brim with water of unusual composition have been discovered on the shores of Queen Maud Land by researchers of the Soviet Antarctic Station Lazarevskaya. These are bays like all others: six bodies of water whose level fluctuates twice daily with the world ocean tides.

However, chemical analysis of their waters yielded sensational results. Samples taken at the surface and in bottom layers at a depth of up to 500 feet contained no trace of salt!

Scientists estimate the approximate age of these strange bays at 2200 years, hypothesizing that they were formed during the summertime thawing of glaciers.

CONCERN FOR NATURE

In the city of Tartu, Estonia, a people's nature protection university has recently opened its doors. Students are collective and state farm leaders, factory directors and teachers, people who have to deal with conservation problems.

The two-year course provides a solid grounding in natural science and legislation on environmental protection.

LITERATURE, particularly fiction, has always expressed, in one way or another, the interests and motivating principles of social classes and groups. It has always been involved, to some degree, drawn into the vortex of life, into the social struggle of its time.

Interpreting the Revolution

The Socialist Revolution of 1917, which shook the world, also created an irreconcilable spirit even in the camp of the Russian democratic intelligentsia. Identical events of the Revolution and the Civil War were as far apart as the poles in the interpretations of Russian émigrés and the writers who now are the pride and glory of Soviet literature.

SOVIET WRITING

By Yuri Kuzmenko
Literary Critic

"We swarmed into literature, in wave after wave. There were many of us," wrote one of them, Alexander Fadeyev. "We were united by the feeling that the new world was our own, by our love for it." "My Revolution," that was Vladimir Mayakovsky's way of putting it.

The Political and the Creative Individual

"My Revolution" and ". . . the feeling that the new world was our own. . . ." The writer's posture was not determined by party directives or external circumstances; one's own perception of the world, one's deep convictions and individual disposition were the elemental factors. "My Revolution" does not describe a social and political stand alone; the words have been a stimulus for work, releasing creative expression. They are, moreover, the determinants of the conflict, the plot, the characters, particularly the heroes, of the ethical judgments involved. "My Revolution," finally, in the simplest terms encompasses the gigantic and contradictory panorama of events.

Talent has organically fused with a definitive ideological position; one cannot function without the other. Out of talent and a creative partisanship came such major epic works of Soviet literature as Maxim Gorky's *The Life of Klim Samgin,* Alexei Tolstoy's *Road to Calvary* and Mikhail Sholokhov's *The Silent Don.*

Continuity: The Past into the Present

Soviet literature today is the outgrowth and direct continuation of the literature of the twenties, thirties and forties, the period of struggle for the construction and victory of socialism. However, direct does not mean identical. Together with irrevocable time something has gone which Leonid Leonov called "the morning of a new era." But something was sown and has bloomed in the soil of the mature socialist society. The special characteristics, too, of Soviet literature are now developing into more complex forms.

One of the vigorous branches of sixties and seventies writing deals with the historical past. Yuri Trifonov wrote an excellent novel, *Impatience,* about the predecessors of the Russian Marxists. Marietta Shaginyan produced a series of highly original philosophical essay-novels around the life and work of Lenin. Vasili Aksyonov came out with a novel about a professional revolutionary, Leonid Krasin, who became the first People's Commissar for Foreign Trade (*Love for Electricity*). The Kazakh writer Abdizhamil Nurpeisov published an interesting epic novel, *Blood and Sweat,* the subject of which is the prerevolutionary life of the Kazakhs. Georgi Markov is finishing work on an ambitiously large novel with a historical-revolutionary theme, *Siberia;* two sections have run in the magazine *Znamya.*

The period of the great social upheaval in Russia attracts writers time and time again, serving as an inexhaustible source of plots and themes. Back of the continuing emphasis on this turning point in history are considerations compelling for the writer: the wish to depict the great future which began to unfold in the years of the Revolution; the need to understand the dialectics binding past and present; the responsibility for making the experience of socialist transformation of the world and man the property of new generations.

Sergei Zalygin's novel *Salty Canyon* is about a peasant republic formed in Siberia during the Civil War. It was surrounded by enemies, completely isolated from the outside world. Its leaders, elected by the peasants, received no directives and had only a vague understanding of Marxism. But they were building socialism there, too, gropingly, independently, on the basis of the people's experience, the peasants' ideas of what the new life should be like. The strength of the Socialist Revolution, says this writer, was that it grew from below, was determined, in the final analysis, by an inexorable historical need, the deep-rooted aspirations of the working masses.

Perhaps the most notable achievements of Soviet literature of the past 15 or 20 years deal with World War II. I believe that this subject has still not receded into history. The war is described by those who fought in it and saw it go on, by people of the generation now over 50 years old. And they write about it in different ways. As unhurried epics, with particular attention to psychological detail, to the changing atmosphere of wartime, as, for instance, Konstantin Simonov does in his trilogy *The Living and the Dead,* or the Lithuanian writer Jonas Avižius in his novel *Lost Shelter.* As reportage, with constant shifting from document to fiction, from a minor, ordinary episode to the strategy of General Headquarters—as the tragic and heroic days of the Leningrad blockade are described by Alexander Chakovsky in his novel *The Blockade.* Lastly, in an altogether different style, lyrically, concentrating the drama of events within the small space of the story, Victor Astafyev writes about the war. Love amidst the cataclysm of war, love which can coexist with heartbreak, bloodshed, the horrors of battle —all of this in the modern pastoral *The Shepherd and the Shepherdess.* War as an entirely unnatural tragedy paid for by youth and beauty, by lives unlived—that is the burden of Boris Vasilyev's story *The Dawns Are So Quiet Here,* which was later successfully transferred to stage and screen.

The people who lost 20 million of their relatives and friends in the war are particularly hungry for books about wartime and have an especially keen ear for artistic dishonesty. In these volumes there is very little said about abstract pacifism; such a stand can blur any social definition in the fierce battles between irreconcilable forces.

Dealing with Today's Hard Facts

Good books about the past are always contemporary in content. However, there is also a great demand for literature specifically about today, and writers are responding with novels, stories, verses, long poems and plays wide-ranging thematically and in style as well.

Soviet life is certainly no cloudless idyll. The country marches on, divesting itself of the remnants of the past, resolving new contradictions that develop as socialist society advances. In the village conditions of life and labor are changing fast. The entire enormous field of industrial production is going through a difficult stage. In process is the transition from extensive to intensive forms of economic management, a large-scale scientific-technical revolution, which is spreading out to new fields all the time. The relation of people to nature has changed in unmistakable ways. We have begun to realize the full import of the protection of nature. Our searchings (educational and successful in many ways) involve new, socialist methods for solving the problems that stir the minds of men. The highly principled transition of our socialist society to a new level of culture comprehends every aspect of life.

Social Problems Reflected in Literature

Modern Soviet literature is an impassioned and committed participant in this gigantic pursuit, mirroring the changes taking place in the lives, minds and world perceptions of men and women, and helping to accelerate these changes. Literature helps us to understand the contradictions and social conflicts that arise, to detect new forms of conservatism and other social evils. Asserting the beauty and future of the communist ideal, the ethical values of the socialist society, literature mercilessly exposes everything that contradicts these values and ideals, fights against the stubbornness of nationalism, bourgeois in both origin and class nature, the consumer attitude to life. Is this partisan, this multifaceted occupation our writers are engaged in? It certainly is.

Ignati Dvoretsky's *The Man from Outside* has been produced in many theaters of the Soviet Union. Its protagonist is the young engineer Alexei Cheshkov, invited from the outside to help organize the work of an enormous modernized foundry in a machine-building factory. It would seem a dull theme, but the play arouses the audience, not only because production here appears as a symbol for the ethical and humane in people. The playwright exposes a very important social conflict: society's ripening demand for a new style of work and new work relationships.

The White Steamer, a parable by the Kirghiz writer Chinghiz Aitmatov, is the subject of lively discussion among readers. The story is set in a distant mountain forest where a little boy lives with only a few grownups. The boy's grandfather tells him a fairy tale about a mother reindeer that

once saved a human tribe. In real life, however, a mother reindeer is brutally killed by the boy's uncle, who is a cruel and avaricious poacher. Good and evil clash so sharply and uncompromisingly that the moral of the story can assert itself only at the cost of the child's life.

A Typical Soviet Writer

How would one describe the contemporary Soviet writer? In his latest novel *Beautiful Adygene,* Vladimir Soloukhin devoted a few pages to the peculiarities of the life and work of the professional man of letters. He quotes from conversations that often take place when he is on a trip somewhere:

"Where do you work?" curious travelers ask him.

"Nowhere," the writer replies. "I work at home."

Like most professional writers, Soloukhin really does work at home. He spends most of his time in his Moscow apartment and the summer months in the little village of Olepino, where he was born. He began as a poet, became known in the fifties for his lyrical works in prose, *A Drop of Dew* and *Vladimir Country Roads.* Later (unexpectedly even for the writer himself) his original and poetic book about mushrooms, *The Third Hunt,* brought him more recognition. His work satisfies the demand of people today for kinship with the earth, with nature, with national tradition. Some of Soloukhin's writing has won unanimous approval from critics. Other works, like his *Black Boards,* on Russian icons, were criticized in the literary press.

This, in brief, is the portrait of one of many Soviet writers, more or less typical because it helps to explain not only the direction of this Soviet writer but of Soviet literature as a whole.

All the works we have described show that the criterion of partisanship cannot be applied mechanically to artistic endeavor. A piece of literature can have social significance even though its subject matter seems to have little direct concern with the social and ideological problems of today.

Some Shortcomings

Does this mean that every book published in the Soviet Union satisfies the criteria of communist partisanship? Not at all.

The literary process is a complex and contradictory phenomenon. Sometimes one comes upon splendid intentions and progressive ideas fully expounded which, alas, never rise to the heights of genuine artistry. Many verses, stories and novels, published and unpublished, clearly show the immaturity of their authors. But the exception, as they say, only proves the rule. Soviet writing today on the whole creates responsible party literature, at the same time meeting social needs and standards.

The Larger World

The Soviet writer does not limit his concern to the problems of his own country.

"The world has found a place in my heart," says the Lithuanian Eduardas Mieželaitis. "And the big world which I have traversed now pursues me everywhere " is a line from a poem by the Avar Rasul Gamzatov. "I'm responsible for everything in this world" are the words of Leonid Martynov. They are, in summary, the social credo of the Soviet writer today.

NEXT ISSUE

Folk dancing takes on a new dimension when the Moiseyev Company does it. Director Igor Moiseyev gathers material for the group's repertoire from the far corners of the big, multinational Soviet Union and transforms it into exquisitely finished gems. This summer the group is touring the United States, presenting old favorites along with new numbers. A picture story in September describes the new dances.

There are all kinds of jobs for students on vacation, and many young people, eager for the opportunity to make a contribution to their country's development, volunteer to work where they are most needed, regardless of the difficulty of the job. More than 500,000 students have formed construction teams and are building houses, schools, roads, clubs. An article describes one such team that is helping reconstruct Gzhatsk, birthplace of Yuri Gagarin, the world's first astronaut.

This spring marked the twentieth anniversary of the virgin land development project in southern Siberia and Kazakhstan. Supplied by the government with building, transport and agricultural machinery as well as considerable funds for incentive pay, thousands of enthusiastic young pioneers settled in those sparsely populated areas with harsh climate. The virgin lands cultivated today account for 27 per cent of the country's grain production. A group of articles describes the transformation of the area and plans for its continued development.

The nazi army dealt one of its first blows in World War II at the Brest Fortress on the western border of the Soviet Union. For more than a month this small garrison fought the superior forces of the enemy. An excerpt from the book *Brest Fortress* by Sergei Smirnov to mark the thirtieth anniversary of a defense that has become a symbol of heroism.

A biographical sketch of the Soviet virologist Mikhail Chumakov, who collaborated with Americans Hilary Koprowski and Albert Sabin in the fight against poliomyelitis. Chumakov and his wife Marina Voroshilova tested the polio vaccine they developed in the fifties on themselves, their children and grandchildren. The experiment was a success, and the USSR is now exporting this vaccine to 40 countries, saving millions of lives.

To mark the 250th anniversary of the Russian Academy of Sciences, we shall acquaint our readers with contributions of Russian and Soviet scientists to world science and the attitude of Soviet youth toward science today.

Americans know film director Sergei Yutkevich for his *Othello,* which took top awards at international film festivals. Yutkevich unequivocally states that social consciousness and responsibility as a citizen are the only brakes on artistic freedom. "The art conscious of its right to creative freedom cannot afford . . . irresponsibility," he believes. In an interview Yutkevich discusses the role of the artist under socialism.

An article by Vladimir Glotser, who dramatized *Uncle Remus* for children's radio programs, tells about letters he gets from Brer Rabbit's little friends.

COMING SOON

Crime Prevention

Lincoln and Turchin: Line of Research

Alexander Borshchagovsky is the author of The Russian Flag, *a novel about the defense of Kamchatka during the Crimean War (1853-1856), another,* The Milky Way, *and of many stories and screenplays. He has recently completed a historical-biographical novel,* Where the Blacksmith Settles Down.* *The action covers a few decades in nineteenth century Russia and significant events of the latter years of the 1800s in the United States, including the presidential campaign of 1860, the Civil War and the subsequent development of the country, particularly the northwestern states, up to the early twentieth century. The central character is Ivan Vasilevitch Turchaninov, a socialist-minded Russian colonel, who with his wife Nadine lived in the USA for 45 years under the name of John Basil Turchin, brigadier general of the U.S. Army. The novel is now being serialized in the magazine* Sibirskiye Ogni *(Siberian Lights). It will be published in book form by Sovremennik, in Moscow. Invaluable assistance in collecting the historical material for his book was given the author by historians, archivists and residents of Illinois, where John Turchin lived.*

** Taken from the proverb "Where the blacksmith settles down, a town will rise."*

Historical novelist Alexander Borshchagovsky.

I FIRST LEARNED about Ivan and Nadezhda Turchaninov in 1967, when I was leafing through a volume of *Literaturnoye Nasledstvo* (Literary Heritage). Among recently discovered letters to Alexander Herzen, nineteenth century revolutionary-democrat, writer and publicist, were two from the Turchaninovs, dated 1859 and mailed from the town of Mattoon, Illinois. Those two letters bit into my memory and gave me no peace. Who was he, that relentless critic of the American way of life a hundred years back who nevertheless made his gratitude to that country very plain: "As for me," he wrote, "I thank America for having helped me to get rid of my haughty ways and prejudices and for bringing me down to the level of an ordinary mortal. I became a new man. No amount of work, of labor, could scare me. Nor was social status any longer an issue with me. Whether I farmed the land and carted manure or sat with great scientists of the new country discussing astronomy in a sumptuous office, it was all the same to me."

Though I had a book in progress at the time, I began searching around in encyclopedias and reference sources for any grain of information I could find about Turchaninov and his wife Nadezhda. I found one mention of him in the *Encyclopedia Americana* and a few words about Nadine, as she was called in America, in the *Dictionary of the Civil War.** I learned that the Lenin Library in Moscow had an excellent collection of materials on the American Civil War. Here there were not dozens, but hundreds, of books published in the United States. Few of them, however, mentioned the man Ivan Turchaninov who in 1856 became John Basil Turchin. Soon after, he enlisted in the U.S. Army and rose to brigadier general, a war hero. Information was all too sparse. A biography was there and waiting, but unsubstantiated by facts and documents.

To give one example: Ernest E. East, a past director of the Illinois State Historical Society, at the conclusion of his interesting article "The Russian General in Lincoln's Service," *Illinois State Historical Society Journal,* 3, No. 1 (1959), writes that official documents supplied little information on the relations between Lincoln and the general. Why, for instance, had Lincoln agreed to Turchin's promotion in spite of the fact that the officer constantly violated military regulations? Was it not because he knew Turchin well that Lincoln had confidence in his military skill, notwithstanding the official reports? If these two men had known each other earlier, where had they first met? When these questions were answered, wrote East, the whole story of Lincoln and Turchin could be written.

Today I know when Lincoln and Turchin first met, what their relationship was and what part Turchin played in the presidential campaign of 1860. Today a new story about Lincoln and Turchin can be written based on documented facts.

Turchin and Lincoln knew each other before the couple moved from Mattoon to Chicago, which was no later than the autumn of 1860. Turchin himself told a compatriot who visited the USA soon after the Civil War about his "active role in the presidential election struggle between Lincoln and Stephen Douglas." Here is Turchin's story, as told in Mikhail Vladimirov's *A Russian Among Americans,* published in St. Petersburg in 1877.

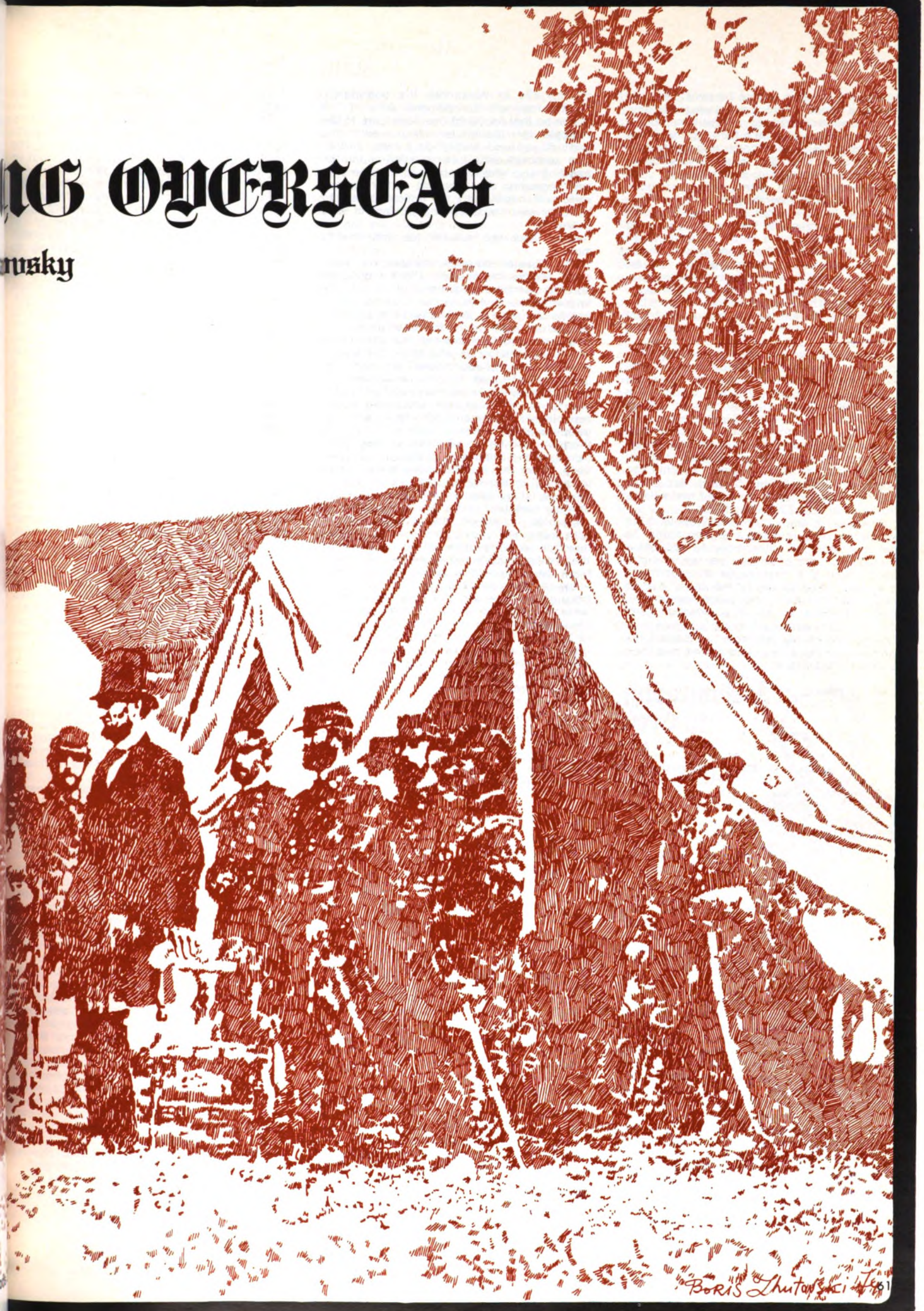
"You know," said Turchin, "wherever Abraham made a speech, Douglas, who followed in his wake, was sure to show up. I was living in a small town not far from here** when we heard that the rivals were bound our way. A few citizens dropped in to ask me to draw a huge cartoon of Lincoln and Douglas and set it up in the woods

* By Mark Mayo Boatner (New York: David McKay, 1959).

** He told this story in Radom, Illinois.

ING OVERSEAS

...nvsky



where the meeting was to be held. That put me in a predicament, considering the passions that were raging at the time, but I agreed. I knew Lincoln's face very well but not Douglas's. It took some figuring to find a way to portray the latter. In the background I drew some pyramids and had Lincoln approach them with enormous strides, peering into the distance from behind his hand. Then I set the stout short figure of Douglas—he was called 'The Little Giant'—with his back to the viewers. From the slight turn of his head one could see the venom that was consuming him as he watched Lincoln. Though both were pictured in caricature, Lincoln stood out to advantage. This thing made an impression. Abraham benefited from it and drew almost the whole locality to his side. The picture is still there—I saw it during a recent visit."

The words "I knew Lincoln's face very well" can only mean that the two men were well acquainted. From the newspapers—cartoons and daguerreotypes—Turchin must have known what Douglas looked like as well as he did Lincoln. The Little Giant was the subject of a great many cartoons. Turchin must surely have known Lincoln before the Douglas meeting in Mattoon. Before Lincoln moved into the White House, Turchin, an engineer for the Illinois Central, had occasion to meet the future president many times in the railroad's Chicago offices.

There were many more blank spots in the American part of Turchin's biography. To get that sense of authenticity so necessary for a solid work of fiction, free as its flight, imagination and psychological conjectures may be, I had to fill in the many events about which I had only piecemeal knowledge or none at all. The situation with Turchin was particularly complex since only one part of his life was spent in Russia; the greater and more important period was lived in the United States.

A Biography in Need of a Supplement

He was born in 1822, in the Voisko Donskoye region, into the family of an officer who was neither rich nor of noble birth. On graduating from the St. Petersburg Artillery School, he served in the mounted artillery on the Don. At 26 he was a lieutenant in command of a mounted artillery battery in Poland, and from there, with Paskevich's army, he marched to the Carpathians. After the military campaign of 1848-1849, he enrolled at the General Staff Academy and finished the course with a medal. Now, as a fortifications engineer, he set off for Sevastopol, besieged by the French and English. His promotion there was rapid—from captain to Guards colonel by the end of the Crimean War. He also won favor at the royal court and was called back to St. Petersburg to build fortifications along the coast of the Gulf of Finland all the way to Narva. After the war he was made Chief of Staff in Poland of the entire Russian corps of 50,000 bayonets. Suddenly this soaring and unclouded career came to an end in the summer of 1856, after the death of Nicholas I, on the eve of Alexander II's coronation. Turchaninov left Europe and crossed the ocean so that he could devote his life to the struggle for republican ideals. With him went 30-year-old Nadezhda Lvova, a Russian princess who had rejected a church wedding and who was soon to write to Herzen regarding her stories: "Everything I write will necessarily be antireligious and antiloyal and therefore unpublished in Holy Russia."

What was the reason for this drastic move?

The Russian sources, meager but sufficient, supply the answer. There are books and Don archive documents of the period following the reform in the Cossack Army and its inclusion in the Russian Army proper, as well as archives of the Artillery School and General Staff Academy, that give us an idea of the man—his character, his way of thinking and his aspirations. We can conjure up the future Turchin, a socialist by conviction, who studied the works of Fourier and Owen; Turchin, the champion of the republic, of liberty and equality of men, regardless of the color of their skin; Turchin, the man who hated all forms of despotism. During the Carpathian campaign of 1848-1849, when the Russia of Nicholas I came to the aid of the Habsburgs in crushing the republic, Lieutenant Turchaninov of the artillery took part in the fighting, against his principles. It may be that his acquaintance with Nadezhda Lvova and their remarkable devotion to each other—it lasted for more than half a century and could, by itself, have been the subject of a proud and sad story —saved the impetuous Turchaninov. By the time of the Crimean War his social ideas were fully shaped, and his closeness to the court reinforced them. When after the death of Nicholas I the whole world labored under the illusion that the future monarch would establish democratic rule, Turchaninov knew better. Unhesitatingly he left Russia for the American republic.

Illinois Comes to the Aid

However, the main object of this article is to give an account of my research on the Turchins in the USA although I was separated from their history there by a wide ocean. At this point let me stop to thank the people at the Illinois Archives, the historians, museum curators and schoolteachers, for their invaluable assistance and unfailing kindness. They were all aware of the significance of these Russian-American ties rooted in the distant past.

Though the dictionaries and reference books mention General Turchin and his books in passing, I soon came to distrust this offhand characterization of the man. What I saw was a deeply creative individual who had served liberty in the highest sense of the word. I found meaning in the differences that arose between Turchin and the Northern generals, a conflict that cannot be explained away by irascibility or temperament. I realized that I could not write about Turchin without first reading the books he had written in the United States.

They say that where there's a will there's a way: Among the numerous books published in the USA on the occasion of the centenary of the Civil War, one turned out to be the magic key to many riddles concerning Turchin. This was William L. Burton's *Descriptive Bibliography of Civil War Manuscripts in Illinois,** in which Turchin is mentioned more than once. Apparently in Chicago, Freeport, Springfield and other cities there were documents pertaining to General Turchin, his letters and reports, and diaries written by his men. Among them was the diary kept by volunteer James Fenton which, judging from the brief annotations, was largely devoted to Turchin and his wife Nadine. I wrote to the Illinois State Historical Society requesting photostats of the manuscripts mentioned by Burton, at least copies of the pages devoted to Turchin. I explained my object, which I thought should interest Americans, for Turchin had been a talented and noble son of Russia who fought bravely against slavery under Lincoln's Republican banner.

I did not have long to wait. Despite the alarms and doubts inevitable in such cases, packages, big and small, began arriving a month later from cities in Illinois. Some of the slim ones contained real treasures—copies of Turchin's letters or army reports in which he invariably made tactical and strategic suggestions and insisted on his right to wage a resolute revolutionary struggle against the "knights of the iron collars" —the slaveowners. I received photocopies of manuscripts from Mrs. Frances Woodhouse, curator of the Stephenson County Historical Society Museum at Freeport, and from Mrs. Stephen West, of the Chicago Historical Society's Manuscript Division. Also, the invaluable diary by James Fenton from Paul Spence of Springfield.

When he donated his father's diary to the Springfield library in August 1953, James Fenton's son, Mesha Fenton Hanson, wrote that he wished to direct the library's attention to his father's stories about General Turchin, the Russian general who played so important a role in the Civil War. Hanson added that his father had greatly admired Turchin and his wife.

After the death, in 1916, of James Fenton, a soldier who served under Turchin, his diary lay untouched for almost 30 years. His son began making a copy of it during another war and finished the job in February 1945. His preface to the diary stresses the point that it was being written in February 1945, when a war greater than any the world had ever known was being fought. Thus did the son of a veteran of 1861-1865, an enemy of slavery who hated the mutinous South, sense the ties between that war against slaveowners and the greatest battle ever waged against fascism.

I was lucky to be sent a copy of Turchin's first book, *Military Rambles,* published in 1865. And M. Kluge of New York, a cousin of the Soviet writer Yuri Gherman, was kind enough to send me a xerox copy of Turchin's other book, *The Campaign and Battle of Chickamauga* (1888). Documents continued to come in (they still do) for three years, greatly extending the framework of Burton's book. I received hundreds of pages referring to Turchin's life in the USA from Mrs. Woodhouse, Mrs. West and others; books published right after the war, for example, such as *The Patriotism of Illinois* (Chicago: 1865),** or, somewhat later, *Illinois in the War for the Union* (Springfield-Chicago: 1887); articles from scholarly jour-

* Evanston: Northwestern University Press, 1966.

** By Thomas Nears Eddy.

nals and old magazines, newspaper items and notes. Now I felt more confident. I had a good picture of Turchin's character and his motivations.

A Northern General

I learned of the couple's first years in the United States, of their failure as farmers, of their privations; of their journey from Long Island to Philadelphia and thence to New York; their sudden move to provincial Mattoon, where Turchin was an engineer for the Illinois Central Railroad. I found out about his acquaintance with Lincoln, then the lawyer for the railroad, and with its vice president and chief engineer, McClellan. I discovered how Turchin came to join the army on June 17, 1861, at Long Camp near Chicago, when the volunteers of the famous 19th Illinois, electing their commander, chose the Russian colonel over Captain Grant, the very Ulysses S. Grant whose subsequent victories won him command of the army and who became President of the United States. I also learned how relentlessly Turchin was persecuted by secret agents of the South in the ranks of the Northerners, people like Don Carlos Buell, commander of the Cumberland Army. From the very outset Turchin fought not only for the Union but first and foremost for the complete destruction of slavery, for freedom for its victims all over the nation.

Much that had been wrapped in mystery became clear. From an item in the *Chicago Record* I learned that the train carrying Turchin's soldiers had not by accident toppled off the bridge over Beaver Creek near Vincennes in the autumn of 1861. As the *Chicago Record* said:

"Mrs. Turchin followed her husband when his regiment was called to Washington to defend the Capital after the Bull Run fight. En route the train went through a bridge near Vincennes, the Knights of the Golden Circle having cut the timbers."

In Fenton's diary I found confirmation of the fact that Turchin's regiment had been the victim of a criminal plot.

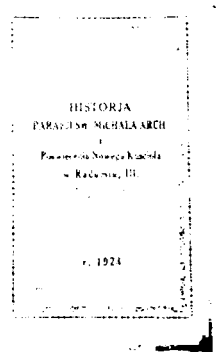
"On about the fifteenth of September 1861, General Grant received an order to send five picked regiments to Washington, D.C., to reinforce McClellan. The 19th and 24th Illinois were started for Washington. In the excitement of that time we did not see anything out of the ordinary, but as no other regiments were sent, it looks at this late date as if someone was trying to kill two birds with one stone." (*Civil War Diary*, p. 18)

It was now clear why the leaders of the mutiny in Missouri and later in Richmond, capital of the Confederation, offered the enormous sum of $50,000 for Turchin's head that autumn of 1861. His trials in Athens and Huntsville, Alabama, in the summer of 1862 exposed their machinations. This was no legal mistake, it was not to be explained by General Buell's temper or an unfortunate concurrence of circumstances. The only thing Turchin was guilty of was that, against regulations, he had been accompanied in his regiment and hospital ward by Nadine Turchin, war nurse and heroine, adored by the volunteers, who addressed her as Madame in token of their respect. The court-martial in Alabama was simply an effort to discredit Turchin. The command strove to rid itself at all cost of the officer who set the life and health of the soldiers higher than the War Department's formal regulations.

Now I know that when she rushed to Washington, D.C., to save her husband from his unjust sentence, Nadine did not talk to Lincoln simply as President, he was a man she knew and respected, a man who held her in esteem. President Lincoln did more than repeal the court-martial sentence. He promoted Colonel Turchin to brigadier general. As John Fergus, publisher of *Chickamauga*, wrote in his preface to the book, General Turchin was one of the best-trained military men in the country. "His procedure for dealing with rebel property, including slaves, at the commencement of his military career in this country was that of an experienced soldier and inspired the people to a more vigorous prosecution of the war."

Thanks to my Illinois friends, I was able to reproduce practically the entire military biography of the Turchins. I found everything set down in great detail in the documents, with the result that the figure of Turchin rose in all its formidable height, revealing the depths of his personality. My distant Illinois friends, who had never met me, set a noble example of disinterested service in a mutual endeavor of historical and cultural importance.

Particularly noteworthy was the assistance of Mrs. Woodhouse. As I see it, my book will, in some measure, also be hers. Our three-year correspondence and the time and effort she spent in the search for documents and books that seemed to have disappeared for good give me grounds for that statement. To help me, Mrs. Woodhouse, who had never taken any special interest in Civil War history, got in touch with historians, archivists, museum people, even village teachers. As a result, she obtained new and very important information about the Turchins.



Founder of Radom

The two books by Turchin are more than rare, there is only a single copy of each.

But I also needed another book, which could not be found in any library. All the efforts of Mrs. Woodhouse and I. Zavoiko, great-granddaughter of Admiral Zavoiko, hero of *The Russian Flag*, who now lives in New York, to locate the book in the libraries of the United States proved to be unsuccessful. It was published in Polish under the title *Historia Parafji Sw. Michala Arch.*

I needed it so badly for this reason: From the spring of 1873 to the end of his life in 1903, ex-General Turchin, now an engineer and real estate agent for the Illinois Central, lived in a village in Southern Illinois, between the Ohio and Mississippi Rivers, in Washington County. The village, with the Polish name Radom (after the city in the Kielce province dating back to the twelfth century) was founded by Turchin a hundred years ago, in September 1873, on St. Michael's Day. It was a Polish colony; Turchin had hoped to make it an example of social justice in operation, and he played a decisive role in its early history. But his plans for creating such a commune failed miserably; the tragedy echoes in his letters.

How was I to get more information about the Turchins' long sojourn in Radom? How was I to see that drama of their later life? The historians say nothing about those years or write in vague generalities. In just one old article did I find a reference to the Polish book about Radom. Two quotations from it led me to believe that the book was one long exciting story about Radom and Turchin. I expected a great deal from it but never imagined how really priceless it would prove to be.

While Mrs. Woodhouse was searching for it in the United States, I tried to locate the book in Warsaw and Cracow. It could easily have found its way from America to Poland. But nothing came of that attempt either. Meanwhile I discovered Waslaw Kruszca's *Polish History in America*, vol. 10 (Milwaukee: 1907), which had some very meager information about Radom and Turchin. It said only that he had been "a remarkably gifted violinist" who "after his death left behind a valuable 270-year-old violin made by the notable Gasparo da Salò."

Mrs. Woodhouse persisted in her search. She wrote me encouraging letters, saying that she and her friends simply hated to give up, that they were searching the libraries and book collections of the Belleville diocese in southern Illinois.

The day I was about to mail a letter to the Vatican Library—my last hope—for, as can be seen from the title of the book, the history of Radom was in the form of a church history—that day, on May 12, 1973, I received an airmail package from Freeport with a happy letter from Mrs. Woodhouse and a xerox copy of a small, 43-page book published in 1924. Mrs. Woodhouse wrote me that she had had to put her 91-year-old stepmother in a home in order to be able to go to Chicago, Radom and other places in search of the book. In Radom she was assisted by a schoolteacher, William Gile. They found a copy of *Historia Parafji Sw. Michala Arch.* at one of the farms outside the town, the property of a long-naturalized Polish family, one of the first to settle in Radom.

The book gives an almost complete picture of Turchin's life in Radom. It tells, in its own way, about the founding of Radom, its life and customs, the people with whom Turchin associated, his social activities and generosity, about his work as a historian, writer and publicist. The book has photos of Radom and, among them, a heretofore unknown portrait of the elderly Turchin himself. The only known military portrait (in a general's uniform) was thus supplemented by this picture of the gray-haired sage.

I have finished my novel, but I feel sure that further searching will yield new discoveries. There may be more manuscripts by Turchin and stories by Nadine and even correspondence. Then it will be possible to write not only a historical novel but a real biography, built from beginning to end on the firm foundation of fact. A biography, better than any other literary work, could resurrect for our country and the United States two very extraordinary people.

"By protecting nature, man protects his motherland," wrote Mikhail Prishvin, an outstanding Soviet ... endowed with the gift of seeing the most romantic aspects of nature and its phenomena. From the first day of its existence the Soviet state has taken conscious steps to preserve its diverse and beautiful nature. More than a hundred preserves have saved from extinction such rare an... and birds as the mountain antelope, snow leopard, snow ram, flamingo, pelican and white he...

ANIMALS

ONAGER. A wild member of the horse family. Hunting the onager is banned in the USSR. Some experimental stations have been trying to mate the animal with the domesticated horse and ass.

THE SAIGA

By Lir Zhirnov

HERDS OF ANTELOPE had been moving in an endless stream past our field camp for several hours. They moved column-fashion, one herd following another, almost in the same tracks. At times, passing across a green-carpeted depression, they spread out along a wide front, nibbling the young, juicy grass on the go. It was the end of April, and they were on their annual migration northward, driven by instinct to the very same sites where their ancestors had given birth to new generations and where they would now, in about a week, bear their own young.

I had often witnessed similar scenes in Kalmykia and Kazakhstan during the spring migration of the saiga—the northernmost antelope in the world.

In the course of many centuries, the peoples populating steppe and semisteppes of our country hunted down the saiga, not so much for their meat as for their horns, which brought high prices as the raw material for medicine. As a result of mass hunting, wolf packs and the settlement of the steppe areas, the saiga was on the verge of extinction. The animal could be found only in the most remote parts of Kalmykia and Kazakhstan. On May 27, 1919, Lenin signed a decree that banned saiga hunting completely.

Some 15 to 20 years later the saiga population was clearly on the increase. By 1957-1958 there were more than two million saigas, numerically disproving the opinion of many naturalists that the northern antelope was a living fossil.

It ranges the zone of dry steppes and semidesert lands—from the foothills of the Caucasus to the foothills of the Altai and the Dzungarian Ala-Tau. Small saiga herds also occur in northwestern China and Mongolia. They favor flat plains, avoiding broken and even hilly terrain.

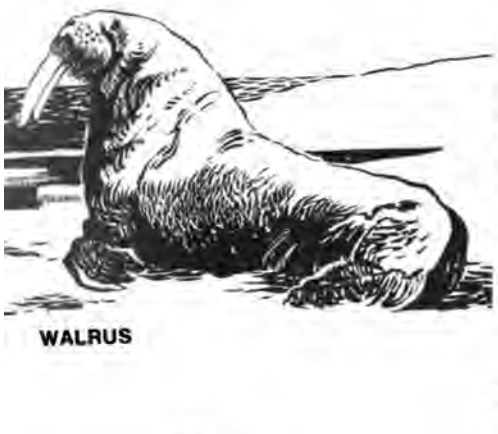
The saiga subsists on steppe and desert vegetation. It feeds on more than 100 varieties of plants, including grasses that poison domesticated cattle. The animal does not attach itself to any definite habitat but roams from one pasture to another. It therefore does not disrupt the biological balance of the steppelands and semideserts as do domestic animals that eat away and trample pastures. At the end of March and in early April the herds leave their wintering sites.

The saiga drops its offspring in early May. Herds double almost immediately. The animal's high fertility, early sexual maturity, mobile life and several other peculiarities ensure its survival as a species, and even its thriving, assuming, of course, the decisive element of government protection.

The saiga is no longer threatened by extinction. Moreover, the overabundant population of these animals has already engendered efforts to use them commercially. Three preserves—the Astrakhan, Irgiz and Bet-Pak-Dala—now permit limited hunting. They annually count the saiga stock, keep an eye on its condition, provide veterinary inspection and protect the animals from poachers.

However, there has been a new threat in recent years—civilization. The dry steppelands, semideserts and deserts which the saiga normally inhabits are beginning to be developed. Irrigation canals and motor highways are being built, land is being plowed up, animal husbandry is developing and new settlements are growing up in once wild areas.

Saiga herds have been deprived of out-of-the-way localities where they can peacefully bear offspring and spend the first week to ten days until the young become strong enough to begin their restless roaming existence with the adults. As the biologists say, the disturbance factor is already well rooted. The saiga stock can be preserved only if conservation elements are included in the comprehensive economic development plans for the areas they populate. The main administration for nature protection, preserves and hunting of the USSR Ministry of Agriculture as well as the hunting and wildlife preserve administrations of the Russian Federation and Kazakhstan, assisted by research institutions, have begun implementing a number of measures for the protection and rational utilization of our steppe antelopes to prevent a repetition of the saiga's past.



WALRUS

BISON. In 1927 there were only 48 of these animals left in the world, none at all in the USSR. By 1956 the Soviet Union had more European bisons than any of the 28 countries, the USA included, where the animal was still not completely exterminated. Today there are 400 pure-blooded bisons in the USSR, with herds of the animal living free.

EIDER. This large sea duck is famous for its down, which no other bird can match. There are about 9,000 eider breeding grounds on the Kandalaksha Islands, the preserve in the Barents and White Seas. At the beginning of the century the eider was almost extinct. Now the number beyond the Arctic Circle grows by 20 per cent annually.

THE WALRUS IS BACK

By Valeri Orlov

I WAS ASSIGNED the job of filming the walrus roo... Wrangel Island.* But when I arrived, there were ... ruses to film. They had not been seen the previo... either. Local hunters, old-timers, told me that the... shown up because of the cold summer and the abu... of ice in the strait. Others, however, insisted that ... had flown over the rookery and frightened them o... that what had happened? The question kept bother... And so I called at the USSR Research Institute o... Fishing and Oceanography in Moscow. Vladimir Kr... associate of the institute, who has spent many years ... ing these inhabitants of the ice-bound regions, listen... me carefully.

"Yes, there was a plane there making a walrus ... count," he replied, "but it couldn't have scared th... There must be some other reason for their absence."

"What is it?"

Krylov had begun his years of walrus watching for ... reason: The findings of air observations of herds ... sea and at rookeries showed a catastrophic decrease ... population of these marine mammals.

While their number was estimated at approximately ... 000 toward the close of the last century, only about ... remained by the second decade of this century.

It was evident that if the hunting of these animals ... not stopped, the Pacific walrus would meet the same ... those in the western Arctic areas, where vast rookeries ... been exterminated by unlimited hunting.

In this connection, the preservation of the living ... reserves of the Arctic became a subject of special ... sion as far back as 1954, at the fourth session of the G... Assembly of the International Union for the Conservat... Nature and Natural Resources, of which the USSR ... member. Interested countries were asked to draw up ... vention for the protection of marine mammals. In 1956 ... hunting was banned completely in the Soviet Union. ... the local inhabitants of the Chukchi Peninsula were ... to hunt the animal. The peoples of the Soviet North ... their housing materials, food supplies and consumer ... delivered regularly from the mainland, so that walrus ... ing is only one of the sources of income of the local ... farms.

The institute's Magadan department was assigned the ... of making a study of the biology of the walrus and of ... up recommendations for the permissible scale of ... cial walrus hunting. That was what Krylov worked on.

He went out to sea with hunters many times, observ... and studying their centuries-old occupation. He visited ... Cape Blossom where the females and their young ... stay, and Rudderskoye, where the males gather.

The years went by, and the picture of the life of Kr... charges became quite clear. As a result of counts ... different seasons, an important fact was established—... duction of the walrus population was very low: only ... per cent a year of the total population. That meant ... more than six per cent of the total could be hunted ... if the over-all walrus population was to be preserved.

Krylov's recommendations were accepted, and state ... were strictly limited in their walrus hunting. Subse... counts from planes showed that the Pacific walrus po... tion was increasing.

"So the absence of walruses on Wrangel Island was ... ously due to local ice conditions, not because they ... scared away," Krylov concluded. "Filming was done ... high altitude, so high that the animals couldn't have ... to the engine noise."

He was right, I found out not too long afterward, wh... director of the preserve on Wrangel Island advised ... last fall walruses had occupied even long-deserted ...

---

* Wrangel Island is in the extreme northeastern part of the ... Union, on the border between the East Siberian and Chu...

The population of the animals on this page is large enough so that they can be hunted.
Top: Caucasian aurochs.
Left: Sable.
Right: Saiga.
Bottom: Beaver.

"Sh-sh, don't scar

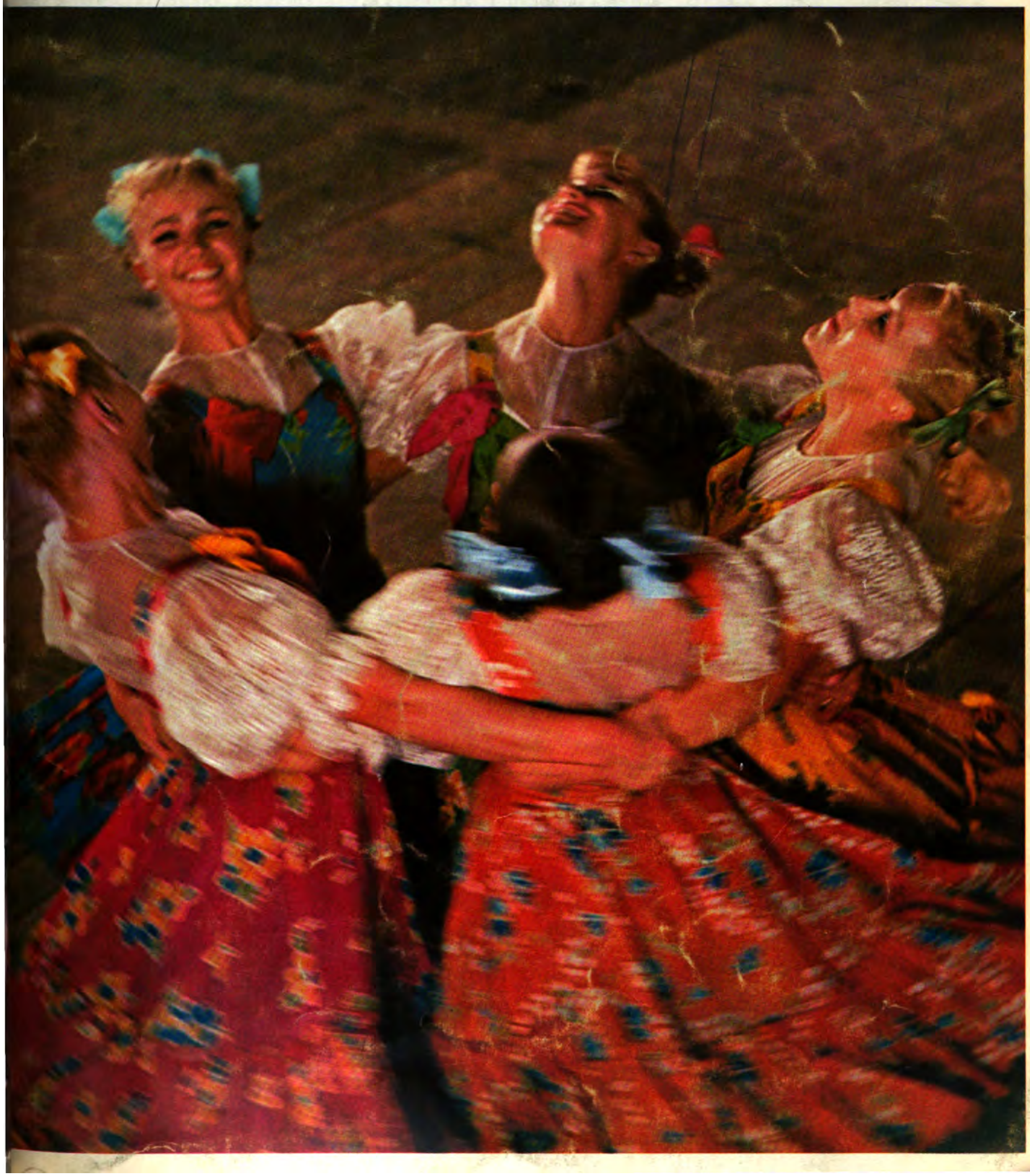
SOVIET LIFE

THE THIRD USSR-USA SUMMIT

USSR ACADEMY OF SCIENCES: 250TH ANNIVERSARY

PIONEERS IN THE VIRGIN LANDS

September 1974 • 50 cents



THE THIRD SOVIET-AMERICA

PROGRESS IN IMPROVING AMERICAN-SOVIET RELATIONS

Having considered in detail the development of relations between the USA and the USSR since the American-Soviet summit meeting in May, 1972, both sides noted with satisfaction that through their vigorous joint efforts they have brought about over this short period a fundamental turn toward peaceful relations and broad, mutually beneficial cooperation in the interests of the peoples of both countries and of all mankind.

They emphasized the special importance for the favorable development of relations between the USA and the USSR of meetings of their leaders at the highest level, which are becoming established practice. These meetings provide opportunities for effective and responsible discussion, for the solution of fundamental and important bilateral questions, and for mutual contributions to the settlement of international problems affecting the interests of both countries.

Both sides welcome the establishment of official contacts between the Congress of the U.S. and the Supreme Soviet of the USSR. They will encourage a further development of such contacts, believing that they can play an important role.

Both sides confirmed their mutual determination to continue actively to reshape American-Soviet relations on the basis of peaceful coexistence and equal security, in strict conformity with the spirit and the letter of the agreements achieved between the two countries and their obligations under those agreements. In this connection they noted once again the fundamental importance of the joint documents adopted as a result of the summit meetings in 1972 and 1973, especially of the Basic Principles of Relations Between the USA and the USSR, the Agreement on the Prevention of Nuclear War, the Treaty on the Limitation of Anti-Ballistic Missile Systems, and the Interim Agreement on Certain Measures with Respect to the Limitation of Strategic Offensive Arms.

UMMIT MEETING

During the summit meeting the following protocols and agreements were signed by the Soviet and American parties:

Protocol to the Treaty on the Limitation of Anti-Ballistic Missile Systems;

Protocol to the Treaty on the Limitation of Underground Nuclear Weapon Tests;

Treaty on the Limitation of Underground Nuclear Weapon Tests;

Treaty on Cooperation in Artificial Heart Research and Development;

A joint statement concerning future discussions on the limitation of the potential danger to mankind from new means of warfare, including environmental warfare;

Long-Term Agreement to Facilitate Economic, Industrial and Technical Cooperation;

Agreement on Cooperation in the Field of Energy;

Agreement on Cooperation in the Field of Housing and Other Construction.

General Secretary of the CPSU Central Committee Leonid Brezhnev and President Richard Nixon after the signing of the long-term agreement to facilitate economic, industrial and technical cooperation.

Both sides are deeply convinced of the imperative necessity of making the process of improving American-Soviet relations irreversible. They believe that, as a result of their efforts, a real possibility has been created to achieve this goal. This will open new vistas for broad mutually beneficial cooperation, and for strengthening friendship between the American and Soviet peoples, and will thus contribute to the solution of many urgent problems facing the world.

Guided by these worthy goals, both sides decided to continue steadfastly to apply their joint efforts—in cooperation with other countries concerned, as appropriate—first of all in such important fields as:

—Removing the danger of war, including particularly war involving nuclear and other mass-destruction weapons;

—Limiting and eventually ending the arms race especially in strategic weapons, having in mind as the ultimate objective the achievement of general and complete disarmament under appropriate international control;

—Contributing to the elimination of sources of international tension and military conflict;

—Strengthening and extending the process of relaxation of tensions throughout the world;

—Developing broad, mutually beneficial cooperation in commercial and economic, scientific-technical and cultural fields on the basis of the principles of sovereignty, equality and noninterference in internal affairs with a view to promoting increased understanding and confidence between the peoples of both countries.

Accordingly, in the course of this summit meeting both sides considered it possible to take new constructive steps which, they believe, will not only advance further the development of American-Soviet relations but will also make a substantial contribution to strengthening world peace and expanding international cooperation.

Excerpt from the Joint American-Soviet Communiqué

September 1974, No. 9 (216).

SOVIET LIFE

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Photograph by Miroslav Murazov

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LETTERS TO THE EDITOR

Having received your publication, SOVIET LIFE, for some months now, I only can compliment you for its high quality of art and presentation. I save all copies and pass them on to my daughter-in-law who teaches down in Southern Virginia.

It is fine that two great countries are beginning to understand each other better, even if they differ in political philosophy. I feel that it is of great benefit to all of us.

J. E. Marshall, Jr.
Falls Church, Virginia

Your magazine has been very helpful to me in my college studies of the Soviet Union. I recently took a 3-week extensive tour of the USSR, and the articles I read beforehand were a great help.

Amy Ballard
Arlington, Virginia

Several years of reading SOVIET LIFE have given me the satisfaction of taking a high-quality publication with good writing of interesting articles and incomparable reproduction of remarkable photography.

S. M. Brown
San Leandro, California

You are publishing the best magazine in America for the general public.

Your articles are inspirational and bring out the creative side of man's nature and the possibility of accelerating man's progress by concious effort. Thanks.

J. J. Geraghty
Vallejo, California

Excellent magazine, we enjoy it very much and wish more people had access to your magazine as a means to promote better understanding between the U.S. and the USSR.

Elmer Horn
Wisconsin Rapids, Wisconsin

I have been looking over your May issue, and I am glad about the work and consideration the Soviet Union is putting into environment and antipollution measures. It is enlightening and interesting. It is my firm belief and hope that the Soviet Union hos high standards regarding health, cleanliness and decency. Just about all I have heard concerning this has been favorable and true to the above-mentioned. I do believe your country is very conscientious in this and even most of the time—very strict! This is certainly what I want it to be so profoundly.

My best wishes for the continuing success of SOVIET LIFE and my deepest hopes for furthering better and good relations between our countries.

Leah McDonald
Honolulu, Hawaii

A DIALOGUE IN THE INTERESTS OF WORLD PEACE

…ably never before have ties and contacts between the Union of Socialist Republics and the United States in different areas of …l, economic and cultural activity been so lively as they are today. …biggest contribution, however, which we, Soviet and U.S. states- …the seventies of the twentieth century, can make to the cause …ter well-being and happiness for our peoples and for all man- …undoubtedly the reduction—and subsequently the complete …l—of the possibility of war between our two states."

Leonid I. Brezhnev

At the third USSR-USA summit meeting in Moscow a special agreement was concluded on cooperation in the development of an artificial heart. At the signing ceremony, from left, are Secretary of State Henry Kissinger, General Secretary of the CPSU Central Committee Leonid Brezhnev, President Nixon and Foreign Minister Andrei Gromyko. Below: President Nixon arrives at Vnukovo Airport in the capital.

By Spartak Beglov
Novosti Press Agency Political Commentator

SOME TWO YEARS have passed since a major turn was made in the direction of normalizing Soviet-American relations. This period has been marked by three summit meetings.

As a special correspondent I covered all three, including the one which took place in the United States last year.

Each of these summits had its own specific features. The most important result of the first was the agreement accepting the principles of peaceful coexistence as a basis for mutual relations between two powerful nations with different political systems. The second meeting was marked by a historic treaty, a mutual commitment to do everything possible to prevent thermonuclear war. The third round, whose results are still being finalized, sets new goals toward which both powers will move in limiting and ultimately stopping the arms race. It also outlines the long-term prospect of mutually advantageous economic, scientific and technical contacts.

Another feature of the two-year period has been the launching of a mechanism of negotiations for limiting strategic arms and the creation of a structure of cooperation in various practical fields ranging from business, science and technology to space exploration and medicine. As an observer of this process from the beginning, I would like to mention still another result which is particularly evident in the atmosphere of discussion and contacts and in the preparation of mutual decisions. It can be defined as developing our ability to do business with each other.

The turn in Soviet-American relations should be assessed from the viewpoint of

The June 1973 visit to the United States by Leonid Brezhnev, General Secretary of the CPSU Central Committee, and the agreements concluded at the time were a landmark in the development of closer ties between the USSR and the USA. Here he is welcomed by the residents of San Clemente. Below: U.S. businessman Armand Hammer meets with Brezhnev in the Kremlin.

In March 1974 Secretary of State Henry Kissinger came to the Soviet capital for talks with Leonid Brezhnev and Minister of Foreign Affairs Andrei Gromyko (left).

A sample of lunar rock brought back by the crew of the Apollo 17 was presented last summer to the Soviet people by Adolph Dubs, the American chargé d'affaires ad interim, on behalf of President Nixon. At left is Nikolai Podgorny, President of the Presidium of the USSR Supreme Soviet. Below: More than 15 U.S. firms now have offices in Moscow. In May of last year David Rockefeller, Chairman, Chase Manhattan Bank, arrived for the opening of his company's branch. Alexei Kosygin, Chairman of the USSR Council of Ministers, is at right.

the historian as well as that of the observer. It is important to recognize that this change was determined by objective historical forces, both past and present, and by the general direction of world politics. Had there not been a shift from cold war to détente, humanity would now have to be content with the mere semblance of peace. Had confrontation not given way to negotiations between the Soviet Union and the United States, the two countries would have to make do with ersatz relations.

Did the American people gain anything from such relations between 1917 and 1933, when the U.S. withheld diplomatic recognition of the Soviet state? On the contrary, this period only prevented the United States from recognizing the political realities of the present-day world and discouraged collective efforts to avert World War II. In the common struggle against nazism, on the other hand, victory was achieved by the cooperation of our two nations and of all the other participants in the anti-Hitler coalition.

As Leonid Brezhnev, General Secretary of the Central Committee of the CPSU, pointed out in his television address to the American people last year, we should now direct our joint efforts toward helping mankind attain a lasting peace.

The Soviet people are well aware that neither their economic and military strength nor international status give our two countries any additional rights. Rather, these things impose on them a special responsibility, not to dominate the world, but to work for universal peace, to restructure the system of international relations on fair and democratic principles. Many of the improvements in international relations have become possible because the world has changed and, to an equal extent, because increased political realism has given us valuable experience in coexistence and cooperation.

Obviously, the initial results of détente have favorably influenced the course of events, helping to resolve problems that had once seemed hopeless. The Middle East is an example. The renewed conflict in that area last autumn represented a test not only of the ability to reach a settlement there, but also of the worldwide process of détente, on which the new stage of Soviet-American relations depends. For the first time in the history of the Middle Eastern conflict, the United Nations succeeded in devising a formula acceptable to most of the states concerned for a halt in military operations, linking this with additional measures to attain a just and peaceful settlement. The concerted action of the USSR and the USA, including consultations with the members of the UN Security Council, played a significant role in this achievement.

Both the Middle Eastern situation and the process of détente as a whole are proof that international problems can be solved only when the legitimate interests of the states and peoples concerned are taken into account. Turning from global issues to the bilateral aspects of Soviet-American relations, it is just as necessary to recognize the importance of the principle of equality. Full consideration must be given to the interests of both sides in negotiations on security and disarmament, contacts in areas of mutual interest and cooperative activities.

The reasoning behind the process of normalization and the assertion of the principles of peaceful coexistence is that if there is an equal consideration of interests, then cooperation will follow.

Take, for instance, the principle of most-favored-nation treatment in commerce. Evidently the originators of international law did not use the most exact terms to define this concept. It does not by any means entail "favors," in the sense of special privileges or benefits, granted by one of the sides. In fact, it is highly improper to try to carry this double meaning over into practice, to interpret the principle politically and

make demands on the other side as a pretext for prolonging discrimination. In an interview that appeared in an American magazine, the Soviet Minister of Foreign Trade pointed out that most-favored-nation treatment is not a favor, but the opportunity to do business on an equal footing with other trading partners. If such nondiscriminatory terms are denied in one place, they can easily be obtained elsewhere. In spite of the artificially created political obstacles, it seems to us that U.S. business circles, on the whole, understand the scope of the opportunities they will miss if trade restrictions are not removed.

They are well aware of the interest of Soviet trade organizations, the capacity of the Soviet market and the vast possibilities opening up in this field. Within a short period the United States has become one of the Soviet Union's main trading partners in the West. The turnover between the two countries reached 1.5 billion dollars in 1973, a sevenfold increase over 1971. The participants in the July summit noted that there are prospects of surpassing the earlier target, which called for a two- to three-billion-dollar trade turnover by 1975. The House Foreign Affairs Committee pointed out in a special report issued in 1973 that the amount could rise to five billion dollars by the end of the seventies. There are even greater prospects for economic ties that extend beyond the boundaries of simple commodity exchange: agreements on an industrywide scale, joint construction of enterprises, compensation deals, specialization and cooperation of production. All this, of course, requires appropriate long-term financing.

An international conference on economic cooperation, held in Moscow in late June, attracted representatives of over 100 industrial and commercial firms and banks in 30 countries. One of the sponsors was the Stanford Research Institute. Thus, on the eve of the third summit, businessmen from all over the world found a common approach to the development of economic, trade, scientific and technical ties between the socialist world and the West.

During the summit a long-term agreement was signed to promote economic, industrial and technical cooperation between the two states. It envisages measures to facilitate the negotiation of long-term contracts between American firms and Soviet organizations and the implementation of joint projects. Included will be an exchange of information on economic and commercial matters, so that potential areas of cooperation can be defined more exactly. Nevertheless, the abolition of discriminatory restrictions on trade with the USSR, which was called for in the 1972 trade agreement and again at the third summit meeting, remains on the agenda.

The claim that each new step in the development of cooperation benefits only the USSR is understandably puzzling to the Soviet people. Take, for instance, the three new agreements on cooperation in specific fields—energy, housing and other construction, and artificial heart research and development—signed in June. The Soviet Union has accumulated considerable experience in housing construction in extremely cold and extremely hot areas and in regions of intensive seismic activity. The residents of Alaska and California would certainly welcome the opportunity to share this experience. Similarly, the people of both our countries are eager for the development of an artificial heart through joint efforts. As regards energy, the Soviet Union is rich both in natural resources and in scientific and technological achievements. The United States, hard hit by the energy crisis, would hardly find itself the loser here.

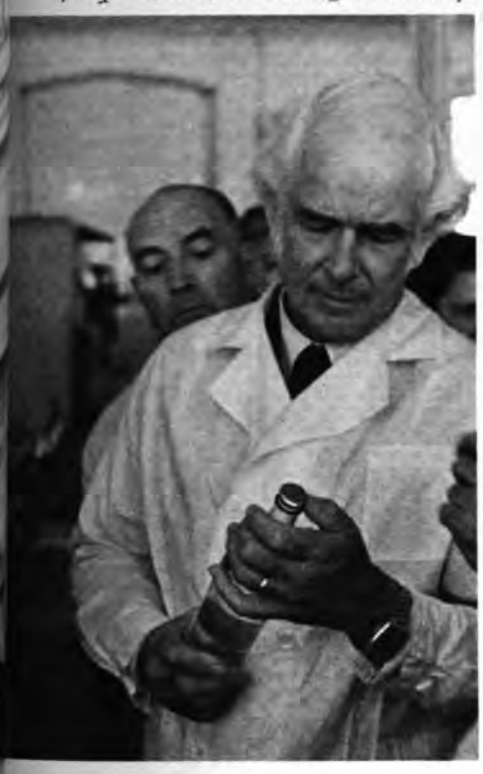
Besides, the value of the dozen or so agreements of the last two years on bilateral cooperation should not be measured by economic criteria alone. There is another

A group of visiting American writers on aeronautics interview USSR Minister of the Aviation Industry Pyotr Dementyev. Below: A Pan American Boeing-707 crew in Leningrad. Soviet and U.S. lines provide regular service between four big cities.

Soviet spacemen visited their U.S. counterparts in Houston recently. From left: Donald Slayton, Alexei Leonov, Thomas Stafford and Valeri Kubasov.

Stuart Broatch (left) represents Pratt and Whitney, a supplier of machine tools for the Kama Truck Plant. Below: The Institute for Joint Nuclear Research in Dubna, which with its counterpart in Batavia, Illinois, is investigating the peaceful uses of atomic energy.

A trade union delegation from the USA at the Volzhskaya hydroelectric plant near Volgograd. Below:Donald Kendall, Chairman of Pepsico, Inc., at a Leningrad distillery.



U.S. exhibitions on a variety of themes are appearing in the Soviet Union. Below : U.S. Secretary of Commerce Frederick Dent at a display of American machine tools.

Dr. Daniel Steinberg of the USA (right) in Leningrad with lipid metabolism specialist Dr. Anatoli Klimov.

vital factor, the political one. The implementation of these agreements calls for mutual action and better mutual understanding. Here is an example: As a result of the agreements, 13 joint Soviet-American commissions have been set up or are projected for the near future. They form an important part of the structure of peaceful relations between our two countries.

That is why the question of who has more to gain inevitably contradicts the spirit of détente. Victors and vanquished, winners and losers exist only in time of war. When mutual agreement is reached and a treaty adopted to ensure lasting peace, each step in this direction is marked by an equal consideration of mutual interests, an equal level of security for each side. Through such an approach the Soviet Union and the United States have been able to achieve tangible results in holding back the development of nuclear and strategic arms. The third summit meeting showed a new level of determination to use the utmost mutual restraint with regard to the further spreading of armaments, to prevent the creation of new systems of strategic arms and to further limit underground nuclear tests with a view toward their total elimination.

Those aims are being pursued through a number of new joint measures. Most important, agreement has been reached to limit the development of anti-ballistic missile systems to a single area on each side, rather than two areas as provided by the 1972 treaty. An agreement has also been concluded to limit underground nuclear weapons tests. Underground testing of nuclear weapons with a force greater than 150 kilotons will be completely ended as of March 31, 1976, while other underground tests will be reduced to a minimum.

The area of agreement on the banning of chemical weapons has been expanded. The USSR and the USA are preparing to initiate jointly in the disarmament committee new steps toward the conclusion of an international convention. Their general position is reflected in the joint statement on the need for effective measures to eliminate the use of environmental modification techniques for military purposes. They also expressed mutual support for holding a world disarmament conference.

The most demanding and difficult job was to analyze ways of achieving a new agreement on the limitation of strategic arms. Such an accord must involve both quantitative and qualitative limitations. The delegations of the two sides at the SALT talks have been instructed to complete the elaboration of this agreement in the near future.

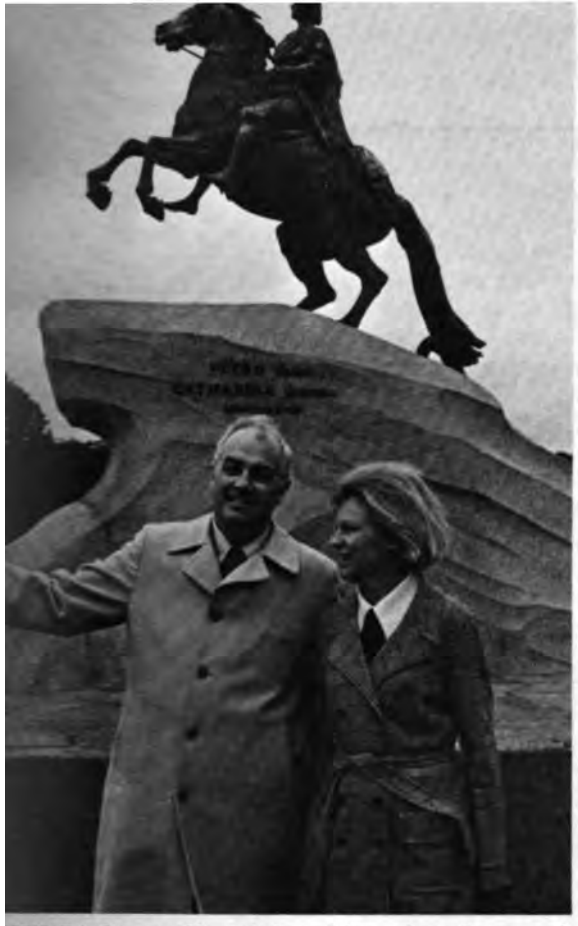
The third summit meeting revealed a new level of mutual understanding between the leaders of the USSR and the USA in relation to a number of other pressing international issues. Chief among these are the consolidation of détente in Europe through the successful completion at top level of the conference on European security and cooperation, and the achievement of a just and lasting peace in the Middle East. The summit participants agreed that to attain the latter, the Geneva Conference should resume its work as soon as possible.

Reviewing Soviet-American relations over the past two years, people of good will everywhere can be confident that, through the joint efforts of our two countries, the process of détente is becoming irreversible.

In a speech at the third summit meeting, General Secretary Brezhnev pointed out: "Ahead are new vistas, new spheres of cooperation for the benefit of our two great peoples and the peaceloving people of the entire world. In large-scale economic projects, in the development of new sources of energy, on transport routes, in scientists' laboratories and architects' design offices—everywhere new sprouts will appear of fruitful, mutually beneficial cooperation of our countries in the name of peace and a better life for the people."

Astronaut Joseph Kerwin visits a technicians club at the Young Pioneer House in Kiev.

A student chorus from Adams College appears with the Minsk Philharmonic Society.



XPO-74 *director King Cole and his wife in Leningrad.*

Young Americans on a tour of the Soviet Union meet some of their counterparts in Minsk.

rskine Caldwell, whose books are extremely popular in he Soviet Union, came here for the fifth time last year.

Rear Admiral Edward Rodgers and students of the Maine Maritime Academy visit the historic cruiser Aurora *in Leningrad harbor.*

American artist Minna Agins recently mounted an exhibition in Tashkent, Uzbekistan.

105 million ACRES OF GRAIN ON VIRGIN LANDS

MARCH OF THIS YEAR marked the twentieth anniversary of the beginning of the large-scale development of virgin lands in Kazakhstan, Siberia, the Urals, the Volga area and parts of the Northern Caucasus.

It was in the mid-fifties that plowing up the virgin lands became feasible. Tens of thousands of enthusiastic volunteers went to sparsely populated areas with building, transport and agricultural machinery. The government allocated large sums for equipment and incentive pay. In 1954-1955 more than 200,000 tractors alone were shipped to the virgin land areas, and 79 million acres of new lands were plowed up and sowed in the first three years. All told, almost 105 million acres of virgin lands have been put under cultivation over the 20 years. They now yield 27 per cent of all the grain produced in the country.

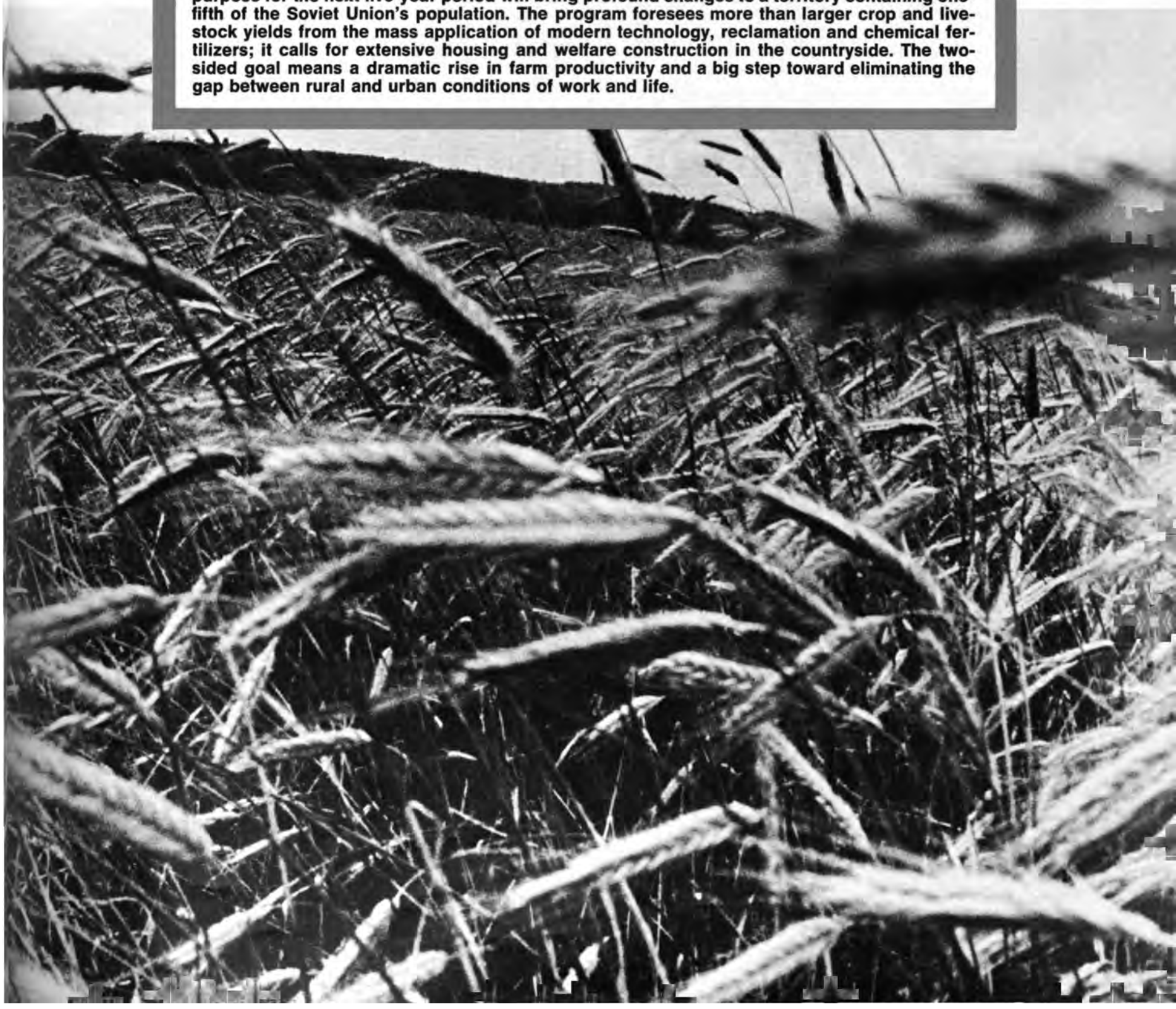
The development of the virgin lands performed another service: It set up a grain fund to cushion the effect of a harvest failure in other parts of the country. In 1973 the grain harvest came to 244.7 million tons—a much higher yield than our country had ever produced. And that in spite of the very bad drought of 1972 which, some specialists thought, would hurt crops in the years following, and also in spite of the very unfavorable weather of 1973 itself.

The concept "virgin lands" is now past history. These lands are now an integral part of the country's arable acreage.

The virgin lands project has transformed huge territories. Hundreds of state farms and dozens of new towns and settlements have sprung up on what used to be perpetually deserted steppes. Industrial enterprises and transport arteries have been built. Scientific centers have been set up. Millions of people have moved here to settle.

Since all the union republics took part, the undertaking became a veritable school of internationalism. The very names of the new state farms—Moskovsky, Leningradsky, Kievsky, Minsky, Gorkovsky, Kharkovsky—identify the new settlers who, together with old-timers from the steppes of Kazakhstan, Siberia, the Urals and the Volga area, plowed, sowed and gathered grain, built houses and elevators, laid power lines, taught children and looked after people's health.

The twentieth anniversary of the virgin lands project was celebrated throughout the country. The jubilee also served as an occasion for reviewing the country's agriculture generally. Projected was a long-range program, to 1990, for the comprehensive development of a vast region in the nonchernozem zone of European Russia. The 35 billion rubles budgeted for the purpose for the next five-year period will bring profound changes to a territory containing one-fifth of the Soviet Union's population. The program foresees more than larger crop and livestock yields from the mass application of modern technology, reclamation and chemical fertilizers; it calls for extensive housing and welfare construction in the countryside. The two-sided goal means a dramatic rise in farm productivity and a big step toward eliminating the gap between rural and urban conditions of work and life.



"I Warmly Recall Those Unforgettable Days"

. . . The veterans of the virgin lands development program well remember that time—the piercing winds blowing across the steppe, the storms and frosts, the tents pitched in the snow, and then the first long furrows in the fields, the first streets in new communities, the days packed with work and the nights that were frequently sleepless. A score of years have passed since then. But we can never forget that the first acres of new soil ready for tilling and sowing and the first tons of grain we gathered from them did not come easy to us. You cannot forget the thing into which you have put your heart and soul.

The history of our socialist motherland has been made and is being made by the working people. It was made and is being made by those who built the Dnieper Hydroelectric Power Station and the Magnitogorsk Steel Mill, those who laid the Turkestan-Siberian Railroad and dug the Kara-Kum Canal, those who transformed the Hungry Steppe of Uzbekistan into a flourishing oasis and who are now putting up the shops at the Kama Truck Plant and extracting oil in Tyumen. The labor achievements of the developers of the virgin lands rank high among all these glorious, heroic accomplishments.

The development of the virgin and long-fallow lands in Kazakhstan, the Altai and Krasnoyarsk territories, the Novosibirsk and Omsk regions, the Volga areas, the Urals and the Far East and other areas of the country constitutes one of the most vivid chapters in the annals of the creative endeavor of the Soviet people. Hundreds of state farms have sprung up; industrial enterprises and modern scientific centers have been built on lands that had for centuries lain idle. This made it possible not only to create a large new grain base in the eastern part of the country, but also to radically change the economy, the culture, the entire appearance of vast regions.

A new word—*tselinnik* (virgin land developer. Ed.)—has become current in the Russian language and in the languages of the other peoples of the Soviet Union. This means, comrade *tselinniks,* that your labor has been indelibly stamped on the memory of the people. I believe there can be no higher reward than this. . . .

The early years of virgin land development brought about a sharp turn in the destiny of hundreds of thousands of men and women, Communists and nonparty people, old and young, all those who moved away from their old homes, denying themselves urban amenities, leaving their near and dear ones behind to put this previously untilled soil to the plow and grow grain on it. They were the ones who were responsible for the success of the project.

Here in this hall are many familiar faces. We met out in the fields, on construction sites, in tents and field workshops, on collective farms and state farms, and at gatherings of party activists and meetings. As you know, comrades, the party sent me to work in Kazakhstan 20 years ago, in February 1954. I am proud that such a great mission was entrusted to me. I warmly recall those unforgettable days, extremely difficult, but, at the same time, truly happy ones.

Excerpt from the Speech by Leonid Brezhnev at the Meeting in Alma-Ata on March 15, 1974, Celebrating the Twentieth Anniversary of the Virgin Lands Development Plan

People from all the republics are cultivating the virgin lands. Kazakh Kairbek Karimov and Ukrainian Vladimir Lisachenko of the Zhdanovsky State Farm.

Hundreds of state farms have sprung up in the steppes.

105 million ACRES OF GRAIN ON VIRGIN LANDS

On the big Luziensky State Farm in the Kazakh Republic the field work is regulated from this control panel. The lights on the map show the number of grain combines in operation. Above left: The Belarus, manufactured by the Minsk Tractor Plant, is in general use in what was once virgin land in Kazakhstan, Siberia, the Urals, the Volga area and the Northern Caucasus. The virgin lands now provide 27 per cent of the country's grain. Below: Grain elevators are familiar parts of the landscape of these once unproductive regions.

105 million ACRES OF GRAIN ON VIRGIN LANDS

There was the splendid feeling of confidence that comes when difficulties are surmounted and forced to retreat. And there were many difficulties that had to be overcome. In the space of a few months, hundreds of thousands of new settlers had to be accommodated. Services had to be organized, and the construction of state farms, grain elevators, roads and bridges had to be launched. Many things did not go smoothly in the beginning. Discrepancies and misunderstanding arose, and there were mistakes, too.

People may ask, why, on such a joyous occasion, recall the hardships, since they have long since passed into oblivion? We cannot agree with such logic. If we pass over these hardships in silence or minimize them, we shall, willingly or unwillingly, belittle the significance of the exploits of the virgin land developers. And they were exploits in the truest sense of the word.

The development of the virgin lands has accelerated the advance in all branches of the economy and in the cultural life in those areas. In Kazakhstan, for example, the past 20 years have witnessed a 7.2-fold increase in industrial production. The virgin lands now include scores of new towns and hundreds of industrial townships with all modern amenities provided for millions of people.

So, the present-day virgin lands, comrades, do not mean just grain, not just milk and meat; they mean a modern, socialist way of life that has become deeply rooted in extensive, previously uninhabited, territories. And, of course, they mean, first and foremost, wonderful people brought up and educated here.

The virgin lands have been the beginning of a whole new life for many people. Scores and hundreds of tractor drivers, combine operators and construction workers have become state farm managers, top specialists, and party and government functionaries. But when we say that the virgin lands have raised the level of the people, we do not gauge this rise merely by their work record. There is another kind of advance, the human one, which is equally significant and noble. I have in mind cultural tempering, the enhancement of skills and moral maturity.

The motherland has duly appraised the selfless labor of many *tselinniks*. The esteemed title of Hero of Socialist Labor has been conferred on 272 of them. Orders and medals have been awarded to 96,965 people. The mass-scale and active participation of the Soviet people in developing the virgin lands is evidenced by the fact that .34 million people have been awarded the Medal for Developing the Virgin Lands.

Excerpt from the Speech by Leonid Brezhnev at the Meeting in Alma-Ata on March 15, 1974, Celebrating the Twentieth Anniversary of the Virgin Lands Development Plan

Leonid Brezhnev, General Secretary of the CPSU Central Committee, is welcomed at the airport at Alma-Ata, the capital of Kazakhstan, with the traditional bread and

TWENTY YEARS AFTER

By Nikolai Maslov

Drawing by Semyon Trofimov

I FIRST SAW Mark Nikolenko 20 years ago on the platform of a small railway station in Northern Kazakhstan.

Nikolenko was 50 when he was appointed director of a virgin land state farm that had yet to be formed. He was among the 520 volunteers who arrived that spring day in 1954. All told, more than 35,000 came that first year of the grand effort to develop Kazakhstan's virgin steppelands.

Not many people would have had the courage to start all over again at his age. He had been head of a model state farm in the Ukraine. Agronomist Nikolenko had done much to turn it into a multibranch, highly profitable enterprise.

His family was comfortably off. His two sons were students at an agricultural institute, and his daughter was still in high school.

What was it that made Nikolenko give up a well-ordered life and set out for a remote, barely settled area? By the looks of it, he should have been satisfied with his life. But his mind worked along different lines. The years had gone by, and he felt that he hadn't much to show for them. Perhaps he felt that way because up to then he had only been improving what others had built before him. He himself had never begun from scratch, driven in the first peg, so to speak. The nationwide drive to develop the virgin lands of Siberia and Northern Kazakhstan provided just that opportunity. And Mark Nikolenko took it. His sons gave him their support. Gennadi, the elder, was graduating that year and planned to set out for the virgin lands right after his father. Three years later, with an agronomist's diploma in his pocket, Vladimir, the younger son, joined them.

Getting ahead of my story, I might say that all the Nikolenkos feel that their most rewarding years have been spent in working the virgin lands.

On a frosty day in March 1954, the director himself dug a hole in the frozen ground, stuck in a pole and hoisted a red flag. As Russians usually do before a long trip, all bared their heads in silence for a moment.

A cluster of tents, resembling a polar expedition, had mushroomed by evening.

Northern Kazakhstan is a grim region. You still get blizzards and temperatures that fall to 22 degrees below zero in March. Not the easiest time to settle the steppe, but they had no choice. To wait for the summer meant losing another year, and that was impossible—the country needed grain.

The most up-to-date machinery, prefabricated housing, seeds —everything the pioneers needed —kept coming in from all parts of the country. The development of the virgin lands was a national undertaking, carefully planned, with the whole country's industrial potential behind it. Not everyone who volunteered had farm skills, but they all had the desire to be part of this major project. And it was farm specialists like Nikolenko who were expected to take the leadership, do the teaching, transmit their experience and know-how, organize the farms.

The very first year the young state farm plowed up 59,000 acres. At the same time the settlement proper began to grow and take shape.

Now, 20 years later, here I am again in these parts. Looking at the community nestling among orchards and gardens, at its vast, lush fields of corn and wheat, at the state farm youngsters in the swimming pool, I find it hard to visualize the once bare steppe.

The state farm grows an annual 44,000 tons of grain, with many fields yielding as much as 1.3 tons per acre. In 1973 it sold over 33,000 tons of high-grade wheat, about 650 tons of meat and more than 500,000 gallons of milk to the state, netting a clear profit of a million rubles.

Mark Nikolenko was our guide that day. He is now retired on pension; his younger son, Vladimir, has taken over. Prior to this appointment Vladimir had been chief agronomist of a neighboring state farm for a good many years. Gennadi, Nikolenko's elder son, also a state farm director, was recently appointed deputy chief of the North Kazakhstan Region's Agricultural Administration. The old man is pleased. His sons will complete what he didn't have time to do.

Nikolenko turned 70 this year, but he doesn't look his age. And he hasn't divorced himself from farm business. He gives lectures, teaches the young and is volunteer supervisor of the farm's seed growing.

Walking together through the settlement, we drop by the three-story 10-year secondary school, the kindergarten, stores, lunchroom with a banquet hall for weddings and other such festivities, and the house of culture. It has a 450-seat auditorium, a library and rooms where amateur performing groups can rehearse. The newspaper photographer who had come along with us complained that it was hard for him to get a good over-all shot, there was so much greenery around the houses. All the housing is spacious, comfortable and supplied with gas and electricity.

The water supply in the virgin area was inadequate at first. Water had to be brought in from a distance. Now every house has running water, and the state farm consumes 153,000-158,000 gallons a day. A part of this goes to water the state farm's orchards and gardens and the personal kitchen gardens. The role of these personal gardens and orchards has become minimal. The state farm people buy their meat, milk, potatoes, vegetables, fruit and berries in state farm shops at cut prices. A quart of milk, for instance, costs 15 kopecks, a pound of potatoes 2 kopecks, cucumbers 4 kopecks, apples 6 kopecks. With average monthly wages running 200 rubles and more, the state farm worker spends only a small fraction of his earnings on foodstuffs. He usually has a good deal of money left after covering his basic expenses.

All the houses will have central heating in the next few years. The farm plans to build a new polyclinic, hospital, a music school with a concert hall, a sports center with an indoor swimming pool, and a shopping center.

Not a single person has left the state farm for greener pastures in the past three years. Obviously urban housing, inexpensive living plus the pure steppe air has an appeal.

And Mark Nikolenko can justifiably feel that the best years of his life were not spent in vain.

At a recent medical congress in Alma-Ata, the capital of the Kazakh Republic, Mariya Smirnova, head nurse of one of the Tselinny District hospitals, was presented with the Florence Nightingale Medal. Inaugurated by the International Committee of the Red Cross in honor of the British nurse by that name who organized hospital and nursing units during the Crimean War against bitter opposition, the medal is awarded to nurses and other hospital personnel for service beyond the call of duty in caring for the wounded and sick in time of war or peace.

By Revmira Voschenko

Drawing by Semyon Trofimov

THE NURSE

THIS MODEST WOMAN is almost a legend; front-line soldiers dedicated their poems to her in the Second World War. During the Battle of Stalingrad Mariya Smirnova carried 421 wounded men off the battlefield and was decorated with the Order of Lenin, the highest Soviet award. For valor during the war she was also awarded the Order of the Red Star, the Order of the Patriotic War, Second Class, and several medals.

That was 30 years ago.

Smirnova is still working as a hospital nurse, still fighting to save lives.

"People who put their heart into their work are needed wherever they go. I feel that I am needed here," she says simply.

She found her vocation early. A few days after she received her graduation certificate, nazi aircraft began flying over her native village in Odessa Region. Her sister and brother were killed in the bombing, and Mariya volunteered for front-line action. That was how she became a nurse.

She went into battle and on reconnaissance missions with the men. She was wounded three times and three times, after recovering, returned to her infantry division. After Stalingrad, the division fought at the Kursk Bulge and took part in liberating the East European countries from nazi occupation. Together with the Guardsmen, Medical Platoon Commander Smirnova celebrated Victory Day in Dresden.

After the war she married and worked as a nurse in a rural hospital. She helped deliver 2,000 infants, all of them alive and well.

Twenty years ago Smirnova again responded to a call for volunteers: With her husband Nikolai and two daughters, Katya and Anya, she went to Kazakhstan where the virgin and longfallow lands were being developed. There was not a single structure or tree at the place the Smirnovs were assigned—a bare field stretched to the very horizon. The hospital she worked in was housed in a railroad car with tents all around it. Many times Smirnova had to go out in frost and snowstorms and across rugged terrain on a tractor or in a truck to reach patients or to get medical supplies hundreds of miles away.

The village of Leningradskoye, the district center of Kokchetav Region, grew up around that railroad car and cluster of tents. Those early days of hardship have been over for a long time now. With help from the people of Leningrad, who assumed patronage over the village, a modern hospital was built. Mariya Smirnova is its head nurse. The local school is attended by children she helped keep strong and healthy. She knows them all by their first names and never forgets their birthdays.

Two new medals have been added to Smirnova's wartime collection: the Virgin Land Development Medal and the Labor Valor Medal.

"Among the first to come to the virgin lands was Ukrainian Komsomol Mikhail Dovzhik. He immediately took charge of the tractor drivers team and began to operate as a shock worker. His career is marked with many innovations which have found thousands of followers. He still holds the job of team leader, but, like many people of his age, Mikhail Dovzhik, during the 20 years, has become a man with a broad statesmanlike outlook, an expert in his trade and a capable teacher and organizer. Mikhail Dovzhik has been elected a member of the Central Committee of the Communist Party of Kazakhstan. The motherland has bestowed on him the title of Hero of Socialist Labor."

From the speech made by Leonid Brezhnev in Alma-Ata

PIONEER FARMER

By Oleg Dronov
Drawing by Semyon Trofimov

IN THE SPRING of 1954 there were 25 of them—young men and women from Moscow, Leningrad and the Ukraine. All their belongings were packed into 25 knapsacks and suitcases.

"We left the Ukraine when spring was at its peak and everything was already green," Mikhail Dovzhik reminisces. "From the windows of our train we saw fields with winter crops, blossoming orchards and freshly whitewashed cottages. And then we arrived at the Zhaksi railway station. The word *zhaksi* means good in the Kazakh language. However, what we saw was not very encouraging. All around us spread a vast bare steppe, with no trees or shrubs, no roads, not even paths. A cold piercing March wind penetrated to the bone. But the Kazakhs from the village of Bayagiz welcomed us very warmly and treated us to their traditional aromatic tea. *Zhaksi,* they said: Everything will be all right!

"There were many snowstorms and rainstorms that first spring on the virgin lands. The weather would change suddenly—one day very warm, the next extremely cold. Later it was easy to talk of crossing rivers with tractors on the cracking ice, of the trips in blizzards, floods and along muddy cart tracks, but then it was very hard work that took every bit of will power and persistence our men had."

On April 30, 1954, the eve of the May Day holiday, Dovzhik's team drove their tractors out to the steppe.

"Well, team leader, shall we begin?" asked the men.

He saw how nervous they were, and so was he—no matter how you looked at it, it was the first plowing of the virgin land. Dovzhik cast an anxious glance at director Grigori Sapozhnikov.

"Come on!" said the director matter-of-factly, to break the tension.

Slowly, first one and then another plow dug into the black soil, which cracked like a torn tarpaulin all interlaced with strong roots. Suddenly one of the tractors began to skid on the root mat. Two of the plow bases had to be removed. At first even experienced tractor-drivers couldn't make half their daily quota. The framework of the plows twisted, axles broke. Once a plow share got caught by a hidden boulder, another time a tractor got stuck in boggy alkali soil. Some of the men were so frustrated they wiped away angry tears when no one was looking.

It didn't rain once that first summer in the virgin lands area. There were no seeds to gather. Many of the young men and women left because they thought the land was barren. But Dovzhik decided to have another try. Later, there were years, too, when there were no seeds because the soil was eroded, but in spite of everything, the farmers held out.

Now Mikhail Dovzhik's team cultivates 13,600 acres of arable land. In 1972 alone the team turned over 8,800 tons of grain to the state.

The names of Mikhail Dovzhik and his comrades are known all over the country. Dovzhik's YCL assignment and the tselinniks' first tent are now exhibits at the Moscow Museum of the Revolution. It was in this canvas tent smelling of wormwood and gasoline where the whole team first lived that Mikhail and Valentina were married. Now Mikhail's eldest son Vladimir is 18, daughters Natalya and Lyudmila are in school and the youngest son Igor is getting to be quite a big boy.

"The second generation of virgin land people will soon replace us old-timers," says Dovzhik. "My boy Vladimir is a machine operator, a skilled farmer."

The sons carry on their fathers' pioneering work. But now they don't live in tents and trucks, but in towns and villages with all conveniences, while the farms they work on are real factories producing grain, meat and milk.

Mikhail Dovzhik is still a team leader on the Shuisky State Farm. Three times during his years on the virgin lands he temporarily worked with other teams to build them up.

He has taken all kinds of courses and graduated from an agricultural school for managers. Though he has been offered bigger jobs several times, he prefers to stay with his team. "It's hard to say what kind of department manager I'd make, but I know as leader of a tractor team I can compete with anyone," he is fond of saying.

A farmer's job takes skill, particularly with the severe climatic conditions of Kazakhstan. I visited Dovzhik on May 12, 1972. At the time he was busy with his usual problem—when to start sowing, a crucial decision. If you started too early, the crops would be strangled by wild oats and scorched by the hot sun of early summer. If you were late, they would suffer from the early night frosts or even be covered with snow, as happened in 1969. That spring was particularly cold, and there was a lot of rain mixed with snow. Together with Dovzhik and Nikolai Selivanov, chief agronomist of the state farm, we rode from one field to the next. The team leader knew them all thoroughly from experience and from the chart of the chemical composition of the soils.

The ground had absorbed all the snow that had fallen in winter, and the plowed fields were so soggy you could hardly pull your feet out. There was six inches of water in a three-foot-thick layer of autumn plowed land, and even more in fallow land. A plot of fallow field, nearly a quarter of all the plowed land, had been cleared of weeds and fertilized from an airplane. This plot was under the team leader's personal supervision.

"We can't wait any longer," decided Dovzhik finally, and suggested that they increase the sowing quota, though this was contrary to the advice of the experts. After a little thought, the agronomist went along.

That autumn I had a chance to see for myself how right Dovzhik was. The crops on his state farm ripened earlier than on neighboring fields. There the wheat was still green. On August 25 Dovzhik took us to a remote field to show a device they had attached to the reaper to turn the stems 40 degrees. That way it was easier to pick up the mow because it dried more quickly. That rainy autumn, when the harvesting period was so short, the several days they saved told on the yield. The team gathered 1,800 pounds of choice grain per acre. Then they helped Timofei Goncharov's team, with whom they competed taking in the crops. And at the end of September the whole collective traveled hundreds of miles to Shortandi to help out the experimental farm of the All-Union Scientific Research Institute of Grain Economy. Institute scientists are working out a soil-protection system, using a new farm machinery setup and advanced working methods.

Last year Mikhail Dovzhik's team sparked off a campaign of Kazakhstan farmers to increase the productivity of each acre of land. And though weather conditions were not very good, the team met its commitments and considerably more.

By Robert Tsfasman
Photographs by Nikolai Bolotin

BIRTHPLAC
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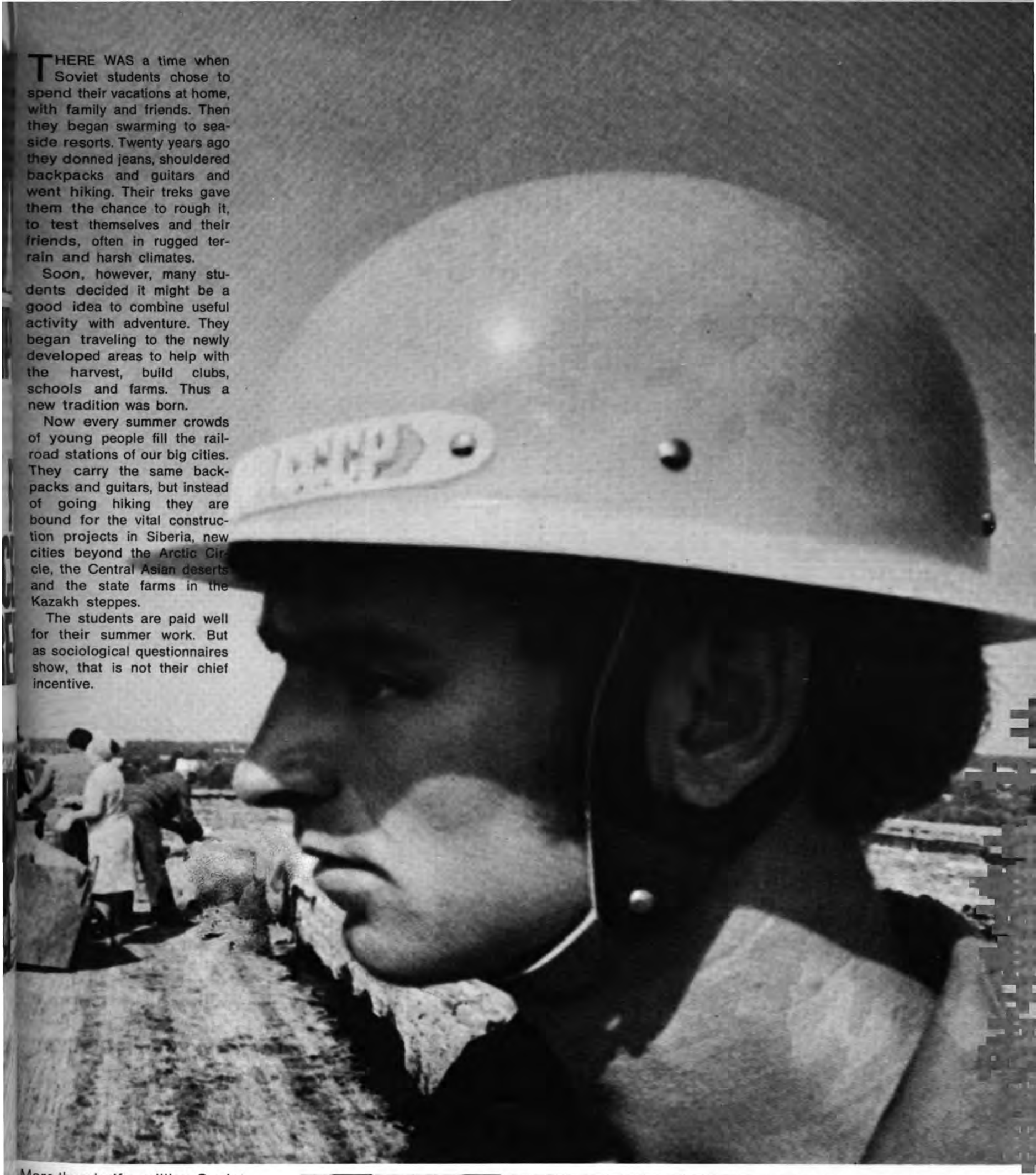
STUDENT

THERE WAS a time when Soviet students chose to spend their vacations at home, with family and friends. Then they began swarming to seaside resorts. Twenty years ago they donned jeans, shouldered backpacks and guitars and went hiking. Their treks gave them the chance to rough it, to test themselves and their friends, often in rugged terrain and harsh climates.

Soon, however, many students decided it might be a good idea to combine useful activity with adventure. They began traveling to the newly developed areas to help with the harvest, build clubs, schools and farms. Thus a new tradition was born.

Now every summer crowds of young people fill the railroad stations of our big cities. They carry the same backpacks and guitars, but instead of going hiking they are bound for the vital construction projects in Siberia, new cities beyond the Arctic Circle, the Central Asian deserts and the state farms in the Kazakh steppes.

The students are paid well for their summer work. But as sociological questionnaires show, that is not their chief incentive.



More than half a million Soviet students spend their summer vacations in building teams. All over the country they help to construct houses, schools, hospitals, farms. They build railroads and highways, lay pipelines, put up power transmission lines. Here is the story of one of these teams. Its members were young students from various institutions and different republics.

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Above: Yuri Gagarin's parents in the house where the world's first spaceman was born and raised. His father is shown in the photo at left, and his mother at right. When the quiet old town of Gagarin (its former name was Gzhatsk) needed rebuilding, 300 college students turned construction workers during their summer vacation to do the job. Top left: The student team and some of the 16,000 residents of Gagarin. Bottom left: An occasion. Laying the last brick in a wall. Below left: The volunteers came from several of the Soviet republics. A multinational party in an improvised Kazakh yurt. Below right: Good-by blues at the Gagarin railroad station.

When it became known that a multinational team—representing a number of different republics—was being formed to rebuild the town of Gagarin, there was a rush to join.

Gagarin is in Smolensk Region, 110 miles west of Moscow. What made it so attractive to the students? In this case, the desire to contribute something took on a special meaning: The old town, formerly named Gzhatsk, is the birthplace of the world's first spaceman Yuri Gagarin. Three hundred builders were needed, but hundreds more applied. So a special competition for the right to join the team was held at institutions of higher education.

The Builders and the Teachers

Gagarin with its 16,000 residents is a quiet, picturesque town. There is plenty of greenery and fresh air. Most of the houses are old wooden buildings; till recently there was very little new construction. The City Soviet had the funds to rebuild, but not enough workers. So the student contribution was very timely.

The young people pitched in enthusiastically and began building several apartment houses, a school for 1,200, a kindergarten, a printshop and several industrial plants. They also paved the streets. In the 45 days they spent in Gagarin, the number of construction projects there doubled.

Of course, students are not professional builders. But most of them had done summer stints on construction sites before. As for the novices, who were ceremonially initiated, they learned their jobs on the spot. There were some real specialists among the students—those who had done construction work before they entered college. Willi Buch of Riga, the best bricklayer on the team, learned his trade at projects in Kazakhstan before enrolling at an institute. The speed and neatness of his bricklaying was applauded by all the old hands.

But what was lacking in skill was more than made up in enthusiasm. The young people came for a short period, during which they had a great deal to do. As much as 600,000 rubles' worth of work, in fact. And so they decided to put in ten hours instead of the regular eight.

Lev Vasilyev, a local bricklayer who went to school with Yuri Gagarin, said: "We oldtimers know how to work, but it hasn't been easy keeping up with the students! Watching them, it's hard to resist stepping up our pace. It's fun working with them. They're full of pep and bright ideas."

The students did have bright ideas—and very productive ones, too.

They made friends with the local people, particularly the younger set, and organized a number of activities. For this they were well equipped, since they had been picked for the team with an eye to their various abilities.

Evenings, after work, some visited the clubs and park to give lectures and concerts to local audiences. Others went off to the factory rooming houses to help young workers prepare for their entrance exams to schools of higher education. Still others worked with children. For instance, a Young Pioneer camp was run for a whole month by the students. Those from the Moscow Aviation Institute organized an aircraft modeling group for youngsters.

Good for Everybody

By doing a great deal for the town, the team did a lot for itself. Particularly for the freshmen just out of secondary school. In the building team they developed independence and initiative, gained experience in working with other people. The more knowledgeable and energetic of the students were elected foremen and team leaders, and thus learned the art of management on the job.

Sagid Kusekayev, a Kazakh, had just graduated from the Moscow Civil Engineering Institute and had been given a job at one of the biggest construction sites of the five-year plan period, the Kama Truck Plant. Nevertheless, he decided to work on a student team that summer. He joined the Muscovites and was immediately elected foreman. "The Gagarin assignment," he said, "was my last bit of practice before starting on the job. I was lucky because the Kama Truck Plant is a youth construction site, and my teammates in Gagarin were all young people too."

The summer building teams are composed entirely of students, with all the qualities of that restless and hearty tribe. The multinational Gagarin team was typical of our Soviet students generally.

Actually, as many as six separate teams came to Gagarin: two from the Russian Federation (Moscow and Smolensk), one from Azerbaijan, one from Kazakhstan, one from Latvia, and one from the Ukraine (Kharkov). They competed for the title of "best" in work and community activity.

Each team had its own leaders, but the entire operation was supervised by a joint staff. Its chief was Yuri Rebrikh, a young teacher at a Smolensk institute. The team commander was Stanislav Korobov, who is an engineer at the Moscow Power Engineering Institute, and the commissar was Boris Bakhtin, a student at the Moscow Aviation Institute.

I mention all these particulars to give the reader an idea of the structure of the building teams. However, the collective was held together not by fiat but by friendship, the law that governs all student groups.

If the Muscovites needed help, they got it from the Riga team working nearby. If something went wrong with the Smolensk students' concert plans, they called on their friends from Baku. Oleg Zhivotovsky, a student at the Kharkov Institute of Culture in the Ukraine, turned out to be a good stage director. At first he planned to organize a show featuring the Kharkov team, but at the request of the students from other republics, he agreed to head an all-team amateur company. Ali Kuliyev, a future architect from Baku, made a similar contribution by assuming the job of chief designer of the team, and Sasha Shalar, a student at the Moscow Aviation Institute who played the piano in its jazz band, became conductor of the all-team orchestra.

With so much to do during the day, the students should have been dead tired by evening. But that wasn't the case. It's a longstanding custom for building team members to sit up late into the night talking, often to the same people they've been working with for five years in a row. Moreover, the students in Gagarin made a number of new friends from various parts of the country, so that the school they were housed in did not quiet down until early morning. Some sat in the bar improvised by the Latvian students, others danced, still others drank tea with the Azerbaijanians.

Sometime after midnight, however, the commanders asserted their authority, ordering their charges to bed so that they could get up at six in the morning.

BIRTHPLACE of FIRST SPACEMAN REBUILT by STUDENTS

s I said before, hundreds more people than were eded volunteered to go to garin. Those who didn't ake it helped out in another y. One Sunday the mem- rs of every student team in e country put in an extra y's work and contributed eir pay to the Gagarin Fund. While we were in Gagarin, ere was a Sunday stint in e town itself. A large delega- n arrived from Moscow, in- uding First Secretary of the CL Central Committee Yev- ni Tyazhelnikov, spaceman eorgi Shonin and other pub- figures.

They spent the whole day th the team, trying not to lag hind the students, carried vay once again by the atmos- iere of which poet Mikhail etlov once wrote: "It is just step from the student houses immortality."

After a solid working day most of the students preferred less physically demanding pastimes like chess. But there were some highly energetic types like those at the right.
Far left: One of the hundred or so concerts that they gave for appreciative

BIRTHPLACE of FIRST SPACEMAN REBUILT by STUDENTS

A visit to Stellar City where the spacemen live. Right: Moscow. The team reflected in an astronaut's helmet on display.

EDUCATION

Education for a socialist society, the discovery of talent, intellectual and moral training were discussed at a round table organized by the Institute of Philosophy of the USSR Academy of Sciences and the journal* Voprosy Filosofii. *The participants included prominent scientists, writers, educators and government officials. In his opening speech Academician Bonifatii Kedrov, director of the Institute of Philosophy, pointed out that the solution of the problems under discussion boiled down to creating optimal conditions for gathering knowledge, for teaching and for the development of abilities. Here we reprint abridged versions of some of the speeches.

I. Y. Lerner

Doctor of Science (Education), Head of the Laboratory on World Outlook, General and Educational Psychology Research Institute, USSR Academy of Pedagogical Sciences

Developing the intellectual capacities, the creative potentialities of the younger generation is not only an educational but a social and political task. The growth of the country's intellectual potential is one of the conditions necessary for the growth of its economic and cultural potential. We must build an educational system that will not only ensure the assimilation of knowledge but provide the experience of creative activity. The latter is as much a part of the culture our society has developed as are knowledge, skills and training. Without the gradual accumulation of this experience it is impossible to become a creative personality.

The experience of creativity is autonomous, quite separate from the sum of knowledge, training and skills. In other words, many highly educated people are creatively barren. Being well read is evidence that a person is well educated, but it is not necessarily evidence of his creative potential.

There is no need at all to increase indefinitely the volume of knowledge required of young people or to prolong their years of study in order to develop creative potential. Children learn fast in the early years, fastest, some data indicate, between five and seven. It is necessary to organize the educational system so that they not only master a given body of information but learn to solve problems independently.

Educational theory has already worked out the foundations of this system. It has collected important experimental material which indicates that the school can ensure students so high a level of intellectual development that further growth depends only on their abilities and effort.

Academician Alexei Leontiev

of the USSR Academy of Pedagogical Sciences, Dean of the Psychology Department, Moscow University

The student and the school constitute one of the most critical relationships. Children start school at 7 and finish at 17. In these 10 years their personalities undergo numerous changes. Their attitudes toward the world around them, toward other people and the society they live in, change, with corresponding changes in motivations.

And what happens to the educational process during this period? While profound qualitative changes are taking place in the students' psychology, the school remains relatively the same.

Take classroom procedures, for instance. Personally, I cannot understand why throughout this period the system of unexpected calls to the blackboard should prevail, making for what I might describe as a "will I be called on or not" state of mind.

Nor do I understand why the structure of classes—explaining new material, reviewing, quizzing—should remain almost unchanged, why more sweeping reforms are not made to bring teaching in the senior grades closer to that of the colleges, which offer lectures, seminars and practical training. When graduates go on to an institution of higher learning or take a job, they encounter precisely these methods of instruction and discover they do not know how to take lecture notes, how to prepare reports and present them at a seminar. These are deficiencies we find too often in first-year college students.

There is also a serious gap between the great change in students' outlook between the ages of 7 and 17 and the relative monotony of school life. Instead of expanding along with the adolescent's other experiences, education becomes a mere appendage to them. As a result, children lose interest in school, become apathetic, and in some cases we have a shift in values. There arises the desire to assert themselves anywhere except at school, even through dangerous contacts in the street, where they can become part of a grownup, though illusory and distorted, situation.

Today pedagogy faces the task of providing suitable teaching methods and a compatible school environment. The 10-year school cannot continue to serve only young children, it must meet the needs of adolescents as well. As the child grows, education must change both quantitatively and qualitatively.

Let me make this further point. Presently, the school curriculum is full, and we keep adding new material. But the vessel can take only so much before a parallel process of bailing begins. Pouring in and bailing is a futile operation: A great deal is waiting to be added, and very little is expendable. I believe that instead of discarding anything, we should encourage an overflow. Where? Into reference books. Much of the course material requires merely memorizing and storing up, at least until the examination. This calls for time and energy which can be released by transferring the material already learned to special school reference books. The more of them there are, the better.

Academician Axel Berg

Chairman, Complex Problems of Cybernetics Scientific Council, USSR Academy of Sciences

I would like to express my thoughts on some problems—particularly in the area of teaching methods—whose solution would raise the level of education.

First a few words about computers, training the necessary personnel, and the use of programmed instruction and cybernetics.

I believe that there are many unresolved questions here. More attention should be paid to applied mathematics, which has tremendous scientific and practical importance. We must recognize the necessity for training additional personnel in this field.

The role of computers and cybernetics, great as it is, continues to grow. It is not a matter of substituting the computer for human beings. We must soberly evaluate the changes in our thinking resulting from the use of computers and cybernetics. They have provided us with automatic aids to the human intellect whose potential we must do everything in our power to develop.

When we talk of the importance of computers and cybernetics in teaching, we do not mean that cybernetics and programmed instruction can replace the teacher or minimize the social functions of education. Man will always be the chief figure in the educational process.

Education must meet all the students' requirements, spiritual, moral and intellectual. Obviously the school must develop the child's ethical values and esthetic tastes. There are young people, however, who finish high school or even college without an appreciation of art or an interest in science. The reasons probably lie in inadequate curricula and poor teaching methods.

I believe that we should pay more attention to the pupils' individual interests. Perhaps we ought to vary the course of study for different groups of students. For example, beginning with the eighth grade, we might consider special interest in mathematics, the natural sciences or the humanities. I do not mean specialization for each pupil, narrow specialization—after all, the school is expected to provide a rounded educational experience.

It is time we organized methodology centers which would conduct and coordinate experiments in the most promising areas of educational psychology, cybernetics and logical programming. Naturally, such centers would have at their disposal the latest instructional and computer techniques.

Finally, a few words about the important role of the teacher. Much has been done in the Soviet Union for teachers. But the task of further expanding their role is still on the agenda. The people responsible for the intellectual and moral development of our new generation should have the best possible living conditions and opportunities

for work and recreation, for improving their skills and continuing their own education.

Grigori Medynsky
Writer

It seems to me that little attention is being paid to moral education.

As a writer, I am in contact with people from all walks of life, people of different sentiments and views, so that I have ample opportunity for observation. Here are some of my conclusions:

When we talk about universal education, we presume that, among other things, the school is a moral filter, a qualitative filter.

But we know that young workers who have recently finished school often have to be re-educated.

"Through all the diversity of young people there runs one common thread—a consumer attitude toward everything around them," geologist Konoplyantsev from Kazakhstan wrote to me. "In the peasant families of the past children shared all the difficulties of life with their parents. They not only saw how hard it was to earn a livelihood, but worked along with their fathers and mothers. They knew the cost of bread and valued it, respected labor generally and the labor of their parents in particular."

The reasoning of my correspondent is clear: Today's children are spoiled. But the rising standard of living need not determine people's outlook: Other factors, such as moral education, can exert a strong influence.

It's our job to find within the society moral forces that refute the consumer attitude toward life. That is what the problem is all about. It is why questions of morality in our country take on such primary social and political importance.

Let us recall what Nikolai Chernyshevsky* said on this score:

"The main purpose of upbringing must be to prepare the child, and then the adolescent, to become an intelligent, ethical and honest person. This is most important. Above all, take care to make your pupils real human beings. When this guiding principle is observed, then—and only then, not earlier—let them choose their careers under your guidance."

A hundred years later, we are faced with this problem, and our society is making an all-out effort to solve it.

In our century of reduced external pressures, the development of inner motivations and imperatives has become the chief task of moral education. The mere existence of a moral code or a set of behavioral norms is not enough to make such rules part of your life. First it is necessary to determine your attitude toward yourself, toward other people, toward society as a whole. Moral integrity consists of recognizing the imperative nature of a moral code.

Igor Karpets
Doctor of Science (Law), Member of the Collegium of the Ministry of Internal Affairs

Take juvenile delinquency. How is it related to the practical process of education, to the surroundings in which children's personalities are formed? We often wonder why an adolescent who has not had any bad experiences, who has grown up in a favorable social, family and school environment, suddenly commits a serious crime.

It is not easy to answer this question. I would like to discuss some aspects of the problem.

For some reason we talk of education as though it were acquired only at school. But education is complex. I believe that the origin of behavior, right or wrong, moral or immoral, can be found in the family, in its connections with the school, with the child's immediate environment and all of society. These are mutually dependent factors. Parents and other adults often have no idea how many different influences adolescents are subject to. Surrounding the teenager is a mass of social phenomena of varying importance. When adolescents commit a crime, we are surprised. We simply do not know all the specific reasons, and our ignorance surprises only us.

Moreover, the adolescent reacts to everything going on in the world around him even more sharply because of his accelerated development. But acceleration must also be correctly understood. Physical acceleration is a fact that cannot be denied, but in the case of social acceleration things are much more complicated: My studies of juvenile delinquents have convinced me that in many cases it is not connected with the development of desirable norms of social behavior.

It sometimes happens that a ninth or tenth grader asks a question on recent developments in cybernetics or physics which the adult cannot answer. Students today are often better informed than their elders. But in other respects they are still immature. They have a rather vague—and often incorrect—idea of their place in society and the rules of behavior and tend to overemphasize personal concerns. In such cases social acceleration leads to an unharmonious development of personality.

How can we prevent this? For one thing, education should not be limited to mastering a particular body of knowledge, it should include social education. But too often the latter consists only of dull moralizing. The effect of such "education" is the direct opposite of what we want to achieve.

We must learn to concentrate our attention on the concrete stages of children's development in order to understand who and where they are, at what particular moment and in what way we can best influence their minds and spirits. What do we demand of the school? To start with, some reforms. For example, teachers ought to be relieved of part of the teaching load so that they can get to know the children, their parents, homes and communities, and learn what outside influences teenagers are subject to.

A. I. Lipkina
Senior Researcher, General and Educational Psychology Research Institute, USSR Academy of Pedagogical Sciences

Regrettably, the educational process at the contemporary school is organized in such a way that when children's achievements are appraised, their own attitude toward their activity is not considered.

Teachers observe, check, find the mistakes and sum up their own judgment in a grade. However, this grade does not always give the children a proper idea of their achievements. In fact, there may be conflicts arising from the discrepancy between the teacher's appraisal and the pupil's self-appraisal. Children who get poor marks develop feelings of inferiority and discomfort, feel inadequate as compared to their classmates. This affects their personality, whether the teacher intends it or not. Early failures at school, reflected in the low grades given by the teacher—the dominant figure in the class—and by a corresponding drop in the esteem of fellow pupils, inevitably lead to a deterioration of children's self-esteem and a change in their social position.

In most cases children find themselves categorized as poor pupils not because of their limited mental abilities, but as the result of personality changes. Consequently, we must begin filling in the gaps in their knowledge in a roundabout way. We must alter their social and personal position, their attitude toward studies, and on that basis improve their progress at school. I would like to describe briefly one of our experiments.

A senior who is a poor student is asked to help someone in a lower grade. Psychologically speaking, we have radically changed the child's social and personal position, as well as the nature of his or her activity and self-image. From a faltering, inferior position, such students are transferred to a strong one, in which they are capable of teaching others. This new role has a marked effect on their whole personality.

By preparing, under a teacher's guidance, to coach younger students and then by assuming the role of teacher, they accomplish another important task—they fill in the gaps in their own knowledge.

We made a systematic study of these teenagers in cooperation with their teachers and found that they were developing the qualities necessary for successful study. The mistrustful and timid student-teachers become more and more self-confident. They make increasing demands on themselves and their pupils and gradually improve their own grades.

This, of course, is not the only idea for improving education. But the experiment is truly instructive since it reveals how close the connection is between students' intellectual activity and their personalities.

The teacher must see children who cannot cope with their studies not only as poor students, but as individuals whose chronic failures cause serious personality damage.

The effort to give our citizens of the future the knowledge and training they will need must be part and parcel of the effort to make them well-rounded people, vital, optimistic, self-confident, conscious of their human dignity and their importance to our society.

Courtesy of *Voprosy Filosofii*

*Nikolai Chernyshevsky (1828-1889), leading Russian revolutionary-democrat, author and philosopher.

Students are required to take classes in drawing and painting techniques. The likelihood is that even if they make commercial design a career, the fine arts will be part of their lives.

Kharkov Institute graduates contributed their design talents to make this very utilitarian farm tractor—used all over the Soviet Union and in other countries—more comfortable and more attractive.

The serious application of a to industry is relatively ne but its beneficial results a evident in almost everyth we use. The Kharkov In tute of Arts and Industry tr to stimulate its students think and work creative And apparently its graduat do. Placed in a job, th adapt easily to the new en ronment and show a go deal of confidence. This b country-cottage carrier w made by student designer

Kharkov, in the Ukraine, has a large number of schools of higher education, among them the Institute of Arts and Industry. It was founded nearly 200 years ago. Its front doors have carried a variety of signboards, from "Drawing Classes" to "Art School" to the present name, and its function has changed accordingly.

DESIGN IS THEIR PROFESSION

Photographs by May Nachinkin

The student body of 600 is considered rather small for a Soviet college-level institution. But the high teacher-student ratio permits individual attention and increases originality.

The physics laboratory of the institute has an automated system, created by Kharkov specialists, which makes it possible not only to determine an individual's receptivity to color but to develop a sense of color differentiation. This is useful for people in a variety of trades and professions, particularly truck drivers and pilots.

One of the institute's many specialized rooms is devoted to bionics. The comparison of living organisms, their structure, function, shape and coloring with man-made objects is another of the school's methods of inspiring original and creative solutions to design problems.

DESIGN
IS THEIR PROFESSION

THE INSTITUTE TRAINS FOR CAREERS IN INDUSTRIAL DESIGN, PACKAGING

VERTISING, INTERIOR DECORATION AND DECORATIVE PAINTING.

The five-year curriculum puts a good deal of emphasis on practice. Even such theoretical and historical subjects as the origin and development of design and design in its relation to the social system are not only studied in lecture halls, seminars and workshops, but applied in real situations. Under the guidance of skilled teacher-craftsmen the students fill hundreds of orders that come in from all sorts of industrial plants and commercial enterprises, among them the automobile plants at Kramatorsk and Togliatti, the tractor and bicycle plants at Kharkov and the shipyard at Nikolayev. The Kharkov Institute of Arts and Industry, probably the oldest art school of its kind in the country (it was founded almost two centuries ago to teach drawing and has gone through many changes since), has turned out some of the Soviet Union's leading industrial designers, packaging experts, interior decorators and decorative painters. The institute offers a variety of courses in photography as well as practical training in the use of the camera. Left: German Drukov's industrial photography class.

FREEDOM VERSUS IRRESPONSIBILITY IN THE FILM

By Sergei Yutkevich

"Creative freedom is predetermined by the artist's human and civic conscience." Sergei Yutkevich, film director and People's Artist of the USSR

Sergei Yutkevich, born 1904, is one of the founders of Soviet cinema. He was an associate and friend of Sergei Eisenstein, of *Potemkin* fame. Many of the 30 pictures Yutkevich has directed in his 50 years of film making are well known both at home and abroad. They include *Man with the Gun*, *Stories About Lenin*, *Lenin in Poland* and *Othello*. He has also written a number of studies and books on the art of the film. In this article Yutkevich talks of the role of artists in a socialist society, their motivations and creative freedom.

I DO NOT REMEMBER a single conversation with foreign film makers or audiences when the question of creative freedom for our workers in the arts did not arise. Often the question was more of a statement: "Soviet film makers are hard pressed for the essential creative freedom."

Some of the challengers were simply ill-informed, others knew better but enjoyed raising this allegedly sore subject. To clear the air, let's look into the role of the artist in society.

Chroniclers of Their Age

There are some truths that need to be proved over and over again.

"Art is always contemporary and real, it never existed and, moreover, cannot exist in any other form," Fyodor Dostoyevsky said a century ago.

Homer and Shakespeare, Charlie Chaplin and Mikhail Sholokhov have told the world about the problems and emotions, the sorrows and joys of their time. Genuine artists "have a sense of their country and class; they are its eye, ear, and heart; they are the voice of their age." Those are Maxim Gorky's words.

You cannot seriously discuss the question of creative freedom without recognizing the inseparable links between society and the artist, the social mission of art.

"One cannot live in society and be free from society." * This statement by Lenin has the force of an objective social law for us. Art is essentially a struggle for or a struggle against. It has never been, and never can be, detached, because artists—unlike cameras—do not simply record events and phenomena, they either affirm or reject them.

Propaganda?

Soviet art, particularly Soviet cinema, is usually accused of being propagandist. But let us define our terms. Propaganda, any dictionary will tell us, is the propagation or advocacy of certain ideas and practices. More relevant, therefore, is the content of the propaganda.

Let us take, by way of illustration, a western, the kind of motion picture that started American cinema. By the way, there was a time when I was very fond of westerns. I use the past tense because I feel that the genre has, unfortunately, degenerated.

But a classic western is nothing other than a piece of propaganda for the frontier tradition, for a certain mode of living, behavior and character. Moreover, I believe that such westerns propagandize what we call a positive hero. This in American westerns is a man of high principle with a fast-shooting gun who fights for law and order where, to his mind, none exists.

The positive hero of Soviet cinema, and, likewise, of Soviet society, is not the knight fighting by instinct and alone against a venal world. He is a conscious and active champion of humanist social laws, which he professes together with society. On the one hand, such a hero reflects the actual situation, on the other hand, he serves to propagate the moral principles of socialist society.

* Vladimir Lenin, *Collected Works*, English edition (Moscow: Progress Publishers, 1964), vol. 10, p. 47.

With Lenin, we consider the film the most important of the arts, because it can exert a tremendous moral impact on the broadest masses of people. Thirteen million people come to our country's movie houses daily. Why should we back away from this "propaganda" if the ideas and moral outlook that the Soviet cinema propagandizes help bolster the moral health of the people and augment their spiritual and creative potential?

Are there themes prohibited to the Soviet director and actor? Yes, cruelty, violence, pornography and perversion—everything that degrades the individual. These themes are played up widely today in the Western countries.

Cruelty spawns cruelty. Emptiness duplicates itself. The art conscious of its right to creative freedom cannot afford such irresponsibility.

Soviet art workers are free, but their freedom is determined by their conscience and their responsibility as citizens. Since they have a greater awareness of historical processes, this responsibility includes portraying events accurately and defending the humanist qualities in people. It is at this level, I believe, that we are fully and genuinely free artists.

"Subjects Choose Me"

"But don't the authorities tell you what pictures to make?" I am used to that question from people who maintain that this is our idea of a "social order."

Let's talk about that. I shall try to illustrate my point from my own experience.

I made three films about Lenin. National heroes and heroines are a popular cinematic theme in many countries.

Why did I choose Lenin as a subject? Because both as a person and an artist, I was eager to understand this great man whose genius opened a new chapter in human history. Nor was I the only one attracted to the Lenin theme. Many film and theater directors, writers and artists were thinking about it.

Then, in 1936, our well-known director Mikhail Romm got together with scriptwriter Alexei Kapler, and simultaneously I teamed up with playwright Nikolai Pogodin, to take this momentous step. Thus the first pictures about Lenin appeared, including *Man with the Gun*, which has been playing in the Soviet Union and abroad for almost 30 years. I'm glad that I stayed with this theme in other pictures—*Stories About Lenin*, and *Lenin in Poland*, which won a prize for best direction at the 1968 Cannes Festival.

Obviously, no one compelled me to make these films, but I see them as typical of our social system. The artist's need, what his heart tells him to do, coincides with what the millions want—to see Lenin on the screen. My desire to make these pictures was a result of society's spiritual needs, which as an artist I must perceive and fulfill.

Another example. After the war, our artists, writers and film makers began to examine contemporary life. Reflecting the interests of society, workers in all the arts are trying to understand and convey the changes that socialism has brought in the consciousness and ethical views of the Soviet people. At the Moscow Institute of Cinematography I met a young man, Grigori Chukhrai, a former paratrooper who knew the hardships of the war against Hitler Germany. Chukhrai directed the film *Ballad of a Soldier*, about his friends, people of his own age, with whom he froze in the trenches and fought against the Nazis. Some survived the war, others didn't. This was his own theme, born of his suffering, and, at the same time, his response to our society's need to understand itself. I think the reason why *Ballad of a Soldier* and some of the films that followed it were so successful throughout the world is that they told real life stories about a new kind of people, the Soviet people.

The French director Robert Bresson once told an interviewer: "You see, I don't choose my subjects, they choose me."

I am inclined to agree with him.

Technical Innovations or New Ideas?

Sometimes it seems to me that people make a fetish of new techniques. "Technology has given the film a new dimension." "Wandering camera! Ragged editing! That's what contemporary cinema is all about." These transports have begun to sound rather naïve and provincial. Technology may be important, but it's not all that's involved. And when I am told that the clear and intelligible language of Soviet cinema is a result of our film makers' "lack of freedom," that the authorities dictate not only the subject of the film but also the way it is made, I can't help shrugging my shoulders.

The language—the style—of Soviet cinema is clear and intelligible precisely because Soviet film makers are both free and responsible: We believe in the educative role of the film, we want to be understood by the millions of people who make up our audience. This is a principled stand, not an artistic weakness.

What I have said does not by any means indicate that I favor primitivism. Sufficient to recall the work of such masters of Soviet film making as Andrei Tarkovsky *(Ivan's Childhood* and *Andrei Rublyov)* and Andron Mikhalkov-Konchalovsky *(The First Teacher).* What makes these pictures up-to-date is not so much the directors' technique as their consciousness of the world around them. The same is true, incidentally, of pictures made by Federico Fellini of Italy, Luis Bunuel of Spain and Ingmar Bergman of Sweden.

The newness of contemporary cinema, for me, lies in the heightened interest of movie makers everywhere in the problems of their society, in the political struggle under way in the world. This interest was first aroused by Soviet film makers. Could these pioneers ever have emerged in a society without artistic freedom?

NOT GOOD ENOUGH FOR SOVIET WORKERS

DURING THE CONSTRUCTION of the Volga Auto Plant, in the city of Togliatti on the Volga, more than 500 changes were made in the original plans in order to ensure the best working conditions.

The Soviet Union had bought the auto project from FIAT of Italy, a company that is well known for its technical expertise. Still, the improvements had to be made. Why?

Because both Soviet authorities and Soviet trade unions objected to the specifications as they related to working conditions. By Soviet law no enterprise or shop can start operations without passing the trade unions' technical inspection. A union can also veto equipment that was bought abroad if it does not have appropriate protective devices to prevent accidents or is in any way hazardous in operation.

FIAT sanitary and hygienic standards are less stringent than the Soviet Union's. For example, FIAT allows a higher percentage of gas in the air, and the lighting in the shops is inadequate by our standards. These unacceptable specifications cut production costs, but working conditions suffer.

For example, the Italian engineers wanted to make the main assembly line (it is almost a mile long) zigzag-shaped. That would reduce the size of the building and the cost of construction, on the other hand, it would make for less working space and poorer lighting.

What did Soviet experts recommend? That all three parts of the main assembly line be straightened out. They were moved closer to the front of the building, and the window area was increased by roughly one-fourth. The roof was raised by more than three feet.

The original project made no provision for clubs, dining rooms, or lounges. These facilities were built at the insistence of the trade union and added a sizable sum to the costs.

Modifications had to be made in all the processes of the plant—pressing, mechanical assembly, foundry, body assembly and others. A powerful exhaust ventilation system, for example, was set up at the hardening installation in the mechanical assembly shop. Without this system the gas content in the air would have exceeded the permissible level by seven times.

In all, about 200 general and local ventilation systems and nearly a score of air conditioners have been installed at the plant above and beyond the original specifications. The capacity of the ventilation systems in the various shops was increased by three to five times, purifying the air that much faster. In some work areas the gas content dropped to one-twentieth of the original specification allowance.

The workers took an active part in all these improvements. During construction and by the time the plant began to operate, they had made more than 1,700 suggestions for labor protection and safety; 1,300 of those have already been incorporated.

A department at the plant handles working conditions. It is made up of a laboratory of industrial hygiene, a working conditions bureau, an ergonomic laboratory (a laboratory for labor psychophysiology) and a laboratory for labor sociology.

Bringing working conditions at the Volga Auto Plant up to standard was an expensive business. Construction costs went up by several million rubles. And they are still going up. The 400,000 rubles spent in 1971 for better industrial hygiene doubled in two years—the 1973 figure was 780,000 rubles.

PILOT IN A SEA OF TRADES

WHAT DO I WANT to be? Many youngsters approaching high school graduation cannot answer that question. Production training centers help them make up their minds.

One such center is attended by seniors from more than 20 schools in the Oktyabrsky District in Leningrad. They are sampling several trades.

Twelve of the leading enterprises in the district equipped the center—the Admiralty Shipyards set up four shops for welding, woodworking, turning and fitting. The Volodarskiy Garment Factory provided the machines for a sewing shop. The city's Department of Trade equipped a cooking laboratory. And the Central Telegraph Office installed 32 telegraph units. The latest equipment has been provided in every department.

Shop classrooms are always crowded. Students from each of the schools come here once a week for a whole school day. They have a choice of 15 trades—the ones most in demand in the Oktyabrsky District.

For the first two months the youngsters can go to any shop classroom they like. After that they divide into groups and begin systematic studies to learn their chosen specialty and to acquire specific work skills.

The children find their workdays absorbing. They start with easy assignments (simple instruments for the physics room, teaching aids for first graders) and move on to more difficult tasks.

The training is free, as in all education in the USSR from elementary through professional school. The state, however, has considerable funds invested in these guidance centers for equipment, wages to foremen and instructors and other costs.

Does all this effort and expense pay off? Yes, without question.

In the first place, the youngster takes less time to decide on a career after taking a course at the production training center. Statistics show that the majority of the children who go to the Oktyabrsky District center choose careers related to the trade they learned there.

Secondly, the graduate who takes a job in a factory or an office after production center training needs less time to master his work, and that is reflected in his earnings.

This new form of job guidance has proven itself not only in Leningrad but in other cities in the country. The children, their parents and the state are all more than satisfied with the results.

POWER RESOURCES

ACCORDING TO Academician Mikhail Styrikovich, one of the most authoritative Soviet specialists in the field of power resources, "The USSR has huge resources of natural gas—about half the world total—oil and practically inexhaustible deposits of coal. In 1970 the Soviet Union consumed 1.4 billion tons of conventional fuel, and by 1990 this figure will have reached, according to preliminary estimates, several billion tons. Our resources will be quite sufficient until then and even into a more distant future."

Soviet economists estimate the country's over-all conventional fuel resources (pyroschist, coal, oil, natural gas) at 7.3 trillion tons, with more than 2 trillion tons accessible for use under present technical and economic conditions.

Here are some figures on Siberia, the country's most promising area.

Tyumen—Oil extraction is expected to reach over 140 million tons by 1975.

Narym—The open deposit contains 200 trillion cubic feet of gas.

Yakutsk—The gas deposit prospected there contains, specialists estimate, 25 per cent more gas than all the proven deposits in the Middle East.

At the same time, in the opinion of Soviet economist Yevgeni Shteigauz, member of the Scientific Council on Complex Problems of Power Engineering of the USSR Academy of Sciences, the volume of coal extracted in the country between 1940 and 1972 rose from 182 to 720 million tons a year.

The Soviet Union's planned economy is able to make use of all kinds of fuel rationally and in reasonable proportions.

In Central Russia, to which many gas and oil pipelines have been extended, a number of big thermal power stations work on peat. In the Soviet Baltic republics, where gas pipelines have also been laid, pyroschist is being used as fuel.

But Soviet power engineers face some tricky problems. One of the prime difficulties is that a considerable part of the mineral power resources are concentrated in the eastern parts of the country. These areas have a harsh climate, they are sparsely populated and their development requires sophisticated and powerful machinery, and huge capital investments for the construction of roads, airfields, towns, factories and agricultural complexes. Enormous sums are being invested in these areas: In the Ninth Five-Year-Plan period (1971-1975) allocations for the development of Siberia will exceed 100 billion rubles.

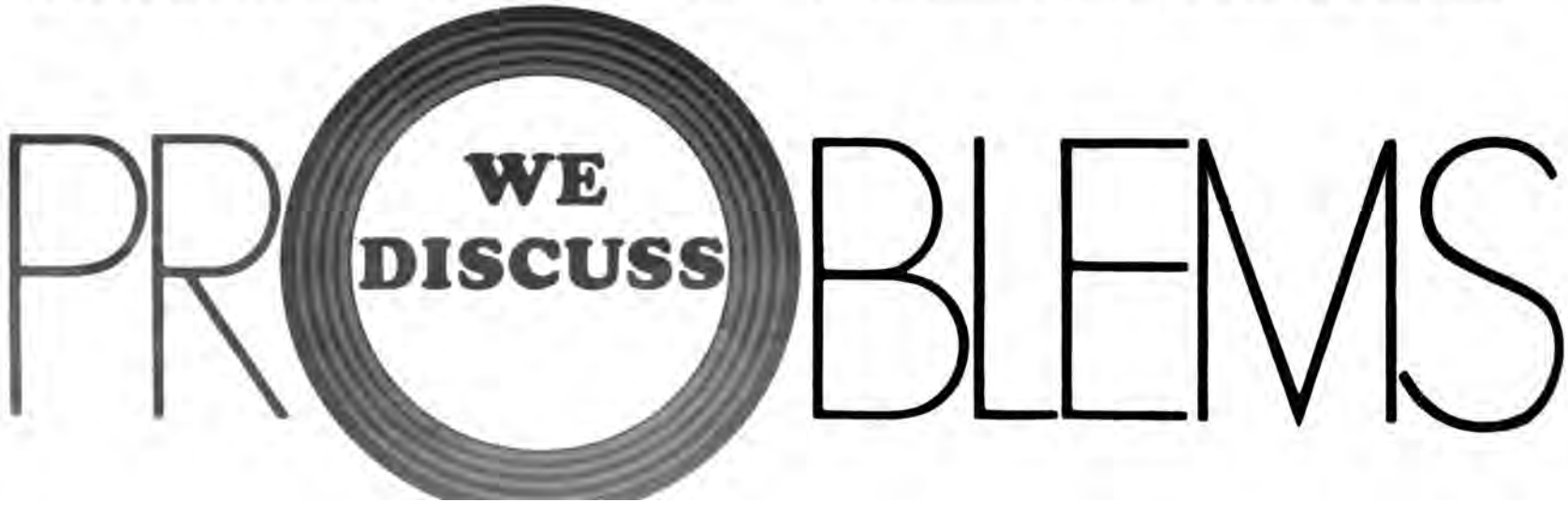
Huge industrial complexes are being set up there; the Bratsk and the Sayano-Shushensky are two of many. An aluminum plant, a timber complex and a number of chemical and timber-chemical enterprises have been built at Bratsk.

The scope of the Sayano-Shushensky complex can be judged by this one figure: the complex embraces 120 industrial enterprises. Siberian oil, along with hydropower engineering, is the basis of the industrial development of this once out-of-the-way taiga area.

Siberian oil will now move westward.

Siberian oil and gas must be transported to the central parts of the country thousands of miles away. It is a titanic job to lay oil and gas pipelines in taiga and swamp. But it is being done.

Gas pipelines have been built with 48-inch tubes capable of repumping up to 350 billion cubic feet of gas a year. Gas pipelines of higher capacity (with a diameter of 55.9 inches) are being built to pump up to 1.05 trillion cubic feet of gas a year. Work is under way on the construction of pipelines with a diameter of 63.8 inches.



QUERIES FROM READERS

QUESTION: Can you tell me something about Soviet soccer, particularly about the teams in the union republics playing in the top division? (Hevig Detyan)

ANSWER: Soccer is by far the most popular sport in the Soviet Union. It could be that interest in ice hockey is growing at a somewhat faster rate, but hockey isn't likely to catch up in numbers of people playing the game. We could say, without too much exaggeration, that the entire adult population of Georgia watched the TV broadcast of the recent world hockey championship in Helsinki. But there are fewer hockey players in all of Georgia than there are, for instance, in just the city of Voskresensk, Moscow Region. As opposed to that, Georgia has several thousand soccer squads—organized in neighborhoods, schools, colleges and factories and on farms. If statisticians tried to determine the number of players per capita, they would probably find it higher in Georgia than in the other constituent republics of the USSR. And if any other republic could match it, neighboring Armenia would be the one. Armenia gave the country last year's champion, Ararat.

In short, the farther south a republic is, the greater the number not only of soccer fans, but of players. For one thing, a southerner can play the game all year round. But in Moscow or Leningrad, where the country's first soccer teams appeared at the turn of the century, the season starts in mid-April, after the thaw, and ends in October. Occasionally you see soccer players in winter, on a field of hard-packed snow, but this is certainly not a mass phenomenon.

Soccer's popularity is borne out by the figures. Each year some 65,000 teams vie in the cup competition of the physical culture and sports clubs in factories and offices. Fifty thousand rural soccer squads take part in the all-USSR Golden Spike Championship, and more than three million schoolboys in the Leather Ball Cup.

A total of 153 teams participate in the national championship in its three divisions. The higher the division, the smaller the number of teams. There are 117 squads in the third, 20 in the second and only 16 in the top division. All of them are amateur, there are no professional teams.

As elsewhere, the encounters between the teams of the top division (many of which are televised) arouse the greatest interest. The championships spring surprises, due not so much to luck as to the annual changes in team personnel. One of the most clear-cut trends is the growing skill of the southerners. Of the 16 teams in the top division, 11 represent southern cities and republics. Six of these are from the Ukraine: Kiev Dynamo, Voroshilovgrad Zarya, Dnepropetrovsk Dnieper, Donetsk Shakhtyor, Odessa Chernomorets and the newest squad in the top division, Lvov Karpaty. The latter, organized in 1963, has already managed to beat all the favorites and win the USSR Cup.

Other southern union republics are represented in the top division by one team each: Yerevan Ararat (Armenia), Tbilisi Dynamo (Georgia), Kishinev Nistru (Moldavia), Tashkent Pakhtakor (Uzbekistan) and Alma-Ata Kairat (Kazakhstan).

How about the other five? They come from two northern cities, the founders of domestic soccer and of the top division. Leningrad is represented by Zenith, and Moscow by a foursome of first-class teams: Dynamo, Spartak, Central Army Soccer Club and Torpedo.

The dean of the top division is Spartak, which was organized in 1922. A year later Dynamo and Central Army appeared, to be followed in 1924 by Torpedo.

Eleven teams in the top division have been competing for the national title since prewar times, and five since the war. The latter are all southern teams: Nistru, Kairat, Pakhtakor, Chernomorets and Karpaty.

National championships for the top division have been contested since 1936 (there are 338 players participating this year). For a long time the northerners, and usually the Muscovites, maintained the lead. From 1936 through 1973 there were a total of 34 championships, with a break during the war, and Muscovites emerged victorious 27 times. The first team from another city to receive the gold medal was the Kiev Dynamo, in 1961. Kiev later repeated its performance four times, so that no one now talks about Moscow's soccer monopoly. Neither does anyone claim that the success of non-Moscow teams is a fluke and that the Muscovites will make a comeback. In the last three championships only one Moscow team, Dynamo, earned a medal. It placed third just once.

But Ararat of Yerevan, which some six or seven years ago was considered good-to-middling, surprised everyone. Not only did it leave behind all the traditional favorites in the championship, but it took the USSR Cup. Ararat won a cherished golden double (winning both the championship title and the cup in the same year), becoming the sixth team to do so in the entire history of domestic soccer.

There were other trophies at stake besides the gold, silver and bronze medals in the last championship (1973). Ararat, which scored more goals than any other team, won the prize named for Grigori Fedotov, our famed soccer player of the prewar and early postwar years. It also took another prize, the Enterprising Guest, for scoring the most victories away from home.

Many Ararat members were on the list of the country's 33 leading players of the year. But recognition as the very best player went to Oleg Blokhin, 22, of Kiev, who scored more goals than anyone else—18.

Another laureate of the 1973 season is Moscow Dynamo's Vladimir Pilgui—the best goalkeeper. He is a pupil of the outstanding goalie Lev Yashin, a member of the world team.

Many of our fans collect soccer statistics, which the sports editors of newspapers are generous in providing. Here are a few:

The Central Army Sports Club squad and Kiev Dynamo took the national championship three years in a row.

Moscow Spartak scored three golden doubles.

Only one novice team in the top division managed to earn a medal in the championship right away. That was Tbilisi Dynamo.

The largest number of goals in a single championship, 34, was scored by Nikita Simonyan of Moscow Spartak. Simonyan, the head coach of Ararat, is one of the best known soccer names today.

Ararat of Yerevan won the USSR cup in 1973.

THE HERMITAGE

By Marina Khachaturova

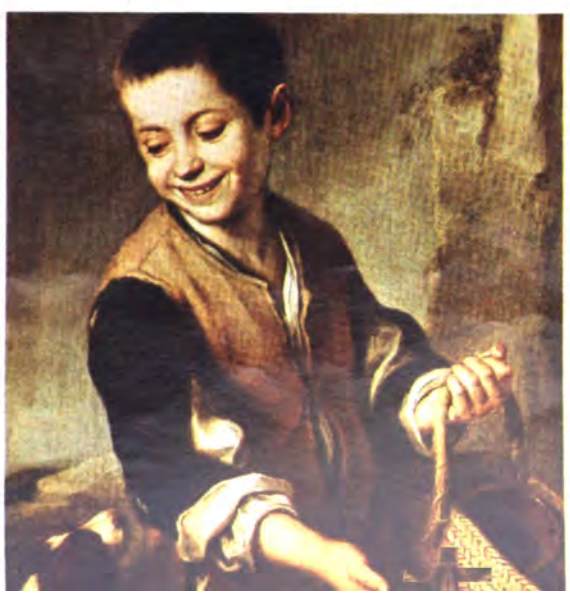
Judith
by Giorgione

IN THE Winter Palace, for a century and a half the residence of the czars, is one of the world's great art museums, the Hermitage.

The year 1764 is held to be the date of founding of the Hermitage. That was when a collection of 225 paintings, purchased in Berlin on orders from Catherine II, was brought to the Winter Palace. The paintings were, for the most part, by Dutch and Flemish masters. Since the Revolution the Hermitage has been transformed from a palace collection available only to the nobility to a museum belonging to the people.

The Hermitage collection now includes more than two and a half million items from different periods, countries and peoples. The total length of the 353 rooms open to visitors is almost 14 miles. No wonder that it is difficult to avoid phrases like "the world's largest" or, also, "internationally famous." It is hard to think of other descriptions for the Hermitage collections of Russian precious and semiprecious stones, Scythian antiquities, Byzantine art, Turkish arts and crafts, West European weaponry of the fifteenth to seventeenth centuries, Italian majolica of the sixteenth century, Spanish painting, works of Rembrandt, West European porcelain, Dutch genre painting, English ceramics, French art, West European tapestries of the fifteenth to eighteenth centuries and many, many more.

The museum annually has about three and a half million visitors. It is especially crowded in the summer, when people come to Leningrad from all parts of the country. Few of them miss the Hermitage, which can be compared only to the Louvre in Paris, the National Gallery in London and the Metropolitan Museum in New York. The summer is a particularly busy season for the museum staff. They go on long trips and archeological expeditions to Central Asia, the Caucasus, the Urals and



The Boy with a Dog
by Bartolomé Esteban Murillo

Portrait of Count Olivares
by Diego Velázquez

Madonna Benois
by Leonardo da Vinci

Dance
by Henri Matisse

Tahitian Pastoral Scene
by Paul Gaugin

THE HERMITAGE

The Hermitage can be compared only to the Louvre in Paris, the National Gallery in London and the Metropolitan Museum in New York.

the Altai. The Hermitage also has experts engaged continuously in research in diverse fields of world art. Among its other activities is an educational program of excursions, lectures and instruction for both children and adults.

In a brief article such as this, it is possible to describe only some of the highlights of the museum's collections.

The West European art section, for example, is the oldest in the Hermitage. It has four departments: painting and sculpture, drawings, engravings and applied arts.

Two, three, even four days are hardly enough to see everything. But most people on their first visit to the Hermitage make a beeline for Room 214, with its two masterpieces, two small pictures by Leonardo da Vinci: *Madonna Litta* (1490) and *Madonna Benois*. Some 10 paintings by Leonardo have come down to us through the ages. They are scattered throughout museums in different countries. *Madonna Benois* or *Madonna of the Flower*, painted sometime around 1478, got to the Hermitage in 1914. Instead of the traditional Madonna the artist depicted a gaily dressed townswoman with a mysterious smile who offers the child a flower.

Italian art of the thirteenth to eighteenth centuries is represented by the work of the greatest masters. There are, for example, two early Raphaels: *Madonna Conestabile* and *Holy Family*, both High Renaissance paintings. The Venetian school is particularly well represented. Outstanding is Giorgione's masterpiece *Judith* (around 1504). Its strikingly beautiful colors and emotional appeal attract many viewers, art historians included. Titian, a fellow student of Giorgione, is represented by eight works of his early and mature periods, each a masterpiece.

The Hermitage collection of sixteenth to seventeenth century Spanish painting is considered to be one of the most important in world museums. El Greco is represented by his *Apostles Peter and Paul* and Velázquez by two pictures: *Breakfast*, dating back to his early period (1617), and *Portrait of Count Olivares* (around 1638). Velázquez' genius as a painter and his psychological insights are evident in the portrait of Count Olivares, a minister at the court of Philip IV.

Among the Spaniards in the museum first place (in value and number of pictures) is undoubtedly held by Murillo, younger contemporary of Velázquez. His 20 paintings make it possible to trace his artistic development. *The Boy with a Dog* (around 1650) shows his realism and interest in everyday themes.

The Hermitage collections are so enormous that a catalogue of the items would alone make a good-sized book. It has one of the most important world collections of Dutch painting of the seventeenth to eighteenth centuries—1,313 pictures. The 26 Rembrandts include psychological studies painted at the zenith of the artist's maturity, the 1650s, as well as *Return of the Prodigal Son*. Four pictures of the nineteenth century Dutch painter Vincent van Gogh hang in the rooms devoted to the French postimpressionists, with whom he was so closely associated. *The Hovels* (1890), painted in the artist's late years, is steeped in distress and anxiety.

The seventeenth century Flemish artist Peter Paul Rubens is represented by 22 pictures and 19 sketches, and another master of the Flemish school, Anthony van Dyck, who lived and worked in the same period, by 25 paintings, mostly portraits.

The museum's collection of French art is the richest outside France. Confining our attention to paintings (the collection includes furniture, tapestries, porcelain, bronzes), we find 17 works of Nicolas Poussin, the founder of the classical style in seventeenth century French art, five of them indisputable masterpieces, as well as 11 landscapes by the classicist Claude Lorrain. The eighteenth century is represented by Watteau, Chardin, Boucher, Fragonard and Greuze; and the late nineteenth and early twentieth century by Monet, Renoir, Pissarro, Sisley, Degas and Cézanne. There are 15 paintings by Paul Gauguin, dating back to the artist's Tahitian period. His *Tahitian Pastoral Scene* (1893) breathes the harmony and purity of a life of innocence, when man becomes part of nature.

Matisse, Marquet, Derain, De Vlaminck are well represented. The 35 Matisses, painted between 1900 and 1913, are, perhaps, the world's best collection of his early work. His *The Dance* (1910) is the epitome of joy; the colors are rich, the figures are done in the decorative-monumental style.

Picasso's 36 paintings and gouaches, from the period 1901 to 1914, include one of the finest works of those years, his *The Absinthe Drinker*. His blue, rose and cubist periods are all represented. *Boy with a Dog* (from the rose period, 1905) is a mingling of lyricism, gentleness and an elusive sorrow.

Here we are, at the end of our story, without even a mention of so many of the unique exhibits of the Hermitage: the collections of ancient, Oriental, West European and Russian coins, the medals and orders of different periods and countries; the fancy coaches and carriages; the textiles, embroidery and lace; the fascinating jewelry. But all this will have to wait for another article.

Hovels
Vincent van Gogh

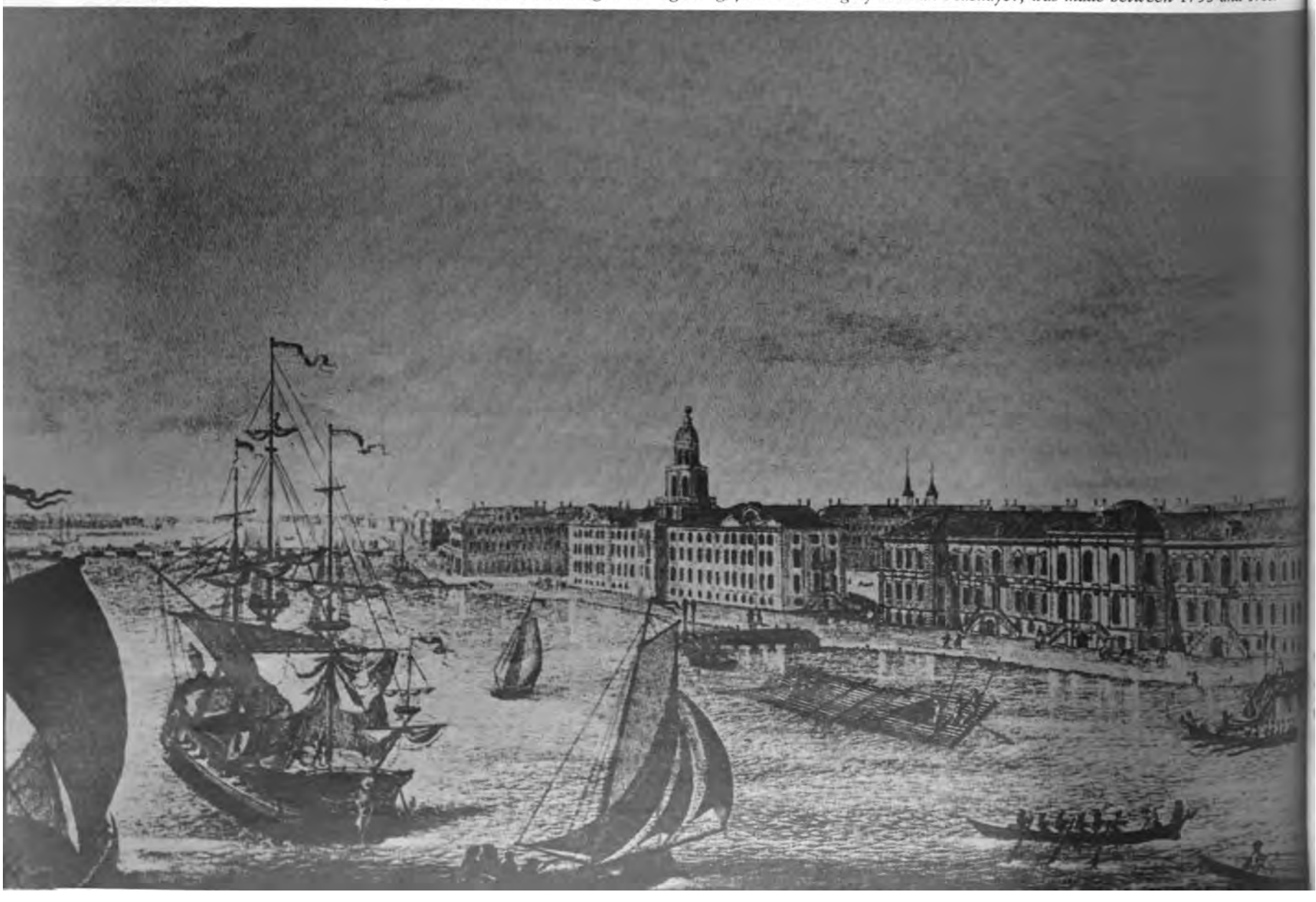
Boy with a Dog
by Pablo Picasso

SCIENCE: OLD AND NEW FRONTIERS

"We pride ourselves on the USSR Academy of Sciences. The Party and people show it every attention and concern. It serves our country and world civilization selflessly and loyally. The great conquests of Soviet science, which have added to the glory of our country, are directly associated with the work of the USSR Academy of Sciences."

Leonid I. Brezhnev

First quarters of the Russian Academy of Sciences, St. Petersburg. The engraving, from a drawing by Mikhail Machayev, was made between 1753 and 1761.



AT A FOUR-HOUR SESSION of the Senate Peter I, Emperor of Russia, considered a detailed draft statute for the Academy of Sciences and the university which was to be part of it. Noting that in other countries these two scientific institutions were not connected, the draft declared that the connection was necessary for Russia. Hence, not only the "proliferation of the sciences" but also their teaching were to devolve upon the academy-to-be. Its division into three branches—mathematics, physics and the humanities—did not resemble a single academy of the time. France, for instance, had a system of parallel academies, theology prevailed at the Berlin Academy and neither history nor law was studied by the Royal Society.

A few days after the debate, on January 28 (February 8, New Style), 1724, the Senate published a decree establishing the Russian Academy of Sciences.

The founding of the Academy was an integral part of the political and cultural activities of Peter's regime. The members of the Academy were public officers, they worked at state institutions and their duties were strictly defined: They were to conduct experiments, deliver lectures, do translations and work on tasks assigned them by governmental bodies.

As early as the eighteenth century the achievements of the St. Petersburg Academy of Sciences had made it one of the most authoritative scientific centers in the world. The Academy fostered the study of mathematics, the natural sciences, the country's natural resources, geography and population composition. Later, in the second half of the eighteenth and the beginning of the nineteenth century, universities, scientific societies and other institutions were set up. The first, Moscow University, founded in 1755, was followed by universities in Kazan, Kharkov and Yuryev. But the Academy still remained the center of scientific thought.

Russian academicians made world-famous discoveries and originated new scientific trends. The work of scientist Mikhail Lomonosov; mathematicians Nikolai Lobachevsky, Mikhail Ostrogradsky, Pafnutiy Chebyshev, Andrei Markov, Alexander Lyapunov, Sophiya Kovalevskaya; chemist Alexander Butlerov; physiologist Ivan Pavlov and "Father of Russian Aviation" Nikolai Zhukovsky brought undying fame to Russian science.*

But even with that abundance of talent science in prerevolutionary Russia was never a really powerful force. The Academy achieved its fame not due to but in spite of czarist policy. Academician Vladimir Vernadsky wrote that this policy in science and education "was amazingly shortsighted and, I would say, antinational, running counter to the interests of Russia." As a rule, the Academy was headed by notorious reactionaries far removed from science. Their function was to prevent scientists from working on acute social and political problems and to guard the Academy against "freethinkers." The most important, challenging and far-reaching ideas remained frozen for lack of support.

Despite that, the international authority of the Academy was great. Its works were regularly reviewed by many of Europe's scholarly journals.

The October Revolution rejuvenated the Academy. Science became the concern of the state. From its inception the socialist state, the sole owner of the country's land and all its productive forces, organized its economy on a scientific basis. As early as 1918 Lenin insisted that scientists help draft and apply the plans for the country's economic development.

This approach required that scientific development itself be planned. And so the Academy gradually became the headquarters responsible for organizing, controlling and planning the country's scientific development.

Abroad that approach to science was ridiculed: The Russians were going to "plan creative activity." In the twenties John Bernal seemed to be the only British scientist who grasped the significance of this initiative. But by mid-century, with the scientific and technological revolution in full swing, the state importance of science, and hence, the necessity to plan it, was generally recognized.

But this is no simple matter. Two factors—internal and external—have to be taken into consideration: the internal being the logic of the development of science itself, the objective laws of cognition of the object of research; and the external, the needs and requirements of the society, the social demands of practical life.

The point where these factors intersect determines the basic line of scientific development.

In the very first Soviet years, more than 50 scientific institutions began work, among them leading physical and chemical institutes, without which the history of Soviet and world science today would be much impoverished.

Lenin projected a vast research program aimed at the country's rapid economic development. Scientists gave unstintingly of themselves in the prewar years when the foundation of the Soviet Union's economic might was being laid.

They did yeoman service in repelling fascist aggression. As Academician Sergei Vavilov pointed out, "One of the many miscalculations that predetermined the defeat of the fascist invaders was their underestimation of Soviet science."

In czarist Russia, scientific centers were concentrated in a few big cities. In the backward parts of the country—Central Asia, Transcaucasia, Siberia and the Far East—there was almost no research. In Soviet times, as early as in the thirties, research affiliates and centers began to be organized in the republics, regions and territories. The first branches, set up in the Urals, Transcaucasia and the Soviet Far East, are now national centers of scholarship. The 14 academies of the union republics have trained scientific personnel of their own and have founded scientific schools that have won worldwide recognition. An example is the Armenian astrophysicists and astronomers headed by Academician Victor Ambartsumyan, director of the Byurakan Astrophysical Observatory and president of the Armenian Academy of Sciences.

Many of the outstanding scientific discoveries of recent years are the products of such new research complexes as the biological center at Pushchino, the chemical center at Noginsk, the physics center at Krasnaya Pakhra and the atomic energy center at Dubna.

The center at Obninsk, near Moscow, has concentrated the talents of a variety of specialists—physicists, chemists, biologists, mineralogists and others—on the very complex and vital problem of atomic energy for peaceful purposes.

The creation in 1957 of the Siberian Branch of the USSR Academy of Sciences was a major event. Its function is to promote the development of science in the eastern parts of the country. The Siberian Branch now comprises 36 large research institutions. It also has three affiliates in Eastern Siberia. The Siberian Branch has grown into a ramified network of research institutes and design offices capable of independently tackling complex scientific and technological problems. "The establishment of so large a scientific center in so short a time was a unique experience," said Mstislav Keldysh, president of the USSR Academy of Sciences. "It was possible only because the whole country helped build it. The appeal of the party to create this center of science was answered by many prominent scientists as well as young research workers."

The expanding front of research requires a continual influx of young specialists. Free education drew a large number of people to science. Partly responsible for this development is the fact that graduation from any type of secondary school—be it a day school or an evening school, a school in the capital or in a remote Siberian settlement—gives a person the right to enter an institution of higher learning. Today the total number of people studying comes to 80 million, five million of them students at 833 schools of higher education. This means that every third person in the country attends some school.

Over 1.1 million people are lecturing and doing research work at higher educational institutions. Every fourth scientist in the world is a Soviet citizen.

Today the Academy of Sciences determines the direction of scientific research and coordinates the developments in mathematics, nuclear physics, quantum electronics, solid-state physics, several branches of chemistry, the earth sciences, space exploration. Fundamental studies in the natural sciences have a decisive effect on the development of modern technological trends—radioelectronics, chemistry of polymers, computer technology, and, in the end, on accelerating technological progress and the development of the national economy as a whole. Soviet scientists take an active part in developing new machinery. In the course of only five years, from 1966 to 1970, more than 20,000 new machines, instruments and technological apparatuses were created. Every sixth invention in the world comes from the Soviet Union.

The material base of the Academy has expanded tremendously, and the quantity and quality of its equipment has kept pace. State allocations for science have increased 20-fold in the past 20 years. Today the Academy has some 250 affiliated research institutions.

In Soviet times, the Academy of Sciences has become one of the world's largest scientific centers. It has broad international ties and is a member of 140 international organizations. The Academy of Sciences cooperates fruitfully with the scientists of the socialist countries and takes an active part in the application of the Comprehensive Program of Socialist Economic Integration within the framework of the Council for Mutual Economic Assistance.

Sixty-nine distinguished scientists are foreign members of the USSR Academy of Sciences, among them Paul Dirac (Britain), Jaroslav Kožešnik (Czechoslovakia), Arnaud Denjoy and Louis de Broglie (both of France), Detler Bronk, Hargobind Khorana, Herman Mark, Severo Ochoa, Linus Pauling, Albert Szent-Györgyi and Glenn Seaborg (all of the United States).

* For more information about the contribution of Russian scientists to world science see pages 42-43.

Contribution to World Knowledge

Mikhail Lomonosov (1711-1765), in the mid-eighteenth century, was the first to formulate and prove experimentally the law of the conservation of matter in chemistry. He applied the concepts of heat and pressure to mechanics and developed a number of hypotheses, which were subsequently confirmed, on the origin of mountain rocks. He discovered the atmosphere of Venus by direct observation of the planet as it passed the Sun's disc.

Nikolai Pirogov (1810-1881) made an immense contribution to mid-nineteenth century surgery. He worked out an atlas of topographical anatomy and devised several surgical techniques, including osteoplastic operations. He did much to promote the use of antiseptic methods in surgery.

Pafnutiy Chebyshev (1821-1894) proved an important postulate in the distribution of prime numbers: There is at least one prime number between any number and one that is two times greater. In the theory of probabilities, he proved the fundamental law of large numbers which says that the arithmetical mean of a large number of random events approaches a constant magnitude.

Nikolai Lobachevsky (1792-1856) was the founder of a system of non-Euclidian geometry in 1826. He proved, in contradiction to the fifth postulate of Euclid, that more than one parallel to a given line can be drawn through a point. Lobachevsky's research stimulated further study of the solid geometry of arbitrary curvature and served as the basis for the theory of relativity.

Boris Yakobi (1801-1874) invented the present design of the electric motor with a revolving rotor. He did fundamental research on the properties of electric magnets and was among the first to build cable telegraph lines and to invent galvanoplastics.

Alexander Lyapunov (1857-1918) solved the most difficult problem of the mechanics of continuous media by determining the form of a rotating fluid mass. He showed that there was no general equilibrium figure for such a mass and that it depended on the velocity of the fluid's rotation. This conclusion was critical in plotting theoretical models of stars.

He also created the world-famous method of determining the stability of systems whose motion is described by differential equations.

Sergei Botkin (1832-1889) established the infectious origin of viral hepatitis (Botkin's disease). He was the first to suggest that the organism be considered as an integral whole closely related to the environment and controlled by the nervous system. Botkin developed the diagnostics and clinical practice for the floating kidney.

Alexander Popov (1859-1906) demonstrated in 1895 the world's first radio set, which he had invented, and a year later transmitted messages by telegraph.

Vasili Struve (1793-1864) was the precursor of several generations of outstanding astronomers and one of the founders of the Pulkovo Observatory. He developed a number of precise astronomical methods, initiated the collection of statistics on the stars and led a 40-year program for the measurement of the arc of the globe's meridian in order to define the shape of the Earth with greater accuracy.

Dmitri Chernov (1839-1921) in the 1870s established the critical temperatures for the phase transformations of steel, thus creating the foundation of physical metallurgy. He established the decisive role of heat treatment in obtaining the desired structure and properties of steel and elaborated the idea of surface hardening and jet tempering.

Pyotr Lebedev (1866-1912) was the first to prove by direct experiment the existence of light pressure. It provided complete confirmation of the electromagnetic theory of light.

Evgraf Fyodorov (1853-1919) worked out the theory of the symmetry and structure of crystals in 1890 and proved the existence of 230 steric groups in which the arrangement of atoms defines the lattice of monocrystals.

Vladimir Vernadsky (1863-1945) developed the fundamentals of geochemistry. He formulated laws by which the distribution of minerals in the Earth's crust can be predicted, and advanced the hypothesis, subsequently confirmed, of the radioactive nature of the Earth's inner heat. He originated the concept of the biosphere, suggesting that the evolution of living and non-living nature be regarded as a single whole.

Alexander Butlerov (1828-1886) originated the theory of the chemical structure of organic compounds, which, among other things, explained the existence of isomers—compounds with similar composition but very different properties. Butlerov's work anticipated the stereochemistry developed much later and laid the foundations for high-molecular chemical compounds.

Dmitri Mendeleyev (1834-1907) in 1869 worked out his famous periodic table of the elements and with it predicted the presence in nature of the previously unknown chemical elements germanium, gallium and scandium. Mendeleyev's periodic table played a critical role in the investigation of the structure of atoms and the nuclei of elements.

Nikolai Zinin (1812-1880) was the first to synthesize aniline by nitrobenzene reduction. Known as the Zinin reaction, it was the foundation for the entire structure of the chemistry and production techniques of aniline dyestuffs.

Ilya Mechnikov (1845-1916) developed the theory of phagocytosis and immunity. He was awarded the Nobel Prize in 1908.

Ivan Sechenov (1829-1905), in his studies of cerebral reflexes, discovered the phenomenon of inhibition, a most important function of the nervous system. He laid a rational foundation for the investigation of psychological phenomena.

Ivan Pavlov (1849-1936) discovered and experimentally substantiated the conditioned reflex, the phenomenon responsible for the adaptation of a living organism to environmental changes. He disclosed the role played by the cortex of the large hemispheres in higher animals in controlling all the reactions of the organism. He laid the foundation for the study of neuroses. In 1904 he was awarded the Nobel Prize for his research on the physiology of digestion.

Vasili Dokuchayev (1846-1903), the founder of modern soil science, propounded the present concept of soil as a medium that is constantly being changed by climate, plant and animal life, time and the physical geography of the country. He elaborated a system of scientific measures for increasing soil fertility.

Konstantin Tsiolkovsky (1857-1935) was the first to substantiate, at the turn of the century, the possibility of using rockets for interplanetary flight. He proposed building a rocket engine that would work on liquid propellants, suggested multiple-stage rockets, investigated the effect of the atmosphere on rocket motion and pointed out the importance of intermediate orbital stations.

Nikolai Zhukovsky (1847-1921) developed the complete theory of the lift force of the wing. He was first to propose the eddy theory of the airscrew and elaborated methods for calculating airfoil profiles, thus laying the foundation for modern applied aerodynamics.

Nikolai Vavilov (1887-1943) formulated, in the early 1920s, his law on homologous rows in genetic variation that genetically close species and families are characterized by similar rows of genetic variation. This law makes it possible to predict forms in some species and families parallel to those in other species of living organisms.

Alexander Friedman (1888-1925) in 1922 found the first nonstationary (depending on time) solution of equations in Einstein's general theory of relativity. From this solution followed the possibility of a change in the radius of the universe and, particularly, the model of the expanding universe, which serves today as the basis for most cosmological theories.

Sergei Chetverikov (1880-1959) in 1926 published his paper "Concerning Some Moments of the Evolution Process from the Viewpoint of Modern Genetics," a first examination of the processes of evolution from the genetic point of view.

Nikolai Semenov (born in 1896) in the 1920s and 1930s developed the theory of chemical chain reactions. It explained such phenomena as oxidation, halogenization, catalysis, cracking and others. For this research Semenov and Cyril Norman Hinshelwood were awarded the Nobel Prize in 1956.

Nikolai Koltsov (1872-1940) in the 1920s elaborated a theory linking heredity with the self-reproduction of giant molecules carrying genetic information in their structure and capable of self-reproduction. This theory, proposed 20 years before the discovery of DNA molecules, anticipated all their basic properties, including the replication method.

Sergei Lebedev (1874-1934) in the late 1920s developed and applied the first industrial method for synthetic rubber production from ethyl alcohol. His synthesis method of divinyl, the source material for rubber, was more effective than those developed earlier as well as those that appeared and were used later in other countries.

Vladimir Filatov (1875-1956) in the 1920s and 1930s developed methods of transplanting the cornea without subsequent opacity. He perfected surgical techniques and methods in the clinical investigation of ocular diseases. He originated widely used skin transplantation methods.

Andrei Kolmogorov (born in 1903) in the 1930s worked out the axiomatic foundations of the theory of probability based on the concepts of the theory of sets. He also originated the theory of probabilistic processes and made the first studies in the field later acquired the name of cybernetics.

Pavel Cherenkov (born in 1904) and **Sergei Vavilov (1891-1951)** in 1934 discovered the phenomenon of radiation during the passage of electrons in a medium with a velocity greater than that of light (Cherenkov effect). The complete quantitative theory of this radiation was worked out by **Igor Tamm (1895-1971)** and **Ilya Frank (born in 1908).** Tamm, Frank and Cherenkov were awarded the Nobel Prize in 1958.

Pyotr Kapitsa (born in 1894) discovered the property of superfluidity in helium at low temperatures. His unique experiments explained an earlier known property of helium—its unusually high heat conductivity—as the property of a liquid that has no viscosity, a superfluid liquid.

Mstislav Keldysh (born in 1911) in the late 1930s and early 1940s worked out very important applications of the theory of the approximation of functions in a complex region to the theory of potential, the theory of wing vibration and other important problems of present-day aerodynamics and mechanics. Since 1961 he has been president of the USSR Academy of Sciences.

Ivan Vinogradov (born in 1891) in the 1930s devised a new method for the analytical number theory (Vinogradov's trigonometric sums). Vinogradov's method, in addition to the theory of numbers, is employed in the theory of probabilities, the theory of functions and other important fields of mathematics.

v Zeldovich (born in 1914)
Yuli Khariton (born in
in 1939 showed that by
ly enriching a natural
re of uranium isotopes
a light isotope (uranium-
a nuclear process was
)le with ordinary water
as moderator.

mir Engelhardt (born in
) in 1940 discovered the
city of muscle protein to
the molecules of adeno-
triphosphate, thus accel-
ng the chemical reaction
n serves as the energy
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nical energy is transformed
tly into mechanical en-

i Astaurov (born in 1904)
e 1930s to 1950s demon-
ed the leading role of the
nucleus in the phenomena
eredity and individual de-
)ment and discovered the
ibility of artificially regu-
g the ratio of sexes in the
ring of the mulberry silk-
n moth—the production of
ominantly female or pre-
nantly male offspring.

Landau (1908-1968) origi-
d the general theory of
rfluidity. He explained the
iagnetism of free electrons,
ed out a kinetic equation
harged particles with due
)unt of collisions, devel-
l the theory of electron-
on showers in cosmic
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of the preservation of
bined parity in weak inter-
)ns. For his major contri-
)ns to theoretical physics,
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limir Veksler (1907-1966) in
discovered and subtanti-
the so-called principle of
se stability in accelerators,
wing particles to be reso-
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t energies. This principle
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accelerators.

olai Bogolyubov (born in
9) did a series of studies
n the 1930s to the 1950s
the theory of nonlinear os-
itions and the dynamic
)ry in statistical physics. He
stantiated the method of
etic equations, the theory
superfluidity and supercon-
tivity, as well as a number
extremely important meth-
in quantum field theory.

geni Zavoysky (born in
7) in 1944 discovered the
nomenon of electronic para-
gnetic resonance.

olai Basov (born in 1922)
Alexander Prokhorov (born
1916) advanced in 1951, independently of Charles Townes (USA), the idea of creating a molecular generator for super-high-frequency electromagnetic oscillation. The practical realization of this idea in 1954-1955 marked the appearance of a new field in physics, quantum electronics. Basov, Prokhorov and Townes were awarded the Nobel Prize in 1964.

Vladimir Kotelnikov (born in 1908) laid the foundation in the 1940s to 1960s of the theory of the noise stability in areas of radio transmission. He proved the fundamental theorem underlying present-day pulse methods of radio transmission and coding, worked out new methods of radio communication and developed and applied planet radar methods.

Alexander Vinogradov (born in 1895) did fundamental research from the 1930s to the 1940s on the relation of the composition of organisms to the geochemical characteristics of the medium. His work on biogeochemical provinces served as the basis for a new biogeochemical method of prospecting for useful minerals.

Ivan Artobolevsky (born in 1905) in the 1930s elaborated the classification of spatial mechanisms and methods for the kinematic analysis of complex multilink mechanisms. He provided general solutions to problems in mechanics and developed the theory of spatial mechanisms, which played an important role in the development of mechanical engineering.

Vladimir Bekhterev (1857-1927) made an important contribution to the investigation of brain morphology at the turn of the century. He discovered the conduction paths of marrow and the brain, and established the anatomical and physiological requirements for the equilibrium and orientation of organisms in space. He was the first to single out a number of characteristic reflexes, symptoms and syndromes essential for diagnosing nervous diseases. He generalized the results of his research in his book *Fundamentals of Teachings on the Functions of the Brain*, published in seven editions.

Ivan Gubkin (1871-1939) made a detailed study in the early twentieth century of the stratigraphy of Tertiary deposits in the Northern Caucasus and established an earlier unknown type of tectonic "diaper" folds, so called, which play an important part in the formation of oil deposits. Applying his concept, he made forecasts and estimates of major oil deposits, among them the Volga-Ural oil basin. His classic paper "Teachings on Oil" (1932) summed up his research in the field.

Abraham Ioffe (1880-1960) made an important contribution in the early twentieth century to the study of the mechanical properties of crystals and the electric properties of dielectrics, and laid the theoretical foundation for the use of semiconductors in electronics and electrical engineering. He directly supervised the first fundamental investigations of conductivity in the semiconductor mechanism of intensive electric fields. He led an important school of physics that trained such famous future scientists as Abram Alikhanov, Lev Artsimovich, Pyotr Kapitsa, Igor Kurchatov, Nikolai Semenov, Yakov Frenkel and others.

Alexander Karpinsky (1847-1936) elaborated the method of tectonic analysis based on paleogeographic principles. He was the first to disclose the basic features of the tectonic structure of the Russian platform and to lay the foundation for investigations in marine transgressions and regressions. He also devised new methods of morphological analysis in paleontology. He was president of the USSR Academy of Sciences from 1916 to 1936.

Vladimir Komarov (1869-1945) provided fundamental descriptions of the flora of the Far East, China and Mongolia. He made an important contribution to plant evolution and taxonomy. He was president of the USSR Academy of Sciences from 1936 to 1945.

Alexei Krylov (1863-1945) worked out classical methods for computing ship characteristics. He developed the theory of pitching and the behavior of a vessel under the arbitrary striking angle of waves. He originated the theory of ship vibration and contributed to other areas of mechanics and applied mathematics.

Pavel Lukyanenko (1901-1973) from the 1930s to the 1960s worked out methods of winter wheat variety selection. He developed 45 new varieties of wheat which are resistant to severe climatic conditions and to various diseases.

Mikhail Millionshchikov (1913-1973) in the 1930s solved important problems in the theory of the turbulent motion of gases and liquids, and developed the law of isotropic turbulence attenuation.

Alexander Nesmeyanov (born in 1899) in the late 1920s originated a new, simple and general method of synthesizing metalorganic compounds, the method of double diazonium salts. The research done by Nesmeyanov and his pupils did much to create an important sector in organic chemistry, metalorganic compound chemistry. He was president of the USSR Academy of Sciences from 1951 to 1961.

Vladimir Obruchev (1863-1956) did fundamental studies at the turn of the century in the geological structure of Eastern Siberia and Central Asia, the distribution of minerals, and problems of metallogeny in that area.

Yevgeni Paton (1870-1953) in the 1930s developed methods for automating welding processes. He originated the hidden arc welding method, did a detailed study of weld joint strength and made extensive use of welded joints in bridge building.

Nikolai Przhevalsky (1839-1888), in the course of several expeditions, made a detailed study of the physicogeographic characteristics and the animal life of Central Asia. He was the first to study the natural surroundings of the Central Asian mountain ranges. He described the climatological features of this area and discovered dozens of new animal species, among them the Przhevalsky horse.

Pyotr Semyonov Tien-Shansky (1827-1914) in the mid-nineteenth century initiated explorations of Central Asia, where he made a number of geographical discoveries. He described the structure of the mountain chains in the Tien Shan and showed that they were not of volcanic origin.

Kliment Timiryazev (1843-1920) made a fundamental contribution to the study of photosynthesis at the turn of the century. He made a detailed investigation of the energy aspect of this process, which established the decisive role of chlorophyl.

Andrei Tupolev (1888-1972) laid the foundation of present-day aircraft engineering in the USSR from the 1920s to the 1950s. He advanced the concept of all-metal aircraft, designed over a hundred different types of planes and contributed to the development of the aerodynamic computation theory.

Igor Kurchatov (1903-1960) was the founder of Soviet atomic physics. It was under his supervision that Soviet atomic science and technology originated; a whole pleiad of brilliant atomic scientists developed under his guidance. In 1954 the world's first atomic power station in the town of Obninsk was put into operation under his immediate supervision and with his participation. Kurchatov was the author of 100 classical research papers which are among the most valuable studies in world physics. For his immense contributions to atomic physics, the USSR Academy of Sciences instituted the Kurchatov Medal for Research in Nuclear Physics.

Victor Ambartsumyan (born in 1908) proposed the concept of star associations in evolutionary cosmology in the 1950s and 1960s. This concept, based on the existence of groups of new stars which appeared simultaneously, made important changes in our knowledge of the process of star formation.

Gersh Budker (born in 1918) in 1956 proposed a method of creating accelerators with colliding beams in which the energy of accelerated particles is used more effectively for the interaction of elementary particles. Budker's colliding beam method has been a promising trend in high-energy physics.

Georgi Flerov (born in 1913) and his coworkers synthesized and investigated the 102nd, 103rd, 104th and 105th elements of the periodic table in the 1960s.

Sergei Korolyov (1906-1966) supervised the research on the creation of space rockets that in 1957 resulted in launching the world's first man-made Earth satellite.

The launching in 1959 of the first multistage space rocket to the Moon inaugurated the versatile detailed exploration of the Earth's natural satellite and the planets of the solar system.

Cosmonaut Yuri Gagarin (1934-1968) made the pioneer flight in the Vostok 1 that ushered in the era of man's penetration of outer space.

Pilot-cosmonaut Alexei Leonov (born 1934) in 1965 was the first person to leave a spaceship and walk in space.

SCIENCE IS A MAGNET

By Albert Belyavsky
Candidate of Science (Law)

SOCIOLOGISTS made an interesting discovery recently when they asked young people in various school grades to choose, from a given list, the profession they considered the best. The most preferred was scientist!

A poll of first-year university students showed that 80 per cent of them planned to go into scientific research.

Much the same results were obtained by several job-placement committees at higher educational institutions. These committees are appointed annually at every college-level school in the Soviet Union to make sure, in conformance with the law, that every graduate gets a job. Seniors naturally made their choice with a better knowledge of what they really wanted to do. But they also chose research.

The number applying for graduate courses —most scientists in the USSR acquire their training through such graduate study—increases every year. We now have about 100,000 graduate students (almost half of them have jobs and take correspondence courses). But there are far fewer graduate student vacancies, in both the universities and research institutes, than there are applicants. To qualify, the student must submit a scientific abstract and take competitive examinations. Those who pass receive a stipend and free dormitory accommodations. In three years (or four, for correspondence students) they have to qualify for their candidate's degree and write a thesis. This independent research is defended before a scientific council of the student's higher school or research institute, which decides whether to award the degree or not. This decision is approved by the Higher Attestation Committee of the USSR Ministry of Higher and Specialized Secondary Education. As a rule this practice applies to the degree of candidate. Only in exceptional cases is a doctor's degree awarded. Usually the scientist works for the doctor's degree after defending the candidate's thesis.

It is, clearly, very difficult to attain the academic standing of scientist. What then? What does the profession itself demand? Scientists have to put in no less than 10 hours a day. Three or four of those hours are reserved for keeping abreast of the newest developments in their fields through reading and attending conferences, symposiums, discussions, on top of the seven hours of work. The vocation demands complete dedication. And yet, young people are drawn to science. Why? Is it simply the vogue?

The science vogue is an undoubted fact, a characteristic of our time. It has been aided and abetted to no small degree by books and periodicals, movies, the mass media, all of which popularize the names of scientists and offer the layman new access to the world of science. Increasingly in books and films the scientist appears to wear a halo of mystery and romance.

More and more parents want their children to become scientists. And many girls would like their future husbands to be men of science. In one university a half-serious questionnaire asked the girls what profession they would like their future husbands to pursue. More than two-thirds chose science from a dozen fields. This preference for the scientific career has spread among all strata of the population. Streets and cities are named after scientists. Honorary titles, state prizes and awards have been established for scientific achievement.

Of course, it would be foolish to explain away the prestige science enjoys, to conclude that the science vogue is simply the creation of the mass media.

Rather, the media reflect the social demand for a rapidly developing science, its larger role in all areas of life.

The new prominence of science, in the life of the country and the minds of the people, derives from its role as a most important productive force, the source of growth of all other productive forces, one of the basic elements of progress. Scientific development in our time has two major characteristics. First, there is the sharp reduction of the time gap between the scientific discovery and its technical application. In the past these periods stretched to decades. The time lapse concealed, as it were, the direct dependence of people's lives on science and, on the other hand, gave them time to accustom themselves to the discovery. Today the interval from the idea to its practical application is measured at the most by a few years, months, even weeks. The close relationship of science to production is taking hold in the public's mind. Discoveries even in the fields of pure science often affect people in practical ways much before they have grown used to the new ideas.

At the same time—and this is the second characteristic of scientific development—work directly related to science is involving increasing numbers of people. The individual researcher's area of concern has expanded into the mass interest of the practical worker. I stress the word mass because the job today, whether industrial or cultural, demands more scientific knowledge. There are, so far, no signs of saturation in society's immersion in science, something the American political scientist Don Krasher Price, Jr., has been prophesying. On the contrary: In every area of public endeavor we find the application of scientific methods, scientific groundwork preliminary to making decisions, constant research to improve industrial output and technology as well as management procedures.

More than half the people now working in the sciences in the USSR are under 30.

As a consequence, there is a sharp rise in assignments to scientific institutions, and industrial plants and commercial agencies are developing their own research services.

Putting capital funds into science is returning more profits than any other type of investment. According to our economists, a ruble invested in research yields, on the average, four times more return than a ruble put into production. No wonder the share of decentralized financing, that is, funds available outside the state budget, for commissions to research organizations, has increased nine times in the past decade.

At the same time, the state centralized budget allocations, which are the main source of financing research, continue to grow (by 14 times in 20 years).

Fundamental research is almost completely financed from the state budget. It should be noted that in the USSR, unlike the United States, the main centers of fundamental research are not the universities (although they too are now so involved) but the Academy of Sciences. In addition, each field of the national economy has its own systems of scientific institutions.

The Soviet Union has more than a million scientists, comprising a fourth of the world's scientific potential. Altogether we have four million people working in science. The field is not dominated by men. Women will soon make up half the total. The number of scientific workers is now six times what it was 20 years ago. So far, this curve of growth—also despite Price's prediction—far from passing into the customary downward path, continues its upward course.

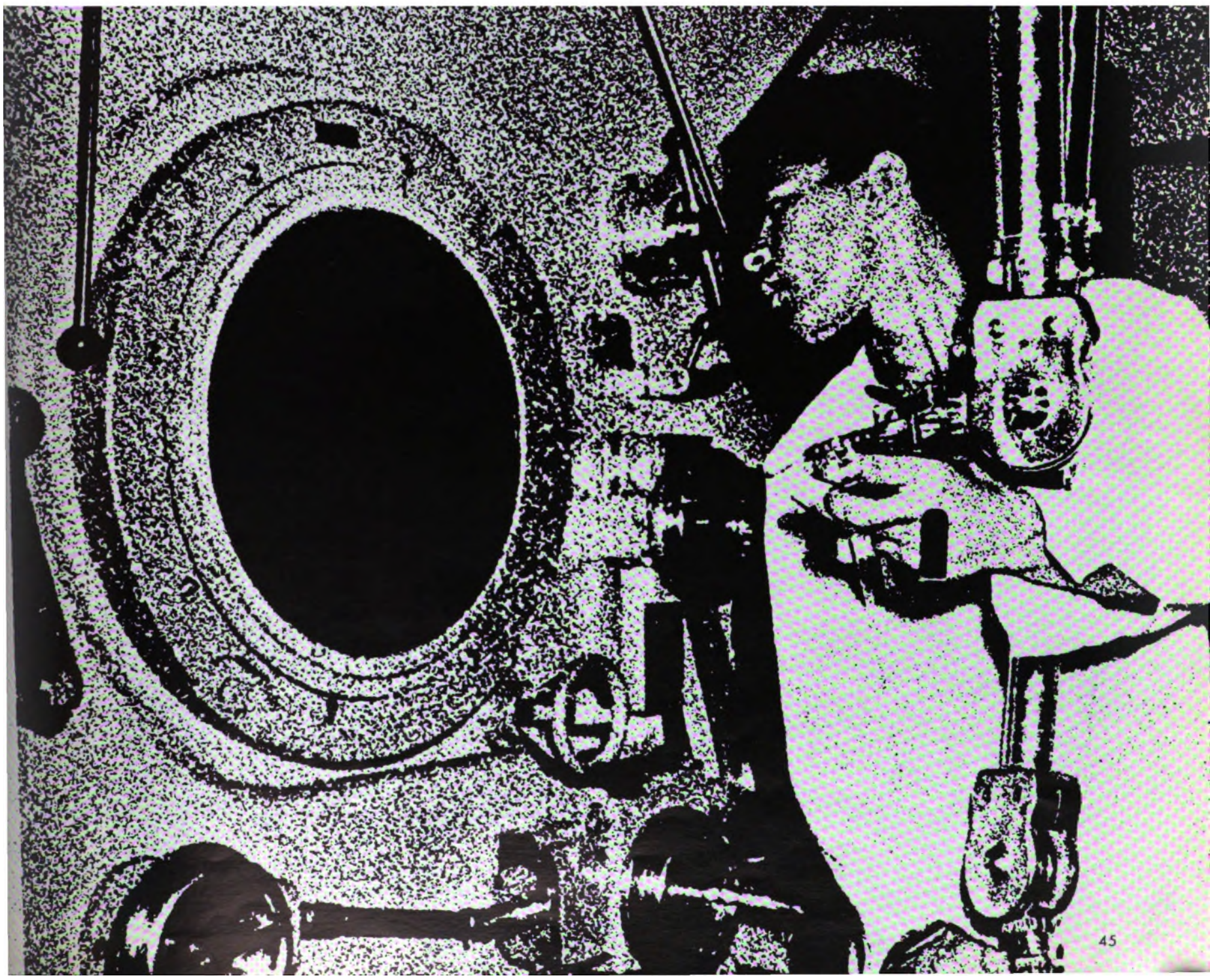
The reason for the continued growth is the creative nature of scientific endeavor. At present, with the rise in living standards (real income per person is four and a half times what it was in 1940), this factor holds top place on the scale of values. Young people are quite definite about that. In the polls and studies mentioned at the beginning of this article, they rated highest the opportunity for creative endeavor. Similar polls of youth in different cities gave the same results.

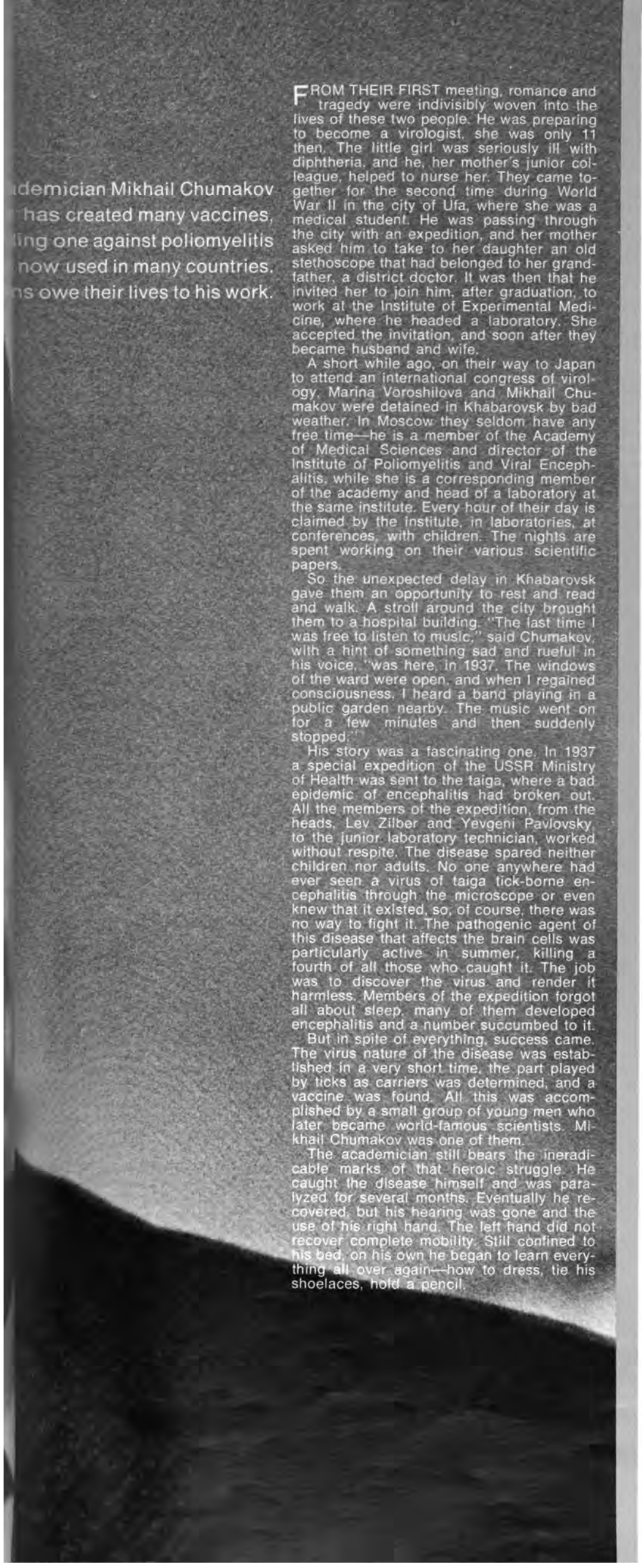
Science opens unlimited vistas for creativity. It is a waiting field for self-expression and self-assertion, for satisfying ambition. "In our days," says Academician Yevgeni Feinberg, "youth goes into science because there it finds the joy of recognizing the truth; creative endeavor; the deep significance of ideas; bold imagination; a unique beauty; the spirit of struggle, demanding maximum tension of forces, clarity of thought, truthfulness and authenticity, democracy and a realization of one's spiritual closeness to comrades, a realization of the need for the work being done, modernity of essence and form, even the sport of competition."

Of course, the flow of young people into science is facilitated also by its comparative accessibility. Not only outstanding giants capable of moving scientific mountains are wanted but also a mass of performers who break off pieces of the mountain, polish them and do a colossal amount of the preparatory work. That is why mass training of scientific personnel is so necessary.

One of the natural sources for replenishment of such workers is the higher school. Science courses are available in 825 higher educational institutions, including 58 universities. There are now higher schools in 347 Soviet cities. A combined facility of 366,000 professors, teachers and scientific workers, including 133,000 candidates and doctors of science, teach more than 400 specialties. There are three times as many science students as 20 years ago, 4,600,000.

Of course, we cannot say what fraction of these millions of young people will actually become scientists. But there is no question that the relative number will increase with every passing year because science needs more and more young people. Even now more than half the scientific workers in the country are under 30.





demician Mikhail Chumakov
has created many vaccines,
ling one against poliomyelitis
now used in many countries.
ns owe their lives to his work.

HE SAVED MILLIONS OF LIVES

By Matvei Khromchenko

Photographs by Edward Ettinger

FROM THEIR FIRST meeting, romance and tragedy were indivisibly woven into the lives of these two people. He was preparing to become a virologist, she was only 11 then. The little girl was seriously ill with diphtheria, and he, her mother's junior colleague, helped to nurse her. They came together for the second time during World War II in the city of Ufa, where she was a medical student. He was passing through the city with an expedition, and her mother asked him to take to her daughter an old stethoscope that had belonged to her grandfather, a district doctor. It was then that he invited her to join him, after graduation, to work at the Institute of Experimental Medicine, where he headed a laboratory. She accepted the invitation, and soon after they became husband and wife.

A short while ago, on their way to Japan to attend an international congress of virology, Marina Voroshilova and Mikhail Chumakov were detained in Khabarovsk by bad weather. In Moscow they seldom have any free time—he is a member of the Academy of Medical Sciences and director of the Institute of Poliomyelitis and Viral Encephalitis, while she is a corresponding member of the academy and head of a laboratory at the same institute. Every hour of their day is claimed by the institute, in laboratories, at conferences, with children. The nights are spent working on their various scientific papers.

So the unexpected delay in Khabarovsk gave them an opportunity to rest and read and walk. A stroll around the city brought them to a hospital building. "The last time I was free to listen to music," said Chumakov, with a hint of something sad and rueful in his voice, "was here, in 1937. The windows of the ward were open, and when I regained consciousness, I heard a band playing in a public garden nearby. The music went on for a few minutes and then suddenly stopped."

His story was a fascinating one. In 1937 a special expedition of the USSR Ministry of Health was sent to the taiga, where a bad epidemic of encephalitis had broken out. All the members of the expedition, from the heads, Lev Zilber and Yevgeni Pavlovsky, to the junior laboratory technician, worked without respite. The disease spared neither children nor adults. No one anywhere had ever seen a virus of taiga tick-borne encephalitis through the microscope or even knew that it existed, so, of course, there was no way to fight it. The pathogenic agent of this disease that affects the brain cells was particularly active in summer, killing a fourth of all those who caught it. The job was to discover the virus and render it harmless. Members of the expedition forgot all about sleep, many of them developed encephalitis and a number succumbed to it.

But in spite of everything, success came. The virus nature of the disease was established in a very short time, the part played by ticks as carriers was determined, and a vaccine was found. All this was accomplished by a small group of young men who later became world-famous scientists. Mikhail Chumakov was one of them.

The academician still bears the ineradicable marks of that heroic struggle. He caught the disease himself and was paralyzed for several months. Eventually he recovered, but his hearing was gone and the use of his right hand. The left hand did not recover complete mobility. Still confined to his bed, on his own he began to learn everything all over again—how to dress, tie his shoelaces, hold a pencil.

Epidemic poliomyelitis kills two to fifteen of every hundred sufferers, and those who survive are often crippled for life. These sugar-coated pills contain live poliomyelitis vaccine.
Top: Polio is an ancient ailment. More than 3,500 years ago, a priest with the characteristic symptoms of polio was depicted on the wall of a temple in Memphis, the capital of ancient Egypt.

"A blitzkrieg against polio."
Albert Sabin

Marina Voroshilova, director of the Regional Center of the World Health Organization, heads a laboratory at the Institute of Poliomyelitis and Viral Encephalitis in Moscow.

In the autumn of 1944, several weeks after the liberation of the Crimea from the fascist invaders and the day after the defense of his thesis, Chumakov and a group of colleagues were flown out to the Special Maritime Army. The problem he faced was no less formidable than that other one in the taiga seven years earlier.

The first peacetime crops were ripening in the fields of the Crimea, and there was no one to harvest them. Soldiers of the Soviet Army had been sent to help. Suddenly an epidemic broke out. The acute infectious disease was of unknown etiology, characterized by internal hemorrhage and profuse bleeding. In very serious cases the illness was fatal.

Chumakov's involvement in this episode laid the foundation for his work with hemorrhagic fevers, which he is still engaged in. His research is important for many countries since these fevers occur in Asia, Africa and Latin America. Chumakov has already isolated 13 varieties of the virus causing these diseases and is searching for vaccines for each one. But his major finding was made 30 years ago when he discovered the virus and its carriers—ticks found on birds and wild animals in whose skin they hide and breed. He went on to create a reliable weapon against the virus—the first such vaccine, one of a series he himself was responsible for.

It was a difficult, dangerous but also a glorious time. Glorious not only because it brought medicine another victory over disease but also because it challenged and tested Chumakov, made him the man he still is.

Now in his sixties, he has not changed in the least. In one three-month period in 1973, for example, he flew 14 times from one part of the Soviet Union to another.

Though he is amiable enough, Chumakov is inclined to be as unsparing of others as he is of himself.

There was never any question of his choice of profession. The works of Ilya Mechnikov, Nobel Prize winner, were the bedside books of his youth, and Mikhail's father, a veterinarian who died of oriental sore, served as an unfading example of devotion to healing. Chumakov studied under outstanding professors, from whom he learned his careful, methodical and rigorous approach to research. Zilber, a famous Soviet virologist, greatly influenced the shape of his thinking.

Chumakov is an honorary doctor of Leipzig University, member of the Leopoldine Natural Science Academy of Halle, possessor of the gold medals named after Christoph Wilhelm Hufeland and Jan Evangelista Purkyne. He has published some 500 papers on hemorrhagic fevers and other ailments. He was awarded the State Prize for his work on taiga encephalitis in 1941 and a Lenin Prize in 1963 for developing the vaccine against poliomyelitis.

Modern medicine is indebted to Chumakov as the creator alone, and also with others, of many vaccines used the world over. I was rather surprised, therefore, when I asked what he considered to be his greatest achievement, to hear him say: "Training people."

Among his pupils are 120 candidates, and over 40 doctors, of science; three of the latter are directors of institutes, 20, heads of laboratories not only in the Soviet Union but also in Hungary, the German Democratic Republic and Bulgaria.

"Today success in science is a matter of staff," he went on to say. He has proved the validity of that statement in his own person on many occasions. Chumakov is not simply a theoretician, he is also a brilliant practitioner and an excellent organizer. He accepted the government's assignment to end poliomyelitis and did it in record time because he knew that the pupils he had taught would work with him in the same selfless way that he does.

To begin with, the virus had to be isolated. Then it had to be studied and bred to produce hundreds of millions of vaccine doses.

Intensive research was crowned with the first success in 1955, when Jonas Salk, an American virologist, obtained a vaccine from a dead virus. The vaccine, however, was very expensive and, more important, did not have the ability to immunize all children.

Complete success came later in 1955. American virologists Hilary Koprowski and Albert Sabin created a live vaccine obtained from specially selected and weakened viruses. However, before vaccination could be started on a mass scale, the vaccine had to be proved absolutely harmless, every assurance provided that a weakened but living virus injected into a healthy child would not precipitate onset of the disease.

Koprowski and Sabin were not able to give that assurance to the American scientific and medical public. It was then that Soviet virologists headed by Mikhail Chumakov and Anatoli Smorodintsev joined their efforts with the Americans'. In the spring of 1956 they met with their counterparts for the first time, pooled experience and worked out a common program.

The main building of the newly founded Institute of Poliomyelitis and Viral Encephalitis still existed only on paper, but the work of the institute was already in full swing. Here Chumakov's organizing talent revealed its consummate best. But when the physicians finally held in their hands the first ampules and the small sugar cubes containing the oral vaccine, their difficulties were far from over. No one could say for certain how the vaccination should be done, how much vaccine should be administered and at what intervals. Besides, there was the important question of what antidotes could be given at the same time to safeguard the children.

A great risk was involved. But devoted to their cause and confident that the vaccine was harmless, Marina Voroshilova and Mikhail Chumakov first vaccinated themselves, then their own children and grandchildren. By the end of 1959 some 15 million people, from two months to 20 years old, had been vaccinated against poliomyelitis. After that the hundreds of millions of doses became an unsurmountable barrier for the "tiny gangster," as Paul de Kruif, well-known microbiologist and writer, described the virus of poliomyelitis. Since 1959 our vaccine has been exported to 40 countries.

"The Russians have carried out a blitzkrieg against poliomyelitis and have won it by defeating the enemy in one-tenth the time spent by the Americans," Albert Sabin said in New York in 1961.

Millions of children owe their immunity to Mikhail Chumakov and his associates. He loves children, is himself the father of seven, the head of a whole family academy of sciences: His older children are already scientists, and the younger ones are preparing to follow their example.

The close cooperation of American and Soviet medical science has done much to develop an effective live polio vaccine. Drs. Albert Sabin and Mikhail Chumakov at the Poliomyelitis Institute.

SCHOOL FOR ACADEMICIANS

By Lev Kokin

Soon after the October 1917 Socialist Revolution a research institute was set up in Petrograd (now Leningrad). It was to become a school for physicists. It is here that Soviet atomic physics, solid-state physics, chemical physics and radiophysics were born. A whole galaxy of Soviet scientists, including such world-famous figures as Igor Kurchatov, Nikolai Semenov, Pyotr Kapitsa, Lev Landau and many others, studied at the institute.

THE AUTUMN of 1920 in Russia. Civil war, devastation, famine. In those grim days for the young Soviet Republic British novelist H. G. Wells met some Russian scientists in Petrograd and was surprised to find them hard at work, to see the eminent Russian physiologist Ivan Pavlov in a shabby coat, continuing his research in a study heaped with potatoes. The spirit of science, Wells remarked, is indeed amazing.

This spirit inspired not only the noted scholars Wells met, men like Pavlov, the astronomer and academician Aristarkh Belopolsky, the geologist Alexander Karpinsky, the orientalist Sergei Oldenburg. A group of young physicists, recent students of Abram Ioffe (who had just been named academician), were taking a seminar with him. They too were imbued with the "amazing spirit" of science and worked long hours in a poorly equipped laboratory of the Polytechnic Institute on the outskirts of Petrograd. This group formed the nucleus of one of the first Soviet research institutions—the Leningrad Physical Technical Institute, first called the Institute of Roentgenology and Radiology. The decision to set it up was signed by one of Lenin's closest associates, Anatoli Lunacharsky, People's Commissar (Minister) of Education.

Keep in mind that the country's economy was completely dislocated by war and famine, but the Soviet Government, thinking of the future, was also concerned with science, with the fundamental research on which the economy could be built.

"We are very enthusiastic here," wrote Ioffe at the time to Dutch physicist Paulus Ehrenfest. "We are simply absorbed with the structure of the atom and molecules. . . ." Ioffe's favorite student Pyotr Kapitsa started calling him "Papa," out of respect and affection, and the others followed suit. Ioffe prized the boldness of youth, even their impudence. Nor was he afraid of lack of experience. He hunted for promising researchers at scientific conferences, in lecture rooms for students and even at entrance exams to the Polytechnic Institute, where the Physical Technical Institute originated. When he headed the latter, "Papa" continued to look after and nurture the physical-mechanical department of the Polytechnic Institute.

The new research institute and its teaching division were located on opposite sides of the road. Many students crossed it to become laboratory assistants and researchers. As for the laboratory personnel, they crossed the road in the other direction, to become teachers. It was not at all unusual for students to take an exam from someone they had worked beside the previous day. "Everybody dreamed of working in the laboratory," recalls Academician Isaac Kikoin, a student at the time, "but there was a very careful selection process." There was no room for mediocrities or idlers in the laboratory, and if some did happen to get there, they did not stay long. . . .

Ioffe was a tall, silver-haired man with a dark mustache, pressed suit and starched collar. The young were attracted by his erudition, his scientific daring, his taste for everything new. "To do what nobody has done before!" was the academician's motto. And when a beginner in research asked him what literature to read on some subject, his reply would be: "Don't worry about literature till you've done the job!"

He managed to infect his students with his feeling for the romance of science, with his passion for physics as the foundation of engineering and technology, as the key to an understanding of nature. They developed into a synthesis of the engineer and the scientist, capable of doing "what nobody has done before."

The effect of his relationship with the youth was mutual. Ioffe believed that in every laboratory beginners should work next to mature scientists if only to excite the tutors by their endless why and how, their compulsion to disagree, to become if not creators, at least catalysts of new ideas.

Future academicians Pyotr Kapitsa and Nikolai Semenov studied the magnetic properties of the atom. The third member of their team was still another future academician, Yuli Khariton, then a 16-year-old student. It was Khariton's first assignment, a prelude to his later work, which played a notable role in the development of chemical and nuclear physics. "At the Physical Technical Institute we went through a school of scientific and technical optimism," said Academician Khariton, author of the first theory of the chain reaction of uranium.

He elaborated this theory in 1940 with Yakov Zeldovich, also an academician today. That was two years before Enrico Fermi lit the uranium pile in Chicago (soon afterward Igor Kurchatov achieved a similar result in his assembly shop on the outskirts of Moscow). Back in 1920 the British magazine *Nation* puzzled its readers with the sensational statement that a Russian scientist had mastered the secret of atomic energy.

The statement was not an invention but rather a lack of understanding of the concepts involved. In 1919 Petrograd professor of physics Dmitri Rozhdestvensky mastered the secret of the transfer of valent electrons from one orbit to another, but not "the secret of atomic energy," as the author of the British magazine article put it. While Rozhdestvensky did not, of course, directly link this discovery with the utilization of atomic energy, he said at the time: "We cannot even imagine how human life will change in the next few decades when the secret of the atom is unraveled. . . . It will be to everyone's benefit if we realize that in this work lies the source of our vitality. . . ." At the time all this was far from being obvious. Even Ernest Rutherford, who in that same year became the first to split the nucleus of the atom, claimed that man would never be able to harness atomic energy. (As Professor Rozhdestvensky spoke of the tremendous potential of the atom, General Yudenich's counterrevolutionary forces were massed outside Petrograd, threatening the existence of the young republic.)

When in 1925 a new researcher, young Igor Kurchatov,came to the Leningrad Physical Technical Institute, nobody could foresee the role he was to play in the atomic age. He began his scientific career in Ioffe's laboratory, where he studied dielectrics. But it was in the Physical Technical Institute that a comprehensive study of the nucleus of the atom by Soviet physicists began. Igor Kurchatov, working with Abram Alikhanov, became one of the leading researchers in this field.

"Nothing makes scientists happier than having their students surpass them," Academician Ioffe once said. He was thinking of Academician Semenov, who came to him as a youth to work on his graduation thesis. Ioffe's remark sums up his personal outlook and the meaning of his scientific school.

Young talents developed next to such veterans of the institute as Nikolai Semenov, author of the theory of chemical chain reactions, who later became the first Soviet scientist to receive the Nobel Prize. The future Lenin and Nobel Prize laureate Lev Landau was one of Kurchatov's students. Others were Georgi Flerov and Konstantin Petrzhak, later academicians, who in 1940 discovered the spontaneous splitting of the nucleus of the atom. Alexander Konstantinov, another future academician, suggested the idea of the iconoscope, which revolutionized television. The world's first pulse radar installation for aircraft detection was built in the mid-1930s in the institute laboratory headed by Yuri Kobzarev, now an academician.

Back in the late 1920s Academician Ioffe recognized the importance of semiconductors and was one of the first to study them. His work led to a number of important findings.

As students gained experience and independence, they often left the institute. Rather than hold them back, "Papa" Ioffe did his best to help them, creating new laboratories for them throughout the country. Thus, research institutes were established by the Leningrad Physical Technical Institute in the Urals, the Ukraine and Moscow. Today institute graduates head various branches of Soviet science: Academician Nikolai Semenov is director of the Chemical Physics Institute, Pyotr Kapitsa of the Institute of Physical Problems, and Anatoli Alexandrov of the Atomic Energy Institute. Sergei Vonsovsky is Chairman of the Presidium of the Ural Science Center of the Academy of Sciences.

Important research is conducted at the Physical Technical Institute itself. It ranges from solid-state physics to astrophysics; some of the directions are new for the institute and others traditional. They include pure and applied research in the field of semiconductors, physical electronics, nuclear physics, plasma physics, radiochemistry and radiobiology. Staff members and students of the Leningrad Physical Technical Institute have won numerous awards. Abram Ioffe received the Lenin Prize for his work on semiconductors, and Igor Kurchatov was awarded diploma No. 1 of the Lenin Prize.

A wide range of interests and research characterize this remarkable scientific institution which has become a "school for academicians." Almost all the country's outstanding physicists were trained there or worked there. And not physicists alone. When the graduates of the institute get together, it makes little difference that one has moved into chemistry and another into mechanics—they talk the same language. "A genuine scientific school," says Academician Nikolai Semenov, "is a way of thinking and acting."

LIFE-SUP
IN SPAC

By Anatoli Lepikhov

The twenty-fourth International Astronautical Congress, held last fall in Baku, capital of Soviet Azerbaijan, attracted more than 1,500 participants from 29 countries. The discussion ranged the wide spectrum of problems in these new areas of human endeavor: space medicine and biology, exploration of near-Earth space, the Moon and the planets, the development of space transport systems, the application of space technology in industry and many other related subjects.
One urgent problem for manned space flight is the development of life-support systems for prolonged periods in an extraterrestrial environment. Science writer Anatoli Lepikhov summarizes below the contributions of Soviet scientists to the congress sessions.

A BASIC REQUIREMENT for manned space flight is a hermetically sealed space provided with food, water and air. As things stand today, these several necessities can be taken along into space from Earth only on relatively brief missions. What about flights to Mars or to even more distant planets? Although this is a problem for tomorrow, work on the solutions has to be undertaken today.

Scientists believe that space flights of very long duration will be impossible unless we can recycle water, oxygen or food in the spacecraft itself. The pioneering Russian scientist Konstantin Tsiolkovsky (1857-1935) made that point when he wrote: "As the Earth's atmosphere is purified by plants with the aid of the Sun, so can our artificial atmosphere be purified. As plants with their leaves and roots, absorbing wastes, yield food, so can the plants taken along on a space voyage work continuously for us. . . . As on the Earth's surface an endless mechanical and chemical rotation of substances takes place, so can that be accomplished in our small world."

However, there are many serious difficulties to be faced before we apply the space greenhouse idea. Suffice it to say that the nutritive value of the biomass of plants (stalks and roots) cannot be taken full advantage of until the plants go through certain processes, and water evaporated by plants must be purified. In other words, we must set up a sophisticated system with a multitude of links between its elements—a highly particularized artificial microworld. Algae, more advanced plants, and units for physicochemical regeneration of water and oxygen can become components of such systems.

Certain plants—these not only serve as food but also absorb carbon dioxide exhaled by humans and release oxygen—play an important role in recycling substances in this man-made microworld. By no means can all plants be used in the space greenhouse. Those chosen must have maximum potential to meet astronauts' vital needs and also have high productivity. The plants themselves must be compatible. They must not liberate volatile substances that are harmful to humans, nor should the reverse situation be allowed. Cooking requirements are also important: The dishes made from these plants must offer sufficient variety and be easy to prepare. Studies of potatoes, cabbage, beets, carrots, legumes, radishes and lettuce are going on with those essentials in mind. Apparently about 130 square feet of such a kitchen garden can satisfy an astronaut's daily needs for vegetables.

The space garden suggested by Soviet scientists does not look very much like the terrestrial variety. Its salient distinction is that it uses no soil: The plants feed on their respective nutrients. The garden can produce about 160 gallons of oxygen in 24 hours, almost as much as a man needs for breathing in that period of time.

The harvest yielded by plants on Earth can be stored for a long time without much trouble. In space the situation is much more complicated. For man to live normally and work in a spacecraft, the composition of the atmosphere can vary only within permissible limits: It must virtually be constant throughout the flight. This condition can be achieved only when the continuous existence of one and the same mass of green leaves, the suppliers of oxygen, is ensured by timely sowings. A rotational method of vegetable growing will provide that stabilization.

What does a vegetable space garden look like? The sown area, equipped with artificial light, is divided into separate sections in which plants of the same age are grown. As one section ripens and is harvested, a new set of seeds is sown. A group of researchers at the Institute of Medicobiological Problems in Moscow has grown carrots this way. As many as 90 microharvests were reaped in 374 days. The time interval between each harvest and the next was three days. Such a method makes it possible to regenerate water and atmosphere continuously. It has, however, one significant drawback—the inefficient use of the illuminated nutritive area, which is relatively expensive. During the growth period the size of the area required varies considerably. For example, cabbage sprouts need .15 square inches for optimum growth while adult plants, depending on the variety, need an area 2,500 to 4,000 times greater. Accordingly, scientists have worked out designs for planting areas that make it possible to alter the distances between plants as they grow, thereby avoiding the extravagance of surplus areas at the initial stages of plant growth. In a well-balanced closed rotational system it is possible to take fullest advantage of space greenhouse capabilities for the sustenance of spacecraft crews. Such a system, consisting of a number of conjugated links, is based on controlled biosynthesis.

In this system space explorers are not only one of the links in metabolism but also the operators who control all the processes providing their living and working conditions. Staff members of the Academician Leonid Kirensky Institute of Physics, the Siberian Branch of the USSR Academy of Sciences, built the Bios 3 experimental complex to work out this system. The complex is a hermetically sealed steel case 46 x 30 x 8 feet, divided into four equal compartments. The unicellular alga Chlorella was placed in one, more advanced plants in two others, and the last compartment was designed for the crew.

The experiment took six months and had three stages, each two months long. In the first the needs of the crew were met by the higher plants (wheat, potatoes, vegetables), which provided the bulk of foodstuffs as well as oxygen and water. To prepare food and drinks, use was made of plant-evaporated water, which was purified and enriched with mineral substances. In the second stage the compartment with Chlorella was introduced in place of one set of vegetable crops, and in the third stage wheat was replaced with a set of vegetable crops. The aim of the investigators was to compare these three versions of living conditions in a closed space.

The introduction of Chlorella in the second and third stages as a regenerator of the atmosphere led to inhibiting the growth of wheat, potatoes, tomatoes and cucumbers. After the Chlorella compartment was switched off from the system and ordinary air was introduced for ventilation, all signs of poisoning vanished completely in three or four days. Although we still do not know which chemical substances precisely are noxious to plants, one thing is clear—in selecting plants, it is necessary to take into account their compatibility with the other crops.

How do we appraise the model of a life-support system investigated in the Bios 3 experiment? That depends upon how self-contained such systems are. The

RT SYSTEMS

significant fact is the degree to which such a system can help reduce expendable stocks. If, for example, astronauts take along food, water and a stock of oxygen which can supply only half their needs (the remainder to be regenerated or grown in space flight), such a system is considered 50 per cent self-contained. In an ideal system experts want to reach 100 per cent. As for the Bios 3 experiment, at periods it was 91 per cent self-contained. This is a considerable accomplishment of Soviet scientists and engineers, who brought their expertise in several specialties to consideration of the problem.

The studies we describe here will have practical application only in the future, but they have significance for today's agriculture.

For example, experiments of this kind have revealed to scientists properties of farm crops they had not suspected before. Their conclusions, which relate to the great reserve capacity of plants, open up intriguing prospects for the population of this planet. They have found that five and six harvests of wheat a year are possible, even now. Apart from their economic importance, these determinations make possible accelerated studies in the breeding of new high-yield varieties of food plants. A new type of low-standing wheat, for example, has been bred in three years instead of the usual eight to 12.

The application of hydroponic vegetable-growing methods in space greenhouses should reduce power consumption and weight and improve other characteristics of hydroponic installations that are now in wide use in hotbeds and hothouses on suburban farms.

The time has arrived when ecological considerations must affect industrial and economic goals. The interrelationships of all processes in the biosphere of the Earth have to be borne in mind. Experience acquired in the development of long-range space life-support systems, in which the ecological principle is fundamental, will help us combat pollution of the soils, of bodies of water and the air on this planet.

President of the International Astronautical Federation Luiggi Napolitano made a telling comment when we discussed these developments: "The history of man's cognition of the universe began when he started to look at the sky from the ground. Later he looked at space from space. And now the time has come when he can look at the Earth from space. So the circle of cognition has closed, as it were. That is what the use of space technology on the Earth means. The Earth-bound applications of space technology bring together not only engineers and scientists occupied with space explorations but also farm specialists, foresters, geophysicists, doctors and psychologists. The cooperation of all these specialists will promote progress. In a sense we can say that if they have problems, the solutions are in our hands."

Mutually Beneficial Cooper

IN MAY 1972 the USSR and the USA signed an agreement for scientific and technological cooperation. Besides strengthening existing contacts between the two countries, it paved the way for new programs in such fields as energy, water resources, chemical catalysis, the use of computers in management, production of substances by microbiological synthesis, and electrometallurgy. Working groups were set up for cooperation in each of these fields.

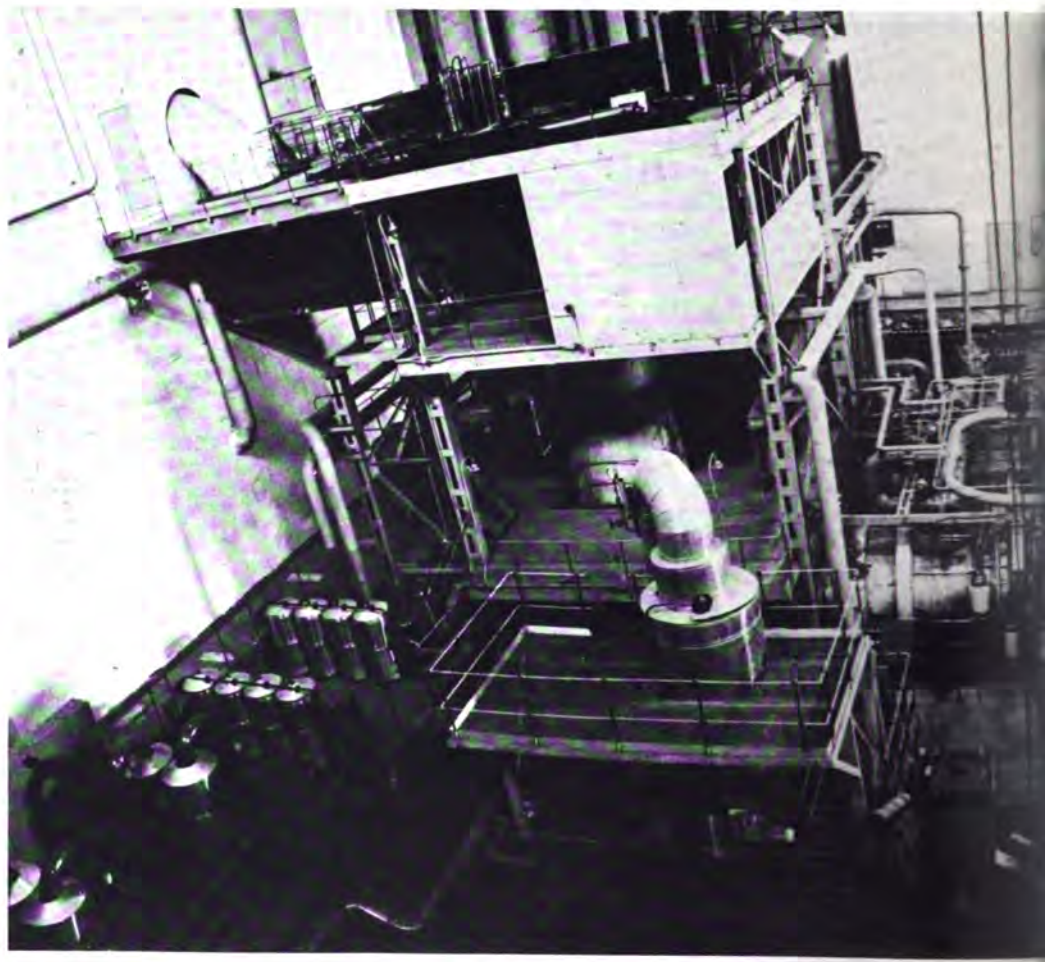
The Soviet-American Joint Commission on Scientific and Technical Cooperation, formed to establish programs and check on progress, has met twice since the agreement was signed.

The commission noted particularly the achievements of the groups working on energy and chemical catalysis. The latter group is studying the effect of a new class of catalysts in accelerating chemical reactions. Catalysis plays a very important role in the chemical and petrochemical industries, where two-thirds of the processes are catalytic.

What is the mutual value of joint research in chemical catalysis? Academician Georgi Boreskov, director of the Institute of Catalysis, Siberian Branch, USSR Academy of Sciences, has this to say on the subject: "We can help our American colleagues with the elaboration of theoretical problems and the processing of data. We are interested in learning their system of applying the results."

Cooperation in the field of energy includes the design and operation of thermal and hydroelectric power stations, the building of high-voltage lines for the transmission of electricity over long distances and the development of magnetohydrodynamic power stations of a commercial type. In the Soviet Union, both theoretical and practical results in all

The formal sessions were often followed by informal but equally serious talks over a cup of tea.



Academician Vladimir Kirilli (right) and Doctor H. Guyford Stev Science Advisor to the President and director of the National Science Foundati sign the protoco at the conclusion of the second session of the Soviet-Americ Joint Commissio on Scientific and Technical Cooperation. Ab The Americans v very much inter in the U-25, a prototype of future plants for direct conve of thermal into electric power.

ıese fields have been excep-
ɔnal.

A joint committee for the de-
elopment and construction of
HD power stations on a com-
ıercial scale and the first semi-
ar on magnetohydrodynamic
ɔnversion of energy met in Mos-
ow this spring.

The U.S. delegation was head-
d by Dr. William Jackson, Pro-
ram Manager for MHD, Office of
oal Research, U.S. Department
f the Interior, and the Soviet
elegation by Alexander Sheind-
n, corresponding member of the
SSR Academy of Sciences.

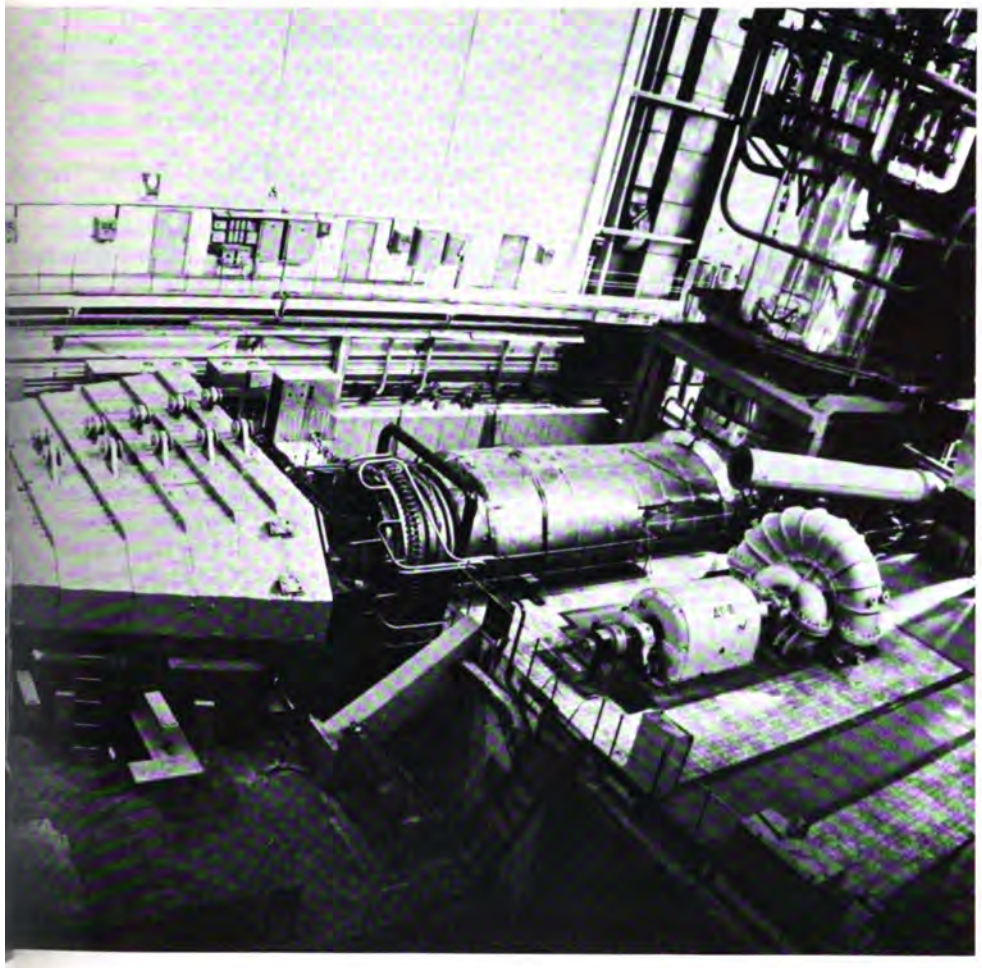
The American specialists
howed great interest in the U-25 installation at the Institute of High Temperatures, USSR Academy of Sciences. This installation is a prototype of future big power plants which will use MHD generators for the direct conversion of thermal energy into electricity. The 6,000 kilowatts it generates can be fed directly into a city circuit. Such an installation can work for 10 to 12 hours without interruption.

In the United States similar installations have a much lower power capacity, for example, the 250-kilowatt Mark VI. The duct of the MHD generator in this unit has been in operation for about 80 hours. The UTSI II plant, whose output reached 10 to 60 kilowatts in separate experiments, has had more than five hours of successful operation.

Recently the Soviet and American experts signed a working protocol elaborating their plans. It calls for joint effort in designing the ducts of MHD generators and a superconducting magnetic system, and study of the structural materials and technical and economic factors involved in the application of magnetohydrodynamic energy conversion.

The American specialists have proposed joint research on the development of installations producing electricity from coal.

Doctor David Oliver of the Massachusetts Institute of Technology has attended two Moscow conferences on MHD generators.



on

idi Maslennikov (left) of the nstitute of High emperatures and raig Maxwell of STD Research at one of the sions. The U-25 pilot plant in operation at the stitute generates 6,000 kilowatts and can be fed directly into a ity circuit. Such installations can work for ten to twelve hours without interruption ilar installations with a lower erating capacity have been built in the United States).

Thirty years ago last July the Soviet city of Brest was liberated from the Nazis. Continuing the offensive begun in late 1942 near Stalingrad, the Soviet Army in 1944 freed thousands of towns and villages. Many of them were more important industrial and cultural centers than Brest. Why, then, was the liberation of this Byelorussian town and fortress on the Bug River so memorable? Why was the thirtieth anniversary of this event celebrated not only in Brest but all over the country as well? The following excerpt from *Brest Fortress* by Sergei Smirnov answers these questions.

TOWARD DAWN on June 22, 1941, hundreds of German aircraft, their navigation lights on, invaded the Soviet Union. At the same time thousands of German guns and mortars aimed their fire at our border zone.

Hitlerite Germany, without a declaration of war, had attacked our country.

Three powerful German Army groups (190 divisions, about five million men) thrust eastward along a front from the Barents to the Black Sea. The strongest of these groups was developing operations in the center of the huge front, where a wide asphalt highway began at the border city of Brest, connecting it with Minsk, Smolensk, Vyazma, Mozhaisk and, finally, Moscow. Field Marshal Theodor von Bock, commanding this central group, had more than 50 infantry divisions and powerful tank groups at his disposal.

On the face of it, everything seemed to be proceeding according to the plan worked out in the Hitlerite General Headquarters. Exactly as envisaged, Guderian's and Gott's tanks, in two broad arcs, converged on June 27 near Minsk and captured the capital of Byelorussia, cutting off a segment of the Soviet troops. On July 16 the German advance forces entered Smolensk. The Berlin press hailed the victory, claimed that the Red Army was finished and that German divisions would reach Moscow soon.

Having occupied half of Europe and come to believe they were invincible, the fascists were celebrating prematurely. As things turned out, it was not the Red Army but the nazi Wehrmacht that surrendered.

But our people lived through four incredibly difficult years between the first day of the war and May 9, 1945, when the nazi Reich was finally crushed. Twenty million Soviet people perished. No matter how hard the struggle, however, none of us ever believed the enemy would win.

Regardless of the surprise factor, which Hitler thought would guarantee the success of his eastern campaign, the Soviet troops fought back with unbelievable determination and heroism.

Contrary to what had happened in all the Wehrmacht's campaigns in the West, the resistance of the Soviet troops did not diminish but increased—despite all the military setbacks—as they retreated into the interior.

An example of unprecedented valor in the first days of the war was the defense of the Brest Fortress on the border of the USSR. The garrison of this ancient fortress just before the war totaled only about two infantry regiments. Yet, cut off and surrounded by enemy troops, it held the fortress for over a month. Smolensk had already fallen, but the red banner still flew over the citadel on the bank of the Bug. The enemy furiously stormed the fortress. The Soviet troops were short of ammunition and had no water, but they held on. On the stone walls they inscribed the words, "We'll die, but we won't leave the fortress."

Now on the banner of the Brest Fort on the banners of legendary Stalingr other hero cities, there glitters the Gold Hero of the Soviet Union, and on revol holidays a cannon salute lights the sky.

The defense of the Brest Fortress is be compared with the defense of Stalin course. Despite its heroism, the garris much too small to hold up or seriously the powerful enemy forces. But some minor episode becomes the symbol of historic events. The Brest Fortress is on symbol of the grim events that began in The name itself has taken on a very meaning: heroic tenacity, disdain of dea determination to triumph.

The defenders of the Brest Fortress that summer of 1941 with unwavering victory, in the rightness of their cause. Th no doubt that the enemy's successes were porary, that the hour of retribution would come. And that hour struck on June 23, on Byelorussian soil. To the thunder of a lery barrage, the Soviet troops began thrust forward to teach a stern lesson German Army and the Hitlerite state, to the invaders.

The border city of Brest is the "front of our country. Thousands of foreign pass through its railroad station. Most tra take the opportunity to visit the fortress-m and majestic memorial complex.

Writer Sergei Smirnov's account is mented by Anatoli Gruzdilovich, chairman Executive Committee of the Brest City S

"Brest was almost completely destroyed ing the war years. Intensive restoration after it was liberated. Now a new ci emerged, covering a wider area and talle Last year alone Brest citizens moved into new apartments with all the conveniences more housing construction is scheduled for

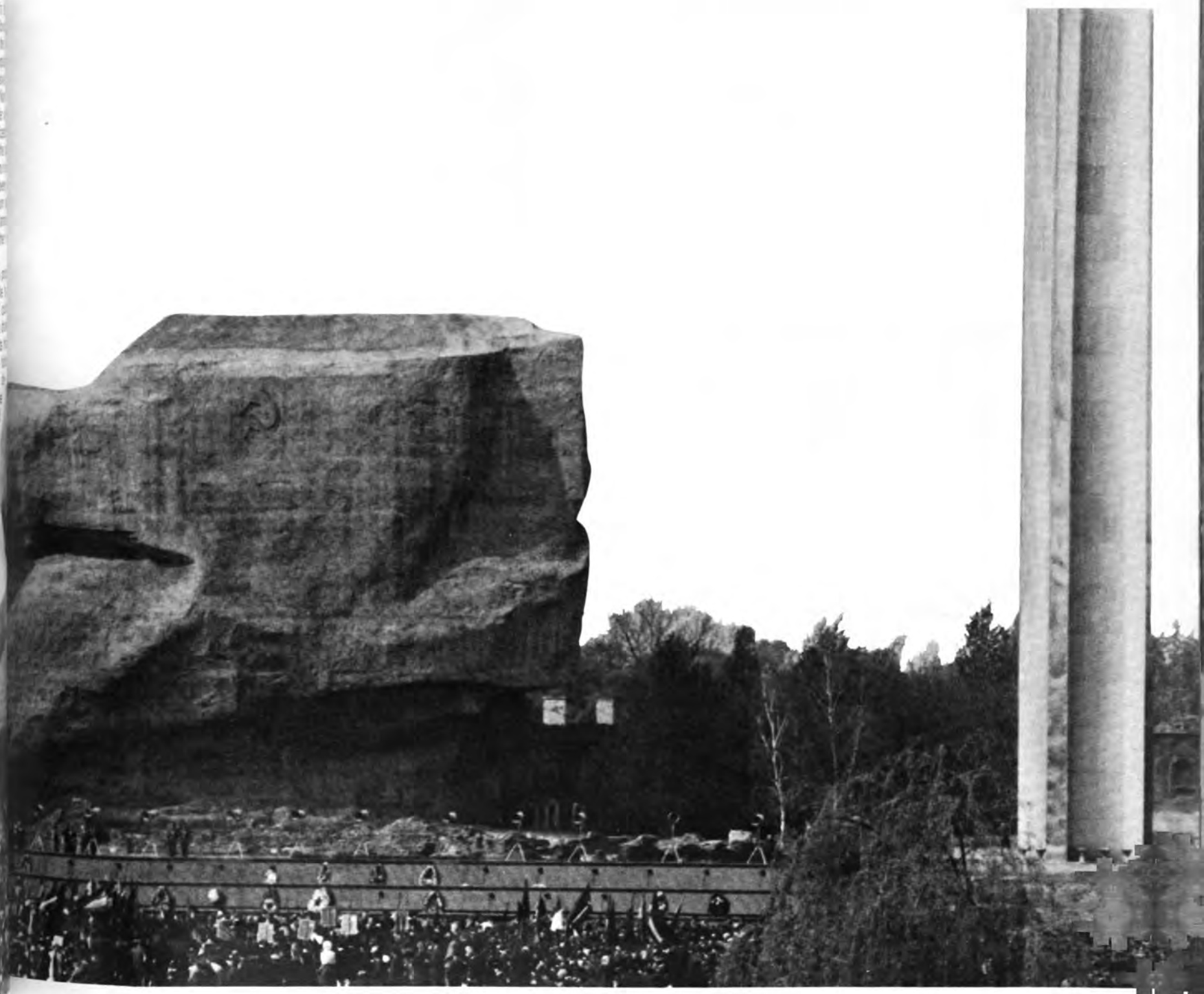
"Brest's industry has been more than The city's 35 factories turn out machine gas equipment, electric lamps, carpets, f knit goods and many other items that ar ported to 27 countries.

"Presently Brest has a population of 15 This figure should double by the mid-eig The city's economic and cultural long-ter velopment plan has been drawn up accord

"Our city is proud of its heroic past. Ou zens hope to make the future worthy of those who defended the fortress on the Bug in 1941 and liberated it from the enemy in 1944."

BREST: SYMBOL OF GLORY

By Sergei Smirnov



Dr. Boris Simonov (center) with fellow prize winners Edgar Glass and Peter Kühtraiber of Austria at a bird show in Olomouc, Czechoslovakia.

Dr. Simonov's hobby has become popular in Tashkent, where he lives. The bird fancier section of the city conservation society holds exhibitions every spring, summer and fall. The doctor (at the left) with one of his birds.

Doves from his collection. He keeps more than birds. Every continent except the Antarctic is represented. Tashkent is ideal for penguins.

TWO DOGS and more than 400 birds—18 kinds of parrots, 30 types of sparrows of the most varied colors, samples of Uzbek bird life, including the mountain partridge, quail, pheasant and lark—all live in the home of Boris Simonov, a Tashkent doctor, and his wife Raya. The Simonov collection includes birds from every continent except the Antarctic. Penguins would not take kindly to the Tashkent temperature, which climbs to 104 degrees and higher.

The Simonov house is never quiet; it is filled with an endless singing, whistling, cackling, cheeping, croaking and even swearing.

"E-e-e, what's that?" asks a huge macaw, the most vocal of the parrots, when the master appears. Without waiting for a reply, it wants to know: "How does a dog bark?"

A TASHKENT DOCTOR'S SINGING COLLECTION

Dr. Simonov is the author of several books on birds. He was the first to classify Uzbek decorative doves. He also produces a TV show for children.

"This is the first time I have been able to keep a newly hatched cockatoo alive. Earlier ones died because they refused to eat," says Dr. Simonov.

These two macaws are the same age as Simonov, 60. They came to Central Asia 45 years ago.

A TASHKENT DOCTOR'S SINGING COLLECTION

Boris Simonov and two macaws are the same age, a little over 60. He was born, raised and has lived all his life in Tashkent, the capital of Uzbekistan. As for the parrots, some 45 years ago they left South America and, after crossing the ocean and the European continent, arrived in Central Asia. They must have been the first Latin American birds ever to appear in Uzbekistan. Somewhat later they joined the Simonov collection.

Boris Simonov does not remember when he acquired his first birds —they surrounded him from early childhood. His father and grandfather loved all kinds of small living things. He recalls walking in the woods with his grandfather and being told, "Listen!"

At the Tashkent Medical Institute Boris met Raya, a fellow student, at whose house most of the stray dogs in town seemed to end up. The Simonovs have been married for 35 years and have brought up two children. Their bird collection has grown too. Recently, by special decision of the Executive Committee of the Tashkent City Soviet, the entire household was moved to a two-story cottage.

Moving is a troublesome business at best, but the Simonovs had some special problems. Among other things, a light-minded pair of cockatoos threw a fledgling out of their nest. Raya Simonov has been nursing it ever since. "It was the first time we had to take care of a cockatoo fledgling," Boris Simonov said. "Other birds are easier to raise, and we have a lot of them. Our three-year-old Indian starling Grisha, for example, turned out to be a very competent musician. He can whistle almost any melody he hears. Cook, a two-year-old cockatoo who was born in our house, is in a class by himself. He imitates human beings perfectly—coughing, sneezing, laughing. When he sees my wife he perches on her shoulder and says affectionately: "Raya, my dear!"

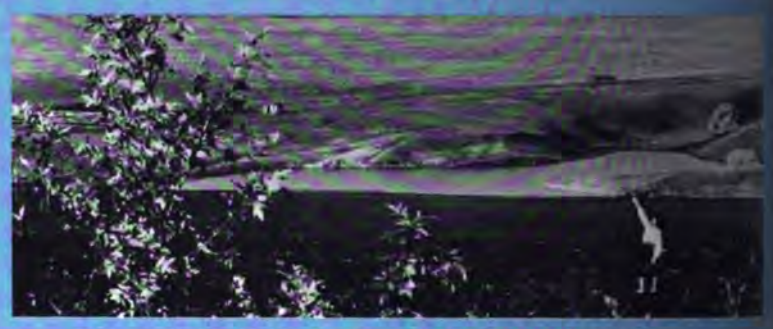
Dr. Boris Simonov's hobby has become popular in Tashkent. The city nature protection society has set up a division for fanciers of singing and decorative birds, of which Simonov is chairman. Many of its members, people of the most diverse ages and occupations, owe their interest to him. The youngest, children of the workers at the Tashkent Cable Plant, are pupils at kindergarten No. 159. Simonov got the kindergarten to set up pet corners; the children feed and look after birds, fish and small animals. The kindergarten also takes part in the citywide exhibitions Tashkent holds in the spring, summer and autumn.

Dr. Simonov is the author of several books on birds. He was the first to classify Uzbek decorative doves and has published material to substantiate the migration of mynas from southeastern Asia to the northern areas of the continent. Uzbek children like the TV program on nature he conducts. He corresponds with a great many people in Austria, Czechoslovakia, the Federal Republic of Germany, the German Democratic Republic, Poland and Rumania.

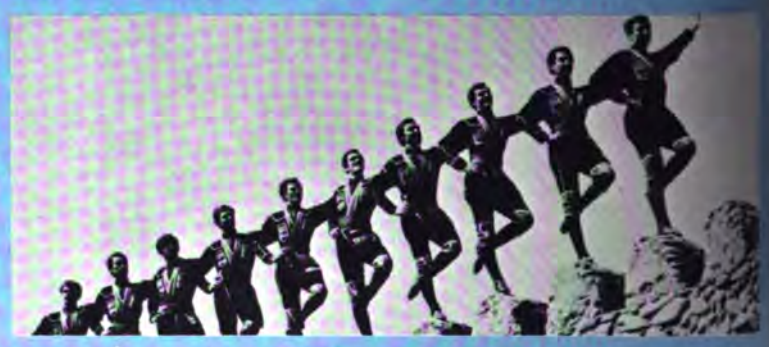
Last year Boris Simonov for the first time showed his collection of Uzbek birds in a foreign country, at an exhibition in the Czechoslovak town of Olomouc. He was awarded the Grand Prix and Big Gold Medal. But prizes are incidental—what pleases him most are the hundreds of bird fanciers he started off.

NEXT ISSUE

Elected judges, individual sponsors for "problem" teenagers and an emphasis on re-education rather than punishment are a few of the reasons for the steady decrease in the crime rate in Soviet times. A group of articles describes the cooperation between the USSR Research Institute for the Causes and Prevention of Crime, the militia and the general public, which has helped make big cities like Moscow and Leningrad the safest in the world. Organized crime disappeared in the mid-thirties. Young people are responsible for only a small fraction of all offenses, and the institute researchers now work on such problems as ensuring a constructive environment for teenagers. Igor Karpets, who heads the All-Union Criminal Investigation Board, tells how his job has been facilitated by the elimination of the fundamental causes of crime.



Next month the Moldavian Republic in the southwest European part of the country will celebrate its fiftieth anniversary. The people of this border area, once the path for Scythian, Greek, Roman and Tatar invaders, have progressed in the past half-century from almost total illiteracy to an advanced agricultural and industrial economy. An illustrated article tells about a collective farm community of Gagauz, one of Moldavia's many nationalities, who came to the Budzhak steppe from the Balkans two hundred years ago to escape their Turkic rulers.



Visitors to EXPO-74 in Spokane, Washington, this fall will get the chance to see the Georgian State Song and Dance Company perform. This lively group has toured dozens of countries, reviving the ancient dances of Soviet Georgia and creating new ones based on local traditions. Its repertoire reflects the wide cultural diversity of the Transcaucasian republic. A story with pictures conveys the mood of Georgian music, the fiery performance of the men dressed in cartridge-trimmed tunics and horsemen's boots, and the floating grace of the women dancers.

Soviet and American astronauts have been preparing for the joint Soyuz-Apollo manned space flight scheduled for 1975. The October issue includes profiles of the Soyuz crew and a discussion by two scientists of landmarks in the investigation of near-Earth space, and other planets.

This year marks the birth centennial of the innovative stage director Vsevolod Meyerhold, whose productions in the 1920s dispensed with such theatrical traditions as the proscenium stage and passive audiences. An appreciation by one of his students, stage and screen comedian Igor Ilyinsky.

A report on medical researcher Albert Bykovsky, whose discoveries of cancer-causing viruses, according to Soviet and American specialists, have brought science closer to a breakthrough in the prevention of this disease.

COMING SOON

Leisure

WHIRL OF FOLK DANCES

By Teresa Bashindzhagyan

Photographs by Miroslav Murazov

IGOR MOISEYEV's folk dance company is a rare guest in its own home in Moscow. The lengthy tours of the Urals, Siberia and the Far East, of the entire Soviet Union and of countries on every continent keep the company away for long periods. Millions of balletomanes have delighted in the art of the dancers, each one of whom is a star.

"What is a folk dance? It is a plastic portrait of the people. Mute poetry, containing a part of the people's soul," says Moiseyev, who never stops working for psychological authenticity in his dance portraits of the national character.

The company's repertoire now includes more than 300 dances, varying in theme, composition and style. There are miniatures, sketches and large choreographic panoramas. But whether

The *Russian Suite*, an audience favorite in countries all over the world where this matchless folk dance group has performed.

The Ukrainian *Hopak*, famous for its jumps.

it is the *Russian Suite*, the *Italian Tarantella*, the *Aragon Jota*, the Byelorussian *Yurochka*, the Ukrainian *Hopak* or the Moldavian *Zhok*, all the dances have in common Igor Moiseyev's choreographic imagination, his highly professional interpretation of the folk images.

The creation of new dances is a long and difficult process. They are the product of years of travel throughout the Soviet Union and intensive study of literary sources, folk tradition and customs. But the primary element is the experience of the Russian school of the dance. Moiseyev himself was a soloist with the Bolshoi Theater ballet.

One of the company's latest works is the *Polovtsian Dances*, with the music from the opera *Prince Igor*, by Alexander Borodin, the nineteenth century Russian composer. This is nothing less than a creative rejuvenation, a modern reading of a classical work. The *Polovtsian Dances* was originally choreographed by the famous Russian ballet master Michel Fokine. Moiseyev has approached the work differently, graphically disclosing the special character of the nomad Polovtsian tribes. He has invested the dances with drama, giving the work a primitive freshness and creating a world of color.

This remarkable company will soon be celebrating its fortieth anniversary. The soloists and their presentations keep changing but not the colorful language of the dance, the perfect patterns, the dancers' virtuosity and, most important, the genuine and inimitable folk character.

WHIRL OF FOLK DANCES

Each dance has Moiseyev's choreographic stamp.

A new dance is the product of on-the-spot study of the sources of folk tradition.

Two scenes from the company's most recent addition to its repertoire, the *Polovtsian Dances*, to music from the opera *Prince Igor*.

Around the Country

ANCIENT WARRIORS ON CHESSBOARD

Nikolai Skripal, an electrician at the Lipetsk Tractor Works, spent a whole year carving a chess set. The 32 wooden chessmen are stylized figures from an ancient Russian army. The pawns —a standard-bearer, a drummer and attacking bowmen and halberdiers in helmets and mail— are authentic representations of ancient Russian warriors and are done with great artistic taste. The castles and bishops are conventional figures.

POWER PLANTS THAT MOVE

Mobile floating power plants are being utilized with success in remote, almost inaccessible, regions of the Soviet Union. The first of these, the floating gas-turbine power plant Severnoye Siyaniye 1 (Northern Lights), located in the settlement of Cherskiy, Nizhne Kolymskiy District, Yakutia (an autonomous republic in Eastern Siberia), supplies electric power to Zelyony Mys, an Arctic seaport, and to industrial plants and gold fields in the area.

Another such power plant will be operating in Yakutia in the near future. On the Aldan River, it will supply electricity to ... trial plants now under ... tion in the region.

BOOKPLATE ARTIST

Fifty-five creations of artist ... imir Maryin, of the ... city of Tomsk, have been ... in a *Bibliography of European ... Libris*, published in Copenh... The bibliography is made ... work by leading masters ... genre.

Maryin is now working on ... plates for Tomsk University's ... ence library.

139-YEAR-OLD STOPS WORKING

Medzhid Agayev, a collective farmer in the village of Tikyaband (High Mountain) in Azerbaijan, has decided it is time for him to retire on pension. He has worked 120 years as a shepherd.

Agayev is the oldest person in the republic. He is 139. Despite his years, he is in enviable health: He is lean, energetic and justifiably boasts about his excellent eyesight. The one hundred years he has been smoking—he likes a strong tobacco which he grows himself—do not seem to have affected his health. But he drinks no wine at all. His diet is typical of these parts: vegetables and dairy products and not much meat.

Agayev's family — children, grandchildren, great-grandchildren —make up 151 of the village population. One of his daughters, Kyzbadzh, has 11 children. When his wife died 70 years ago, Agayev married a second time. His present wife, Kyanaziz, is 83.

The ex-shepherd is not the only one here who has crossed the 100-year border. There are seven people—two men and five women —in Tikyaband, which is in the Talysh Mountains, 5,700 feet above sea level, who are over 100 years old.

PROTECTING WHITE BEARS

On Wrangel Island a ... bear hunting team ... up shop to check on the ... population. White bears ... have permanent areas of ... tion in the Arctic, they roam ... over the icebound area. But ... begin their wandering life ... island, where most of ...

BRATSTVO PIPELINE SECOND SECTION

The Bratstvo (Brotherhood) Gas Pipeline carries natural gas from the USSR to a number of countries in Europe. The last seam of the second section was welded in the Carpathian Mountains on the Soviet Union's border with Czechoslovakia. This is the first time a pipeline with a maximum diameter of 56 inches has been laid in mountains.

UNDERWATER ANCIENT CITY

Storms rage every spring on Issyk-Kul, a high-mountain tectonic lake in Kirghizia (Soviet Central Asia) covering an area of 2,400 square miles. No little inconvenience is caused ship crews by storms up to force 12, but they bring many pleasant surprises to archeologists.

The great waves frequently cast ashore material evidence of this alpine region's ancient civilization —household artifacts, coins, clay utensils. These items are proof ... the high development of ... and culture in the sixth to ... century settlements which are ... covered by deep waters.

Many finds show that ... were cities on the vast stretch ... land over which Lake Issyk ... now spreads. Not long ago ... example, skindivers discov... towers and whole blocks ... ancient city.

YOUTH TECHNICAL EXH...

An exhibition of creative ... by young people ... and technology was part ... activities of the Seventeenth ... Congress held in Moscow.

The 12,000 exhibits ... light-winged plane and a ... train, earth-digging machines ...

MEDAL TO . . . A CANARY

-eight canaries contended ne songster championship ity of Saratov. The condi- f the competition were rigid: In 10 minutes the nts had to present a free- ogram. Of the 28, only the hearts of the lis- with their resounding trills. articularly skillful warblers warded silver medals and s.

PERFORMING ARTS OF KARA-KALPAKIA

Actors, dancers and singers of the Kara-Kalpak Autonomous Republic, in Soviet Central Asia, performed to enthusiastic audiences in Moscow.

A region which prior to the Revolution had no professional performing companies, Kara-Kalpakia today has a symphony orchestra, a music and drama theater and a ballet school. Its national companies—the Kara-Kalpak Dance and Song Ensemble and the Kyrk-Kyz (Forty Girls) Ensemble—were particularly popular with Muscovites.

JOINING TWO RIVERS

A waterway has been routed to connect the Volga with the Ural River. It will be about 290 miles long. One of the largest hydrotechnical projects in Europe, the waterway will begin at the Yeruslan River, the last left-bank tributary of the Volga along its lower course.

The new man-made river will irrigate Western Kazakhstan's arid steppelands with Volga waters. According to preliminary estimates, about 25 million acres of pasture lands will benefit.

NEW NAMES ON STELLAR MAP

The Minor Planet Center of the International Astronomical Union in Cincinnati has approved Chebotaryov and Dirikis as the names of two new asteroids, discovered by Soviet astronomers, for listing in world planet catalogues. They were named in honor of two distinguished researchers in celestial mechanics—Chebotaryov, director of the Institute of Theoretical Astronomy, USSR Academy of Sciences, in Leningrad, and Dirikis, an associate of the Astronomical Observatory of Latvian University.

NEW USE FOR HERBICIDES

Uzbek scientists have found that weed killers can be used to protect ancient architectural monuments. Not only rain and snow erode masterpieces, so do innocent-looking plants. Such weeds as wormwood are not very choosy, they take root even on glazed surfaces, bore into and crack the material, making the edifice more vulnerable to wind and rain.

The chemists have found six preparations which can be used with considerable effect to remove plant life from ancient structures. Herbicides added to building gypsum helped restorers strip the weeds from the Ulug-Beg Madrasah in Samarkand, one of the priceless medieval monuments of Central Asia.

---

t is now a natural pre-

hunters this spring were ed to catch 10 cubs for the 's zoos. White bear hunt- anned in the USSR.

minary estimates indicate ere are no more than white bears in all of the as compared with the arger population of brown 10,000 in the USSR alone.

EA VITICULTURE

A member countries plan set up a viticulture re- center in the city of Yalta, in the southern part of imean Peninsula. Special- m Bulgaria, Cuba, Rumania, ry, Czechoslovakia and the Union begin their joint oon.

This section of the Crimea is one of the USSR's major viticulture areas.

STREETCAR SUBWAY

A high-speed tramway, soon to replace the old conventional type, is now in the design stage.

Called metrotram (a combination of subway and street car), individual sections of the line will run underground at 45 miles per hour. A section of linked cars will accommodate from 240 to 370 passengers.

Volgograd will see the first of these high-speed vehicles soon.

AMERICAN STUDIES IN THE UKRAINE

American writing is one of the fastest growing fields of Soviet literary research and criticism. This is true not only in Moscow and Leningrad but in other cities as well. In the past two years several interesting studies have been published by Ukrainians. In her monograph *The Contemporary American Short Story* young researcher Valentina Oleneva traces the sources of the American short story form, its links with oral folk art and its development in the nineteenth century. Her emphasis is on contemporaries, Erskine Caldwell, John Updike and J. D. Salinger in particular. She also comes up with fresh observations on such older short story writers as Sherwood Anderson, Ernest Hemingway and William Faulkner.

Critic Tamara Denisova from Kiev, in *From Romanticism to Realism*, shows how the principles of romantic esthetics enriched twentieth century realist literature in America.

NEPTUNE'S SPRINGS

Subterranean freshwater springs occur not only on dry land but at the bottom of the world ocean. They have been discovered in many places—near the coasts of France, the USA, Cuba, Japan—and also in the Black Sea.

In the Soviet Union, a special department of the Institute of Water Problems, USSR Academy of Sciences, has made submarine springs a special area of research. Along with their theoretical interests the scientists have a very practical goal—to find additional sources of fresh water for cities. The point is that submarine freshwater sources help specialists survey water-holding beds of the Earth's crust.

Once such beds are located, their water can have economic importance, suggesting even such interesting possibilities as submarine springs replenishing freshwater stores of ships at sea.

---

gant tourist railroad car. hibition had been preceded ilar countrywide displays 4,000 projects, including ef- v suggestions and some un- imaginative inventions. y per cent were good for commercial applica- with a resulting saving of illion rubles.

OUNG LAUREATES

een-year-old Misha Pletnyov om Kazakhstan, a republic e southeast of the USSR;

ROCK ANNALS

A unique museum of rock annals—a lapidarium—has been established in Feodosiya, one of the world's most ancient cities, founded on the Black Sea coast 25 centuries ago. Here is a collection of autographs on rocks and slabs, the writing of peoples who populated the Crimea in the very distant past. Preserved on the stone pages are also drawings depicting their life and work. Many of these diaries in Greek, Italian, Turkic, ancient Armenian and other languages have been discovered in and around Feodosiya.

12-year-old Tanya Kharchenko from Tajikistan, a Central Asian republic, and 15-year-old Muscovite Ira Kirillova were prize winners at the First International Young Pianists Competition held in Paris. They placed first, second and fifth respectively.

KARELIAN BALLET

A new ballet, *The Kizhi Legend*, has been staged at the Musical Theater in Petrozavodsk, capital of the Karelian Autonomous Republic, in the northwestern part of the USSR. The ballet's story derives from a folk legend about the building of a 22-cupolaed church—a miracle of early eighteenth century wooden architecture—on Kizhi. The island on Lake Onega is now an architectural reserve for some unique creations.

The Kizhi Legend is Karelia's second national ballet. The first, *Sampo*, was based on themes from the ancient Karelian collection of heroic poetry *Kalevala*. Music for both ballets is the work of the Karelian composer Helmar Sinisalo.

A FISH PIPELINE

Experience has shown that a pipeline is one of the cheapest means of transportation. Water, oil and gas pipelines are used widely in the USSR. Specialists in Murmansk, a seaport beyond the Arctic Circle in the northwestern Soviet Union, have evolved one for fish. It is 300 feet long—quite enough to transport a fish catch from a vessel's hold to a floating factory or a fish-processing plant on shore.

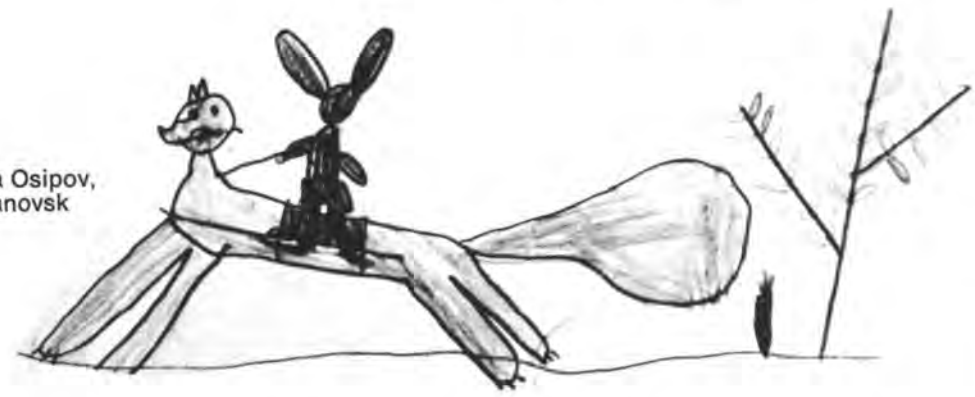
Special installations create a vacuum in the pipeline. The fish is sucked into it by external pressure and in a matter of seconds is on the fish factory's receiving end. The pipeline can transport more than 15 tons of large fish and 25 tons of small fish per hour.

CARDIOLOGY CENTER

The central facility of the USSR for cardiology research, treatment and training is being built in the Moscow area. It will develop new methods for the treatment of atherosclerosis, hypertension, cardiac insufficiency and other diseases of the heart. An adjunct of the USSR Academy of Sciences, it will also supervise the prophylaxis and treatment of cardiovascular diseases in polyclinics and hospitals throughout the country and will train cardiologists.

"Hello, Uncle Remus!"

By Vladimir G



by Seryozha Osipov, four, of Ulyanovsk

I LOVED THESE STORIES when I was a child, and I still have one of my own Uncle Remus books. That is why, when Radio Moscow asked me to adapt some stories for young children, I chose first Joel Chandler Harris's *Uncle Remus*.

"One time, when de an'mals live' like good nabers," Uncle Remus begins his story in my adaptation, "nobody wuz sharp ez Brer Rabbit."

"Not even Ole Fox?" Miss Sally's little boy asks.

"Not even Ole Fox," replies Uncle Remus.

"And what about Brer Wolf? And Brer Bear?" persists the little boy.

"Ain't I jus' get th'ough tellin' you nobody wuz ez sharp? Dat means needer Brer Bear en not Brer Wolf wuz a match fer 'im."

"So Brer Fox never did catch Brer Rabbit?"

"You's surely one unpatient boy, chile. Wants ter know ev'ythin' aheader time," chuckles Uncle Remus. "Now don' you rush me. I'm goin'ter tell you ev'ythin' en good time. Better listen ter dis new story."

That's how they spend their evenings—Uncle Remus and the boy—in the old man's cabin. The child can hardly keep his eyes open, and Aunt Sally has called for him to come on home to bed several times, but he can't tear himself away from Uncle Remus. He just has to know what will happen next—will Ole Fox catch Brer Rabbit after all?

I could easily explain why I liked these stories so much. But I should be speaking in grownup terms and giving grownup reasons. It would be so much better to give you the impressions of children, without any adult intrusions. And happily I can, for I have read many of the letters the children sent in when they were invited to tell what they liked about the Uncle Remus radio program.

The invitation followed each of the three radio sketches; the response was fascinating. A child's imagination, which can hold fast for a long time after a broadcast, in the case of those who cannot write yet, expresses itself in the form of a drawing. Or the older child writes a letter; more often, the letter contains both a written impression and a drawing.

The medium of radio inspires flights of fancy in the child artist. Nothing interferes to curb the freedom of the mind. Children's drawings received by Radio Moscow are utterly unlike book illustrations because the artists are not influenced by what a book would picture for them.

We get thousands of drawings and letters from every part of the country. When I read what the children have to say, it seems to me their words today were mine so long ago.

Sasha Trankevich, eight, from Leningrad, writes:

> Dear Uncle Remus,
>
> I liked the first part so much. Thanks for the story. You know the one I liked best? Brer Rabbit, of course. Please tell us the second part of the story as soon as possible.

A boy from Voronezh prints in careful block letters:

Dear Storyteller,

My name is Sasha Kotelnikov, and I'm five years old. I love fairy tales, and I know many from radio broadcasts and records. I have known Uncle Remus's stories a long time, and I love them very much. Uncle Remus is so kind and his stories are so interesting! Brer Rabbit is really very cunning and clever. And so funny!

My book about Brer Rabbit is so old that the pages are falling out. Mom and I keep pasting them back in, and we handle the book ever so carefully. Still, the letters are fading. My grandma gave the book to my uncle and to Mom when they were little children. That was way back in 1937. I suppose there are few of these books left now. Grandpa Litvinov,* you're a real magician. You can do anything. Please get my favorite books reprinted many times over so that all the children can read them.

Sincerely yours,
Sasha
February 21, 1974

* A favorite children's actor and storyteller, who plays Uncle Remus in the radio sketches.

by Lena Mashina, seven, of Krasnoyarsk Region

by Yura Kozlov, 10, of Solikamsk

Рисунок от домашней кошки!

Lena Kuznetsova, nine, of Pechora, Komi ASSR, writes:

> I like the stories very much. I just can't *help* laughing at Brer Rabbit's cunning and how Brer Fox trusts him.

From Nadya Bashilova of Moscow:

> Hello, Uncle Remus and Little Boy!
> I'm in the second grade at school. We've also got a Brer Fox and Brer Rabbit in our class. We call them that because Brer Fox chases after Brer Rabbit and wants to hit him but never manages to.

Sasha, first grader, and his sister Nadya, second grader, write from Golyanka Village, Orel Region:

> Brer Rabbit, we're worried about you, but we feel sure you'll never be caught by Bad Fox.

The much-loved Brer Rabbit is an object of the warmest affection and the tenderest sympathy. He may be praised, scolded, approved of or condemned, but he is never ignored by his fans.

Many of the children can hardly wait for the next Friday's broadcast, they are so anxious to know whether Brer Rabbit is still safe and sound.

Gena Lavrentyev from Gorky begs:

> Write to me, please. I'm terribly worried about Brer Rabbit. He was so jolly and funny!

They take great pleasure in recounting the rabbit's adventures to one another.

Andrei Gibarenko, second grader, from Ivanovo, says:

> After hearing your story, we retell it to each other word for word.

> Hello, Uncle Remus!
> This is my first letter to you, but I've heard all your stories. They're very exciting. I admire Brer Rabbit because he's clever. I thought the way he fooled Brer Bear was wonderful! I laughed so hard, Mom thought I was sick! When she saw I wasn't, she asked me what made me laugh like that. I told her, and she began smiling too. Every time I thought of that incident I had another fit of laughter.
>
> Sergei Starunov, 10,
> Surovikino, Volgograd Region

One boy wrote from Rostov-on-Don:

> Hello, dear Radio Editors.
> My name is Kolya Ivashchenko, and I'm eight years old. I was sick in bed when I heard your broadcast. I liked it very much. It's such a pity I am getting well because I'll be in school when your next broadcast is on!

Nina Shepilova (of Yefremov, Tula Region) wrote actor Nikolai Litvinov with a burning request:

> Dear Storyteller,
> My baby brother is always bawling, and only when you tell your stories does he keep quiet. If you could just tell them all year long without any letup, he would listen and never cry. Or maybe you could send us the book, and then you wouldn't have to work so hard? Please do!

The little girl drew the picture of a book with the title: *Uncle Remus and Brer Rabbit.*

> I could listen to them every day, because they are so sweet and jolly,

writes nine year-old Lara Shumilova of Melitopol.

And here is a very brief outburst:

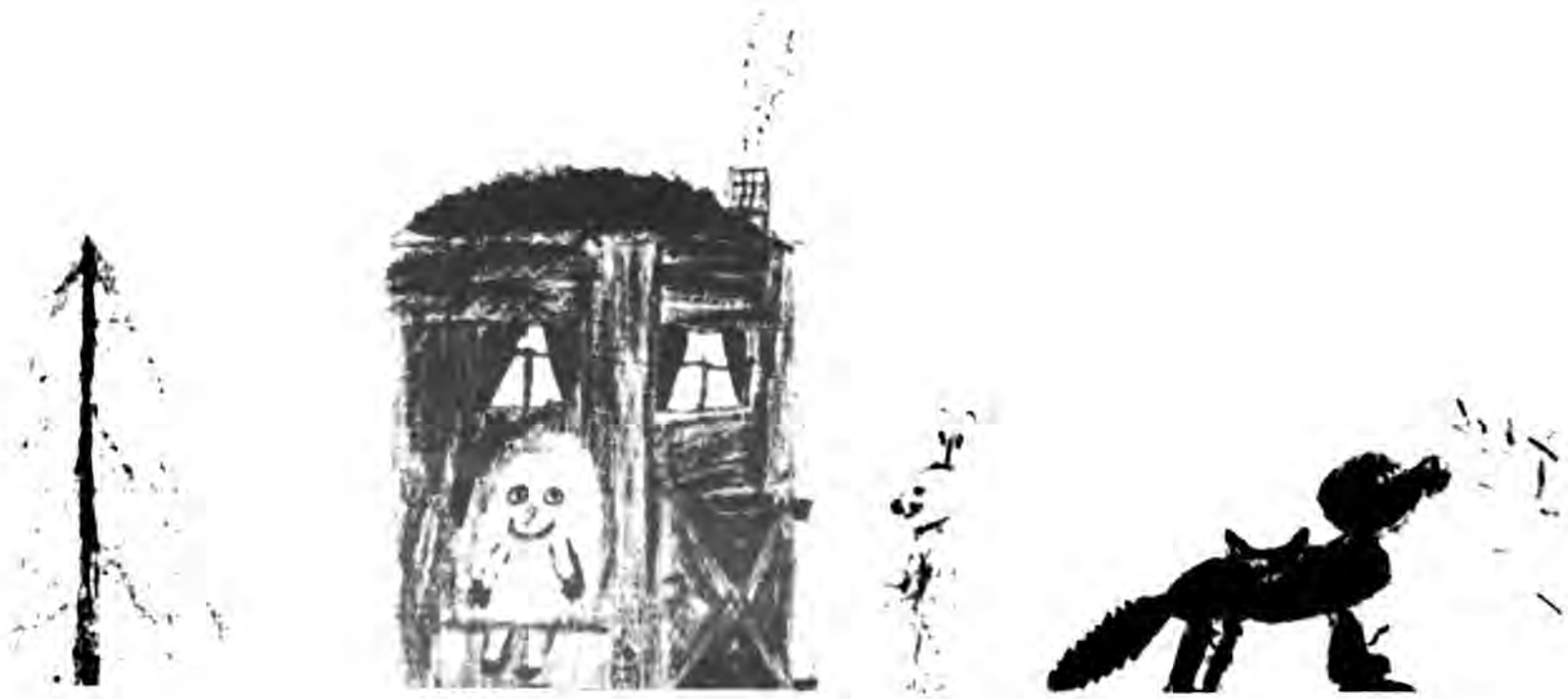
> Uncle Remus, I'm crazy about your stories.
> Igor Reznikov, second grader,
> Osinniki, Kemerovo Region

Of course, the success of the broadcasts is largely due to the actors. The little boy, as played by Margarita Korabelnikova, interrupts Uncle Remus with such innocently logical questions that he is like a surrogate for the little listeners, who would have voiced the very same concerns. The children enjoy the familiar chuckle of wise old Uncle Remus, the prattle and infectious laughter of Miss Meadows (Zinaida Narishkina) and the braggadocio of the dauntless Brer Rabbit (Irina Pototskaya). Music also has its part in the radio sketches. All of Brer Rabbit's songs and many episodes are based on the melodies and folk tales of American blacks.

Two Uncle Remus records were issued long ago, and a third will be ready soon.

There is also an animated cartoon featuring Brer Rabbit (I learned this from the children's letters), and a slide entitled "Stories" adapted for TV. I am happy that Uncle Remus and his friends mean as much to the new generations of children as they once did to me.

by Yura Kozlov



THE USA ON SOVIET POSTAGE STAMPS

By Leonid Fursenko

INTERNATIONAL COOPERATION, foreign states and their leaders are the themes of many stamps issued in the Soviet Union.

In June 1944 a two-stamp series was dedicated to the anti-Hitlerite coalition. It showed the flags of the USSR, Great Britain and the United States. A year later the United Nations was established, a result of the cooperation of these countries in World War II.

In November 1943 a stamp was issued to mark the Teheran Conference of the heads of the three great powers. It pictured the flags of the USSR, Great Britain and the USA.

The centenary of the birth of O. Henry, the American short story writer (1862-1910), was marked by a stamp designed by Alexander Zavyalov. O. Henry is very popular in the Soviet Union. His works have been published in 139 editions and in 12 languages, a total of 5,015,000 copies.

In 1956 Alexander Zavyalov designed a portrait series titled "Great Figures of World Culture." Dostoyevsky, Mozart, Rembrandt and other famous personalities were commemorated. America was represented by Benjamin Franklin (1706-1790).

Mark Twain is one of the most widely read foreign authors in the Soviet Union. His works have been published in 357 editions in 28 languages, a total of 20,139,000 copies. The one hundred twenty-fifth anniversary of his birth in 1960 was celebrated with a stamp showing the writer's portrait, with his house in Florida, Missouri, on the left and the monument to his literary heroes Tom Sawyer and Huckleberry Finn in Hannibal, Missouri, on the right.

The one hundred fiftieth anniversary of the birth of poet Henry Wadsworth Longfellow (1807-1882) was marked in 1958 by a stamp with his portrait. Longfellow's *The Song of Hiawatha* was translated into Russian in 1898 by the eminent poet and novelist Ivan Bunin, who was awarded the Pushkin Prize for the translation. That work strongly influenced our poet-translators. In the Soviet period the poem has been reprinted in 26 editions in 9 languages, a total of 877,000 copies.

At the end of 1971 a stamp celebrated the ninetieth anniversary of of the birth of William Z. Foster (1881-1961), a prominent leader of the American communist movement. The artist depicted Foster against the background of an American city and a workers' meeting.

The historic visit of Leonid Brezhnev, General Secretary of the CPSU Central Committee, to the USA in 1973 was marked by a special stamp. The same stamp was issued in a three-stamp set marking Leonid Brezhnev's visit to the Federal Republic of Germany and France.

SOVIET LIFE

SAFE CITIES

SOVIET CREWS FOR APOLLO-SOYUZ FLIGHT

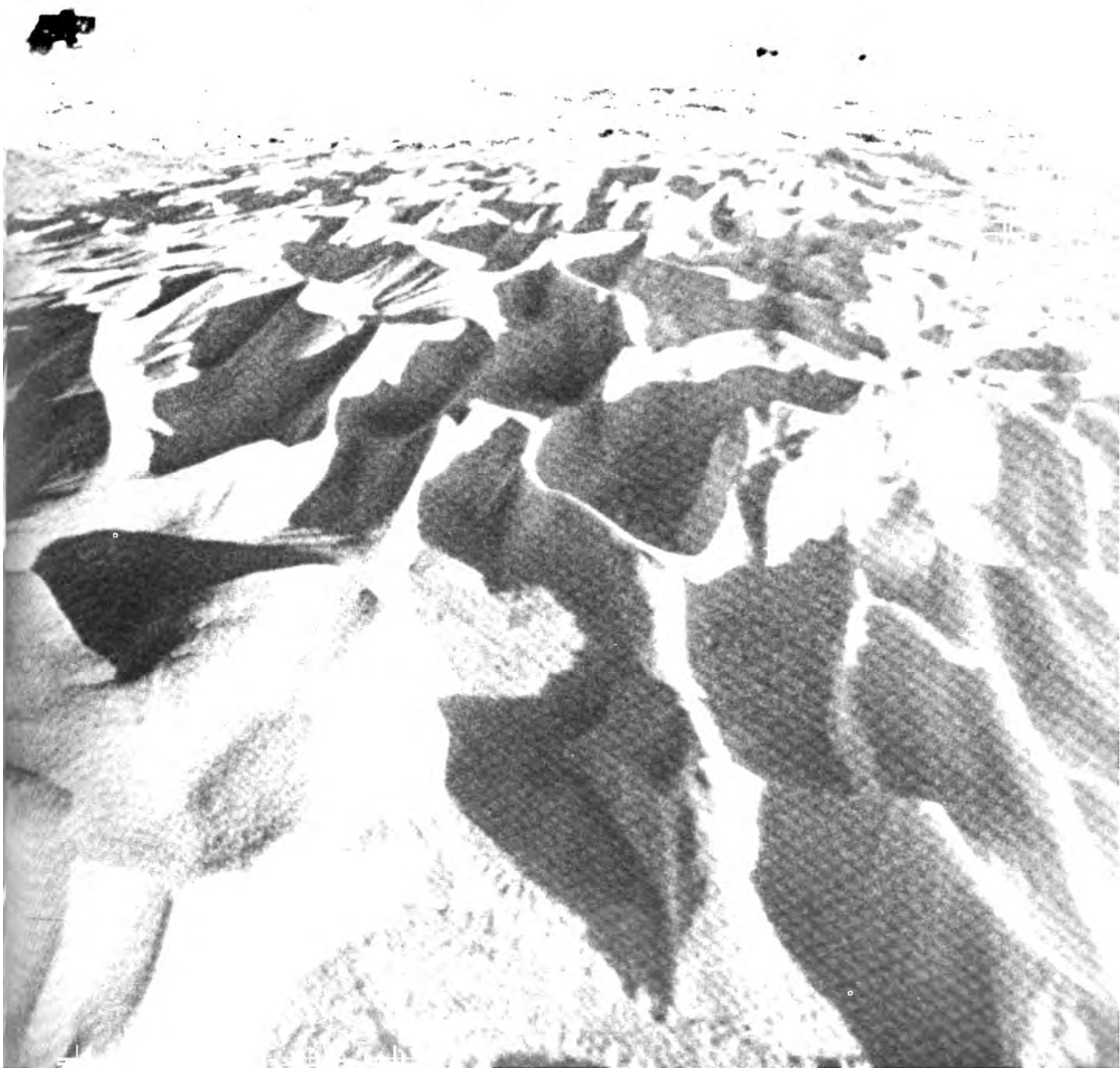
NEW STAGE OF CANCER RESEARCH

October 1974 • 50 cents

ORTHERN REAS-LANDS F FUTURE

The Soviet North accounts for about 45 per cent of the territory of the Soviet Union, but according to 1972 statistics the population of this enormous stretch of country is only 6.3 million, under 3 per cent.

Story on page 54



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SOVIET LIFE

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Front Cover: Albert Bykovsky discovered the virus, shown here, suspected of causing cancer in humans. Article and pictures pp. 56-59.

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LETTERS TO THE EDITOR

Congratulations on your excellent ... issue. The importance of research in ... all aspects of the oceans was brought home sharply in the article by Leonid Brekhovskikh.

It is gratifying that our two countries are joining their efforts in this extremely important work. The future of mankind, without question, depends in great measure on both the mastering of knowledge of our world, on the one hand, and peaceful cooperation between nations on the other.

I was struck, as well, by the clarity of the article "The Individual and Society," and by the profound humanity expressed by Surgeon Nikolai Amosov in his article.

Your magazine is a fine contribution to understanding between our peoples and thus to peace in the world. I particularly welcome it as a member of a union that has taken positive steps toward this understanding.

In 1972 the president of our organization led a delegation of officers and members on a tour of the Soviet Union's electrical and machine tool industries.

Our delegates reported favorably on the friendliness of the Soviet workers and on the prospects for increased friendship and trade between our countries.

I look forward to future issues of your magazine, and trust they will be as chock-full of ideas and information as that of July.

Hudson Wells
Garrett Park, Maryland

We are always interested in seeing how some kind of better life for all can be made, and your magazine certainly shows us that a better life is possible. We appreciate your making SOVIET LIFE available to us, as do many of our friends.

We like your approach in "Animals," August 1974. In general, would it not be possible for you to address yourself to some controversial subjects so we can see how a socialist country would do things?

Marge and Norman Malcolm
Takoma Park, Maryland

The excellent pictures of Soviet people in SOVIET LIFE magazine sharpen my desire to reach out and touch each person in the Soviet Union. They seem so friendly and strong. The scenic views are outstanding. The pictures of the porcelain articles and other art objects are lovely.

I enjoy reading about Soviet people in SOVIET LIFE magazine.

Irmi J. Thomas
Hamilton, Virginia

people and events

War Anniversary for Sevastopol

Not long ago the USSR celebrated the thirtieth anniversary of the liberation of Sevastopol from the Nazis. During World War II this Black Sea city became a symbol of heroism as its defenders held off huge enemy forces for eight months. For its courage and self-sacrifice, it was honored with the title Hero City.

Today's Sevastopol is a large industrial and scientific center whose war dead are remembered with reverence. Some 574 monuments to them have been erected in the city and its environs.

Thousands of people from all over the country gathered for the anniversary. Friends greeted each other, brought flowers to the old monuments and unveiled new ones, named streets in honor of heroes and saw art exhibitions whose theme was the defense of the city.

Eighth Grader Earns Medal

Eighth grader Misha Lyapin from Gorky Region has been awarded the Medal of Labor Merit. Misha, a delegate to the Seventeenth Young Communist League Congress, heads one of the teams of rural schoolchildren who help out during summer vacations and at other times. He and his comrades have been working in the fields, vegetable gardens and orchards of the state farm that sponsors their schools.

Valeri Shukshin Film Wins National Award

Mosfilm Studios' *Kalina Krasnaya (The Red Snowball Tree)* won first prize at the Seventh National Film Festival in Baku, capital of Azerbaijan. The film's scriptwriter, producer and star is the versatile Vasili Shukshin.

Shukshin is also a gifted prose writer. He began to write as a student of the Moscow Institute of Cinematography. His first stories were understated, colorful studies of rural life depicting an unfamiliar world of eccentrics and dreamers.

The film *There Is Such a Fellow* was Shukshin's debut as a producer, and it won him wide recognition. It was followed by *Pechki Lavochki* and *Kalina Krasnaya*.

YCL Members Build a Railroad

"Where do I sign up for BAM?" is a question asked in hundreds of letters to newspapers these days. "Please get me a job on BAM," young people write to Komsomol (Young Communist League) committees at enterprises all over the country.

BAM is the Russian abbreviation for the Baikal-Amur Trunkline, which will cut through taiga and mountains and cross the rivers and swamps of Eastern Siberia.

"A new large industrial area of the country will be created there, and new cities and settlements built," said Leonid Brezhnev, speaking of BAM at the Seventeenth Congress of the Young Communist League. "We are firmly convinced that the Komsomols and young people will make a worthy contribution to this great construction project."

The first detachment of more than 600 young enthusiasts took off for the construction site right after the YCL Congress and is already hard at work. The trunkline has been declared a national Komsomol project.

Claude Brinegar Visits the USSR

Claude Brinegar, the U.S. Secretary of Transportation, visited the Soviet Union last spring at the invitation of USSR Minister of Civil Aviation Boris Bugayev. Secretary Brinegar was a passenger on the first flight of Aeroflot's new Washington-Moscow route. He visited Moscow, Leningrad and Kiev and conferred with representatives of the Ministry of Civil Aviation on the servicing of USSR-USA air routes and on the expansion of cooperation between the two countries. Before his departure Secretary Brinegar told an APN correspondent:

"I foresee a significant increase in trade over the next decade. I also hope to see a great many more American tourists come to the Soviet Union. The figure now is relatively low compared with travel to Western Europe, but I think it will increase as Americans realize how open and friendly Soviet citizens are and how welcome Americans are here. Prices in the USSR are very reasonable, and it doesn't take long to get here by air. Tourism is an excellent way to normalize relations between our two countries. I think that the kind of understanding that comes with friendship will iron out our differences."

EDITOR'S NOTES

SOCIAL CAUSES OF CRIME DISAPPEAR

IN MAY 1972 a group of American newsmen spent a dull hour in a Moscow institution which, judging by its function, should have been anything but dull. They had been invited to observe the work of officers at the militia service communications panel. During that visit only two offenses were registered in this city of seven million people—an auto accident and a petty theft.

Western criminologists have always held that the larger the urban community, the higher the crime rate. But Moscow, Leningrad and other big Soviet cities are an exception to the rule. Though their populations are rising, the number of crimes committed in these cities is declining.

This is not a temporary phenomenon but an unmistakable trend, according to the experts whose job it is to work out crime prevention measures and the militia, which enforces those measures. A group of articles in this issue describes the approach of the criminologists and members of the militia to their work.

If crime is declining even in the big cities, the reader might ask, why do sociologists, criminologists and the general public devote so much attention to the subject? In the past decade, for instance, the number of teenage offenses in Leningrad dropped by 40 per cent, but juvenile delinquency is still discussed in Leningrad newspapers. The unusual thing is that letters from readers rarely call for legislative and executive bodies to take tougher action. Most of them urge as the first step an analysis of the causes of lawbreaking. People are very much aware of the definition suggested in the thirties by the famous educator Anton Makarenko: "There is no standard lawbreaker. There is a normal teenager who finds himself in abnormal conditions." The solution, obviously, is to change the conditions. Or, as the crime experts say, "Change the bad situation to a good one."

This applies not only to juvenile delinquents. A report of the USSR Research Institute for the Causes and Prevention of Crime cites this example: Thousands of workers of different trades and ages come to a construction site from various parts of the country. For some, it is hard to adapt to the new life, to overcome the feeling of alienation bred by separation from old friends and familiar places. The crime rate may increase for a while as a result. But that is a short-term phenomenon. As the influence of the party, trade union and Young Communist League organizations and the cohesiveness of the community grow and various social welfare programs are introduced, the situation gradually improves.

This example is far from theoretical. Our criminologists cite specific towns—Togliatti, Naberezhniye Chelny—booming new communities growing up around industrial projects.

Obviously, crime prevention in such areas involves different forms of government and public influence, depending on the circumstances. But the principle remains unchanged: the primacy of persuasion over enforcement. This is the essence of socialist law.

Of course, the first step in crime prevention is to find out what motivates offenders. Here an important difference can be noted between the viewpoints of Soviet and Western criminologists. The concepts of criminal instinct, of a correlation between urbanization and crime or between sexual pathology and crime are highly unpopular in the Soviet Union. You will find no fatalists here, no proponents of the theory that crime is an inevitable evil. On the contrary, people are convinced that in socialist society there is a genuine prospect of ending crime as a social phenomenon. We might remind our readers that in the mid-thirties the Soviet people succeeded in eliminating organized professional crime because such basic causes as unemployment and sharply different standards of living had disappeared.

Of course, the militia must still deal with an occasional professional robbery, but such cases are few and far between.

Criminologists have found that apart from a very small number, crimes in the Soviet Union are not committed because of need, misfortune or social inequality—because of any insoluble conflict between the individual and society. In other words, the Soviet people have eliminated the social causes of crime.

1976-1990: LONG-TERM PLANNING

By Fyodor Kotov
Master of Science (Economics),
Senior Worker, USSR State Planning Committee

THE USSR is formulating a new long-term economic development plan (1976-1990), similar to those being worked out by other socialist countries. The 15-year period covered by the Soviet plan corresponds roughly to the reproduction cycle of fixed assets.

The USSR has had a half-century of experience with three kinds of economic plans: long-term, five-year and current. They differ from each other, not only in duration but in scale.

The most usual planning period has been five years, with annual targets assigned to all enterprises and organizations.

At the same time, the Program of the Communist Party of the Soviet Union has set goals for longer periods: the building of the material and technical basis of communism, the molding of communist people, a higher level of labor productivity than under capitalism and a consequent steady rise in living and cultural standards. Besides, the expansion of economic ties with other countries, the need to change the ratios and the structure of production, and the participation of the USSR in the Comprehensive Program of Socialist Economic Integration present a host of problems that cannot be solved in a five-year period.

All these considerations call for long-term planning. Another factor is the scientific and technological revolution, which requires optimum-size enterprises and installations and big interbranch industrial and agricultural-industrial complexes. This increases the time between the drafting of a project and its completion.

To get new projects into operation as quickly as possible without causing disproportion in the national economy and to guarantee that they meet future technical standards, scientists and specialists devise a model that will provide information on the development of technology and other related indices for approximately 15 years ahead.

One of the most important principles here is unity of purpose and resources: The purpose of the project can be identified only on the basis of the material production expected at a given time.

A long-term plan determines the priorities for developing newly discovered deposits and setting up new industrial complexes, the probable acceleration of rates of scientific and technological progress, measures aimed at protecting the environment and improvements in the methods of economic management. It forecasts growth in labor productivity, public education and cultural standards, and the solution of so cardinal a problem as meeting all consumer needs.

In this connection, an increasing role is being played by the chemical industry, electrical power engineering and machine building, particularly by a complex of branches of the information industry: electronics, instrument making, control and communications technology. A substantial growth of labor productivity in these industries will mean an increase in the output of equipment for the industries producing consumer goods, for the construction of housing and related facilities, including recreational facilities. Great importance is attached to the intensification of agriculture.

A long-term plan also incorporates a complex of such goals as the social homogeneity of Soviet society, the bridging of the essential distinctions between mental and manual labor, and between living conditions in town and country, better ways of distributing material benefits and improved management systems.

The long-term plan is drawn up in two stages. In the first stage the main directions for the whole country's economic development are worked out. Then they are broken down for industry branches, union republics and economic areas.

On instructions from planning agencies, scientific institutions provide a whole complex of scientific-technical, economic and social forecasts. The USSR Academy of Sciences uses them to prepare a program of scientific and technological growth and works out the socioeconomic implications.

These activities give rise to such new problems as cooperation of specialists from the various sciences (basic, applied and social) in preparing forecasts, programs and shifts from indices of long-term plans to those of five-year plans.

In the very near future the long-term plans of the various CMEA countries for the 1976-1990 period will be coordinated.

CENTRALIZED ECONOMIC PLANNING AND LOCAL INITIATIVE

By Academician Nikolai Fedorenko
Director, Central Institute of Economics and
Mathematics of the USSR Academy of Sciences

WESTERN news commentators often argue that economic planning in the Soviet Union does not work. The USSR, they say, is such a large country that centralized planning from Moscow for Siberia, for instance, is ineffective. Is this true?

Management in so huge a country as the USSR is no less complex than in other industrially developed countries, but the fact is that all parts of the economy, in both the production and service spheres, are included in planned management. That, however, does not mean that every screw is planned by the national government.

Management from top to bottom operates on the principle of democratic centralism. As applied to economic matters, this principle means that at each level of the economic structure decisions of different scope, significance and complexity are made. For example, nobody from Moscow controls the drilling of an oil well on the lower reaches of the Ob River in Siberia. But the long-term program for the development of the West Siberian lowlands with capital investments of billions of rubles, for the construction of scores of new towns, oilfields and gasfields, ports, railroads, is the result of centralized planning. In the short period since the program was conceived and implemented, oil extraction in the lower reaches of the Ob has exceeded a hundred million tons a year and is growing rapidly. This particular example as well as the fact that in half a century the USSR has been transformed from an agrarian, semicolonial country into the second industrial power in the world are the best evidence that economic planning works in a country as big as ours.

Western economists also argue that centralized planning is not able to coordinate the output of different industries and guarantee deliveries on schedule. Emphasizing the difficulties involved, of which Soviet specialists are well aware, they forget, for some reason, about the wealth of positive experience we have accumulated in industrial management.

The process of improving economic management is no less dynamic than the development of the economy itself. Thus, within the last half-century two methods of organization of industrial management have been tested: the territorial principle (the control of industry in separate economic regions by national economic councils) and the branch principle (central control by ministries of the enterprises in their related branches throughout the country). There are now dozens of such ministries. As a result, we have both positive and negative experience with various systems of management. In 1973 an important decision was adopted to improve industrial management, and as a result we are forming large production complexes with greater decision-making powers. The complexes are made up of both production units—factories, plants, mines—and experimental and design units. We hope that this structure will combine the advantages of the branch and territorial principles of management.

As for coordinating the numerous interrelations of the economy, organizational arrangements—the unified system of material and technical supply, wholesale industrial fairs and the like—and better planning with economic and mathematical methods are helping us solve this problem. Specialists will appreciate the fact that in the USSR interbranch relationships are studied not only to check the over-all state of the economy, but to help plan production.

"The central planning organizations of the USSR give enterprises so many economic indices that the result is confusion, a race for the gross national product," goes the argument of some Western economists.

It is true that planning organizations often give enterprises too many economic indices. But efforts to reduce them started with the introduction of the economic reform in 1966. Now Soviet economists and other specialists are discussing a further reduction in the number of planned indices and greater independence for enterprises within the framework of the general state plan. Experiments are in process with new systems of planning and management that provide, among other things, for fewer indices. The Moscow motor transport enterprises, for example, have changed over to a self-accounting basis. Progress is determined essentially by one or two indices and by certain factors relating to distribution incentives and other financial matters, the rest of the problems are solved by the management of the enterprises independently. Another wider experiment of this kind is being conducted throughout the instrument-making branch of industry.

Finally, Western economists and journalists often talk about the deceleration of the rate of industrial production in the USSR, which, supposedly, slows down the fulfillment of future economic plans. But as the figures regularly published by Soviet statistical agencies show, the Ninth Five-Year Plan, like all the previous ones, is on the whole being fulfilled successfully.

Western observers should take note of this important factor: Growing labor productivity accounted for only 51 per cent of the entire surplus of industrial output in the First Five-Year Plan period, 68 per cent in the fifth, 72 per cent in the sixth, 73 per cent in the eighth and 83 per cent in the first three years of the Ninth Five-Year Plan period. Over the past 13 years the productivity of labor has gone up by an average 5.5 per cent annually in the USSR. We do not hide the fact, however, that we have had difficulties in the current plan period. They are the result, first of all, of the unusual drought from which our country suffered in 1972. According to meteorologists, it was the most severe in a hundred years. The drought sharply reduced the grain harvest. It forced the government to take grain from state reserves and to buy abroad in order to ensure an uninterrupted supply to consumers. It also affected the rate of development of some branches of industry, particularly the food industry, and consequently the index of development of industrial production as a whole.

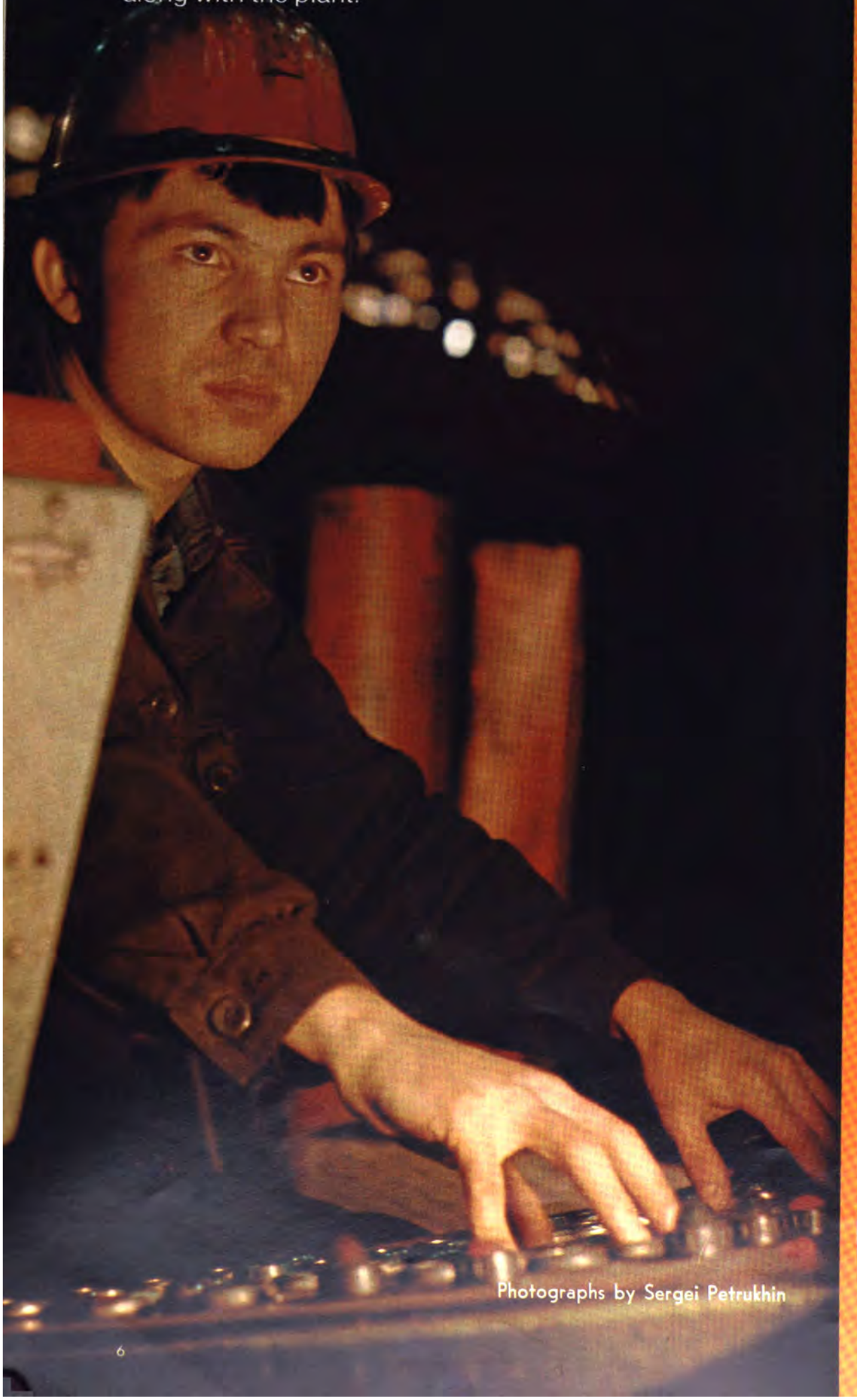
The picture has changed radically. Thanks to organized efforts throughout the country and to the bumper harvest in 1973, the growth rate of produotion has risen again. We are quite satisfied, for example, with the published figures for the first quarter of 1974. All the ministries and all the union republics more than met their targets for total volume of production, for output of the majority of the most important items and for manufactured goods, exceeding the plan figure by some two billion rubles.

In comparison with the first quarter of last year, the growth in production was 8.3 per cent as against the planned 6.8 per cent, a very considerable increase. The growth of labor productivity in industry was 6.7 per cent for the first quarter. The most important branches, those which determine the technical progress of the entire national economy, are being developed at an especially high rate. For example, in the first quarter Soviet industry produced 24 per cent more computing equipment and spare parts for it, 16 per cent more cars and 17 per cent more farm machinery than in the same period last year.

Of course, not all branches are being developed as quickly. But taking into account all the data given above, there is clearly no sign of deceleration in our rate of production growth.

At present Soviet planning organizations and large staffs of scientists are working out the long-term plan for 1976-1990. It will provide for further expansion of all branches of production and continued scientific and cultural growth. It is still early to cite definite figures—with complicated economic and mathematical calculations still in process—but a picture is already forming now which gives us every reason for optimism.

Thousands of miles of pipeline come off the conveyors of this West Siberian rolling mill each year. Opened in 1942, it has been renovated countless times, and the people have grown along with the plant.



Photographs by Sergei Petrukhin

The Chelyabinsk Pipe Plant in the Southern Urals is one of the country's largest and most modern enterprises. Hero of Socialist Labor Yakov Osadchy has been its director for the last 18 years. A loader's son, he started as a horse driver in a coal mine, worked on the construction site of the Dnieper Hydroelectric Power Station, graduated from an industrial academy and got a job in management. Osadchy is 73 now but still very active, still pushing for radical improvements.

The director of the Chelyabinsk Pipe Plant is interviewed by Yuri Kaleshchuk, **Smena** correspondent.

Q: When you first came to the Chelyabinsk Pipe Plant, you began to rebuild the electric welding shop. It was quite new and up-to-date at the time, wasn't it?

A: Yes. But even back in 1956 we had to anticipate the need for thousands of miles of pipe to carry oil and gas from newly prospected fields. The diameter of the pipes had to be enlarged also. A few years later, in 1962, our plant received a high-priority order for 40-inch pipe from the builders of the Bukhara-Ural pipeline. We delivered it in plenty of time to keep the project on schedule. As you can see, the renovation helped.

Q: Is rebuilding still your Number One priority?

A: It's going on all the time. But the main thing now is to give the staff a chance to prove to themselves and everyone else what they can do. Improvements make it possible to increase labor productivity. We still have the same number of workers—a thousand—who have put their best efforts into the plant and are changing with it. Working side by side with them and watching their growth is one of the best parts of my job.

Q: Are you talking about skills now?

A: About personality development, too. On the one hand, the plant keeps giving people more complicated assignments so that they must mobilize all their resources, perfect their skills. On the other hand, the mill is growing, increasing its profits and helping the workers meet such everyday needs as

OF PIPES AND PEOPLE

The workers participate in managing the plant through the Permanent Production Conference.

housing and child care. It's giving them more leisure and broadening their intellectual horizons.

The plant also provides a chance to display creativity. Thousands of our workers take part in the Permanent Production Conference, where they discuss all sorts of questions, from the renovation of the mill to the social development of the staff.

Q: You said the people are growing along with the plant. Do you see that when they come to you with their personal problems?
A: Certainly. There was a time when I could predict: If a man came to see me, the talk was sure to be about an apartment, if it was a woman—about enrolling her child in the kindergarten. Now, for the most part, they offer suggestions and criticisms connected with the work. Often they will bring up subtle details of relations between the workers and management. People's self-respect and self-awareness have grown. And the foremen's job has become more diversified, too. They used to be responsible only for production, now they are concerned with the education and leisure of the people they supervise. This doesn't mean poking their noses into anyone's business, but friendly relations and a constructive interest in other people.

Q: Doesn't this interest in the individual have a production aspect, too? You're trying to cultivate in the workers a pride in their plant, to spare them emotions that make for dissatisfaction. Wouldn't a disrespectful remark from a foreman or poor living conditions affect people's productivity?
A: It's difficult to draw a clear line between the human and the production factor. Our work is efficiently organized now, and that's good for the plant. But don't the workers themselves benefit from improved planning, from the fulfillment of quotas and assignments?

Q: The plant, I gather from people I've talked to, has always set itself especially difficult assignments.
A: Difficult, but feasible. What they took was creative dedication, a characteristic of our ferrous metallurgy workers. It's no accident that the rise in output in this branch has been achieved through higher labor productivity, without any increase in personnel.

The people in our branch have been growing, too. We have shop superintendents, still quite young, who began here as rank-and-file workers.

Q: The superintendent of one of the shops told me that what you demand first of all is independent decision making.
A: And not only from the superintendents. I expect it of every worker, the technicians and engineers especially. We have shop superintendents with the kind of background and flare for ideas that anyone would envy.

Q: And you personally, I've been told, work hard at improvements.
A: Yes, but then the plant grew up in such a way that everyone had to do that. It began during the war, in the autumn of 1942, with a mill evacuated from Mariupol (now Zhdanov) at the last moment—the fascist submachine gunners were already marching into the city. We were missing 20 freight cars with equipment when we arrived. But the mill did begin operating, though without some important auxiliary units—we changed the technology as we went along. I've always valued creative initiative, the ability to adapt under difficult conditions, to find practical solutions for engineering problems.

Q: These qualities are especially valuable in young people. Do the Young Communist League members who work in your plant justify your expectations?
A: Yes, they do. But I expect still more from them. I think they can handle more difficult assignments. I suggested that the YCLers take over the cold rolling shop, make it their project—it's a modern and promising division. But somehow they haven't responded, the idea is still hanging fire.

Q: Maybe the YCLers just want to weigh all the pros and cons. It's no simple matter, and there's no guarantee against mistakes.
A: They've got to learn to take risks. If you make a mistake, go ahead and correct it yourself: That's been our principle from the beginning. People should be given a chance to display all their abilities. Instead of waiting till we push them, the younger workers should look for responsibility. We trust them.

Courtesy of *Smena* magazine

Youth takes pa

SOME 3,000 workers at the Chelyabinsk Pipe Plant are under 30. Two thousand of them are Komsomols, members of the Young Communist League, an organization that plays an important role at the mill.

Several years ago one of the shops was renovated. It was made three times bigger, fitted out with brand-new equipment, and working conditions were vastly improved. The young people at the mill were directly involved in this extensive rebuilding. A special Komsomol headquarters was set up, headed by a metalworker, Yevgeni Fedyukin. Headquarters declared the renovation a shock construction project of regional significance. Young workers from other mills and factories and students from the institutes in Chelyabinsk came to lend a hand.

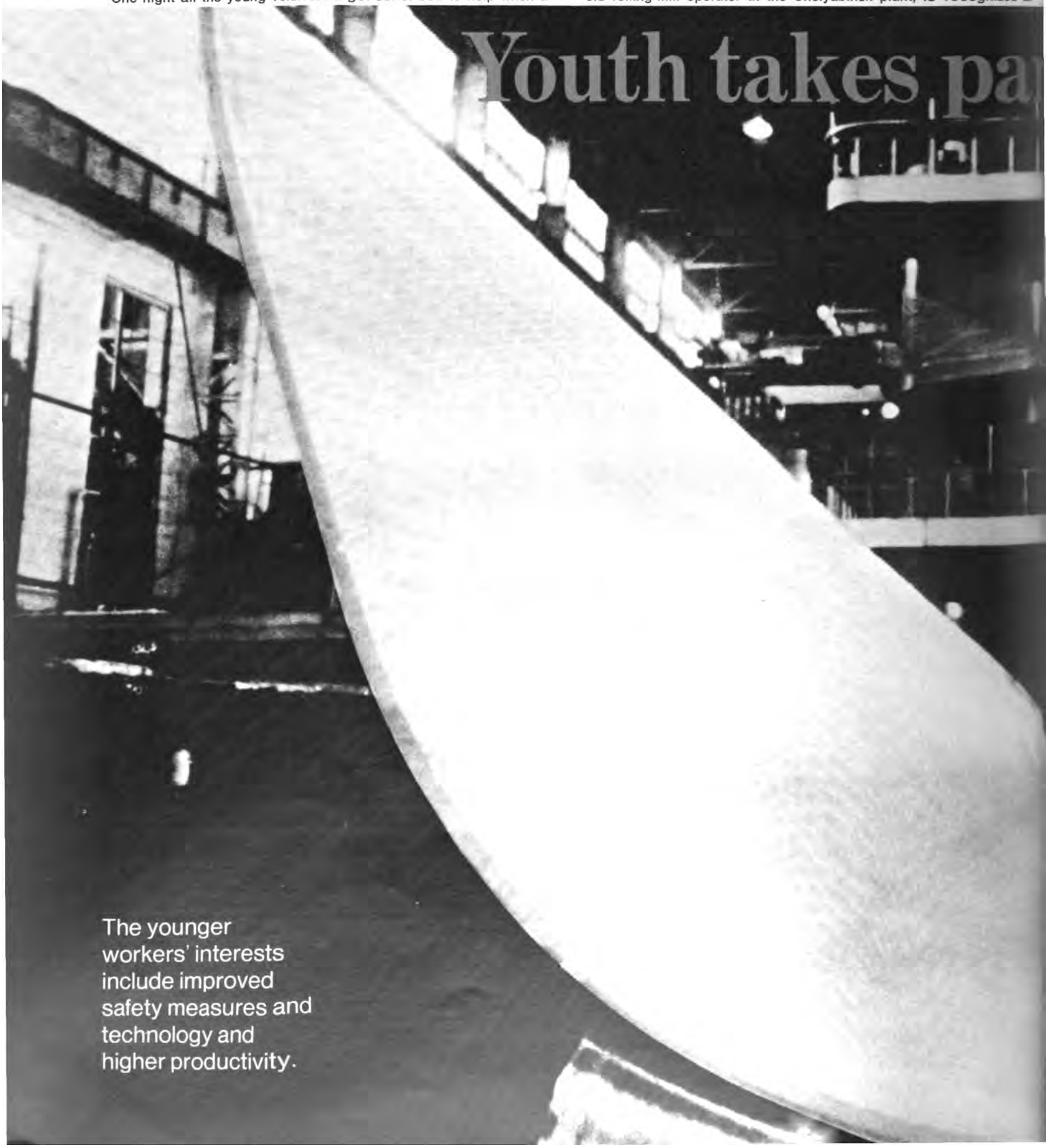
But, of course, the main responsibility was assumed by the Komsomols of the pipe plant, each of whom pledged to work at least 10 hours on the project. Actually they put in even more time.

One night all the young volunteers got out of bed to help when a trainload of equipment arrived and the other workers were busy on the construction site. In a little over an hour the cars were unloaded.

Once deliveries from a metal plant in another city were held up. The Komsomols from the pipe plant got in touch with their counterparts at the metal plant and asked for help. The latter worked overtime to provide the needed materials. Another time, when a problem arose with the installation of some electrical equipment from Kharkov, Komsomol headquarters turned directly to Moscow, to the Ministry of Electrical Engineering, for help.

Thanks largely to the Komsomols, the new workshop went into operation 10 days earlier than planned.

These examples prove a point: that the Komsomols do not simply do what they are told, they use initiative. At all enterprises labor emulation among Komsomols is the general rule, both for individuals and teams. Such emulation is not confined to single enterprises, often it is countrywide. For example, Alexander Rusakov, a 25-year-old rolling-mill operator at the Chelyabinsk plant, is recognized as



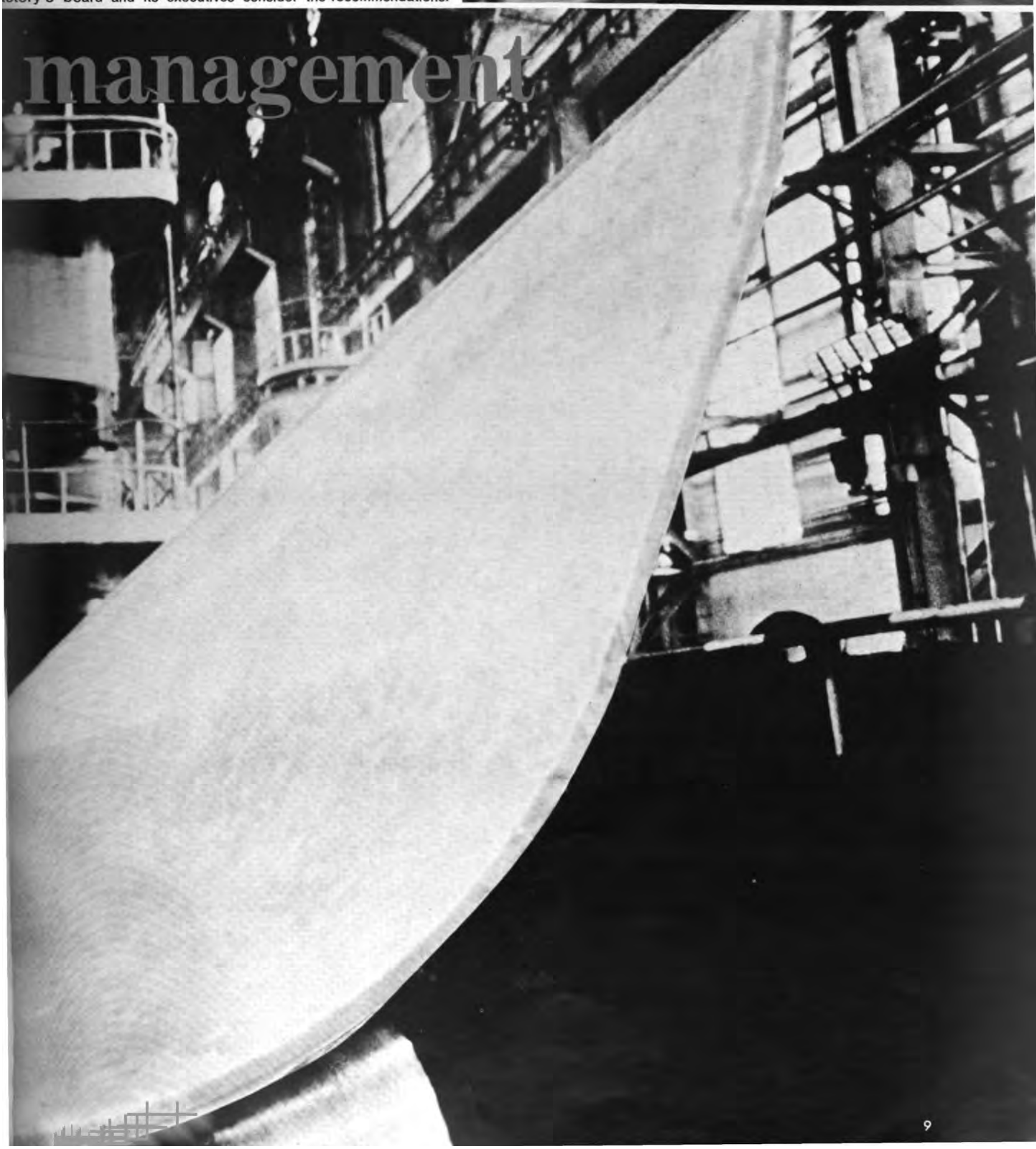
The younger workers' interests include improved safety measures and technology and higher productivity.

The decisions of the plant YCL committee always influence management.

ıe best young worker in his trade in the Soviet Union. The 52-ıember Komsomol youth team led by Valentin Skurikhin is the best ı the country's ferrous metallurgy industry.

But there is more to labor emulation than prizes and recognition. ften it provides the opportunity to increase labor productivity.

The majority of the Komsomols at the pipe plant are looking for ew ways to boost production. Technical guidance is provided by a ouncil of young specialists headed by Pyotr Abramenko, a 26-year-ld graduate of the Moscow Institute of Steel and Alloys. The council oordinates the efforts of the inventors and innovators. For instance, young engineer may come to them with an idea, perhaps not even ompletely thought out. The council members discuss the idea from ll points of view and decide whether it has merit. If they think it has, ıen they ask the inventors to make a thorough study. If this study roves too much for one person, several people tackle it. The council also responsible for seeing that good ideas are applied. Both the ıctory's board and its executives consider the recommendations.



Every YCLer at the mill is either enrolled in some special course or studying at an evening school or institute.

On the average, the young people at the pipe plant have an almost complete 10-year secondary education. Almost all the Komsomols are continuing their studies while they work, either at evening schools and institutes or by correspondence. A number of courses and lectures are given at the factory.

Leisure interests of the young metalworkers include reading, lectures on various subjects, the theater. They are active in the performing arts groups at the plant's well-equipped palace of culture. Sports are popular, the factory stadium is never empty. And for outdoor weekends there are a variety of plant-owned campsites.

At an exhibition of the plant's Sunday painters. Far right: Indian dance by a member of the amateur dance group.

The Moldavian Autonomous Soviet Socialist Republic was formed on October 12, 1924; in 1940 it became a union republic.

MOLDAVIA: bountiful republic

THE MOLDAVIAN SOVIET SOCIALIST REPUBLIC is located in the southwestern part of the Soviet Union, where the Russian plain ends and the Carpathians begin. It is bordered on three sides by the Ukrainian Republic and on the fourth side by Rumania.

Moldavia is a small republic but densely populated. With a territory of only 13,000 square miles, its population numbers about four million.

Nature is bountiful here. The climate is temperate, the sun warm, the soil fertile. Wooded hills, far-reaching vineyards, gardens and wheat fields—that is Moldavia.

This small republic rates as one of the first in the country in grape production and accounts for 20 per cent of the Soviet Union's wine: Grapes are depicted on Moldavia's state seal. It also accounts for 33 per cent of the country's tobacco and a large fraction of its sugar beet, sunflower and vole-

tile oil-bearing crops. It is the rare food store in the Soviet Union that does not carry canned goods from Moldavia.

The republic has more to boast of than its agriculture. It manufactures tractors, pumps, oscillographs, electric engines and equipment, transformers, refrigerators and silk fabrics. However, these lines of production are of relatively recent origin.

Moldavia's history was not a happy one. As the ancient saying goes, the land lay at the crossroads of misfortune. Scythians, Greeks, Persians, Romans, Goths, Swedes, Turks, Tatars and many other invaders devastated the Moldavian steppes.

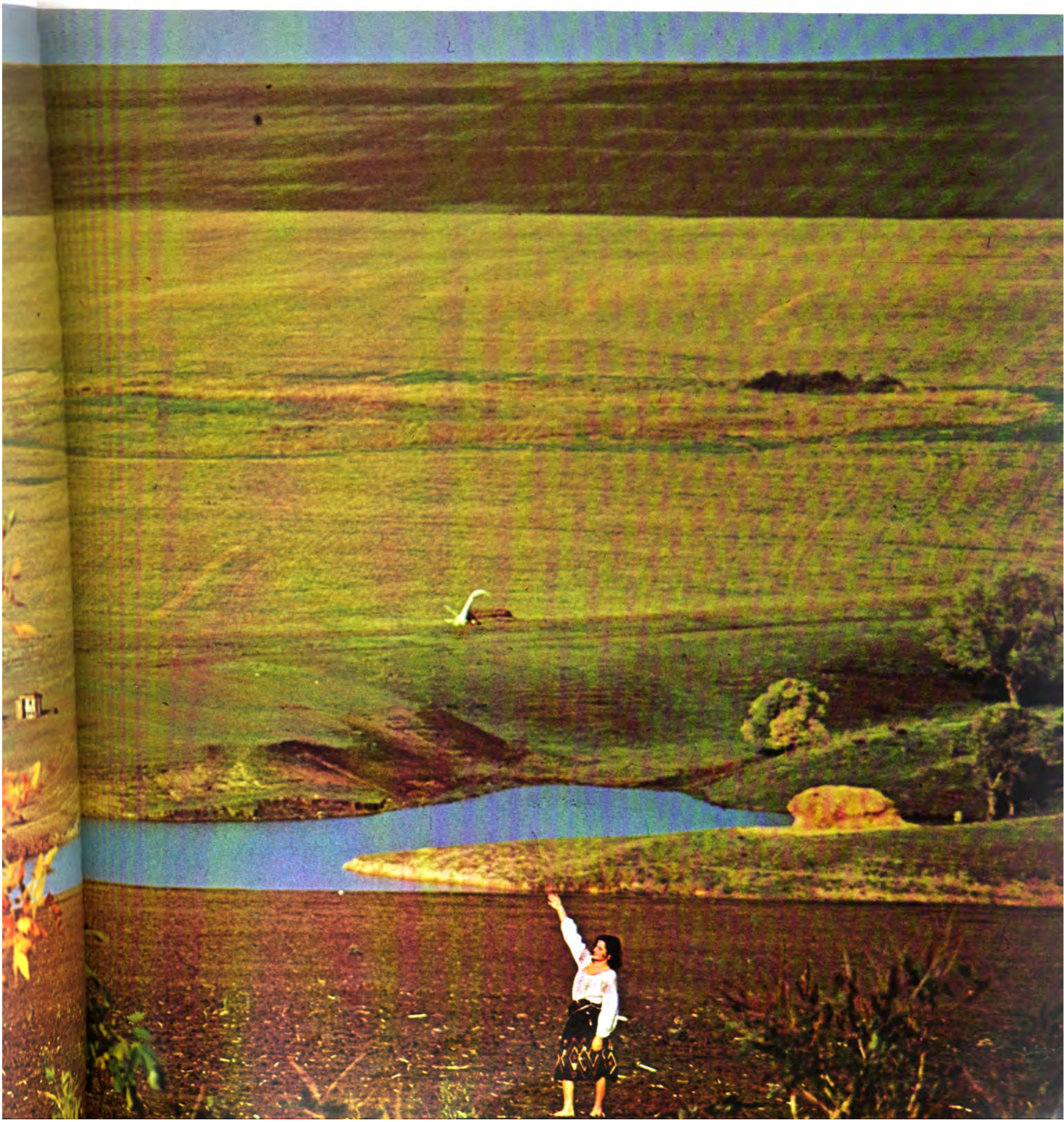
The German fascist invaders, too, left behind smoldering ruins in the Second World War. Moldavia was helped by other Soviet republics to rebuild after the liberation. Dozens of new cities and villages, hundreds of modern factories and mills, large farms have sprung up on the ruins.

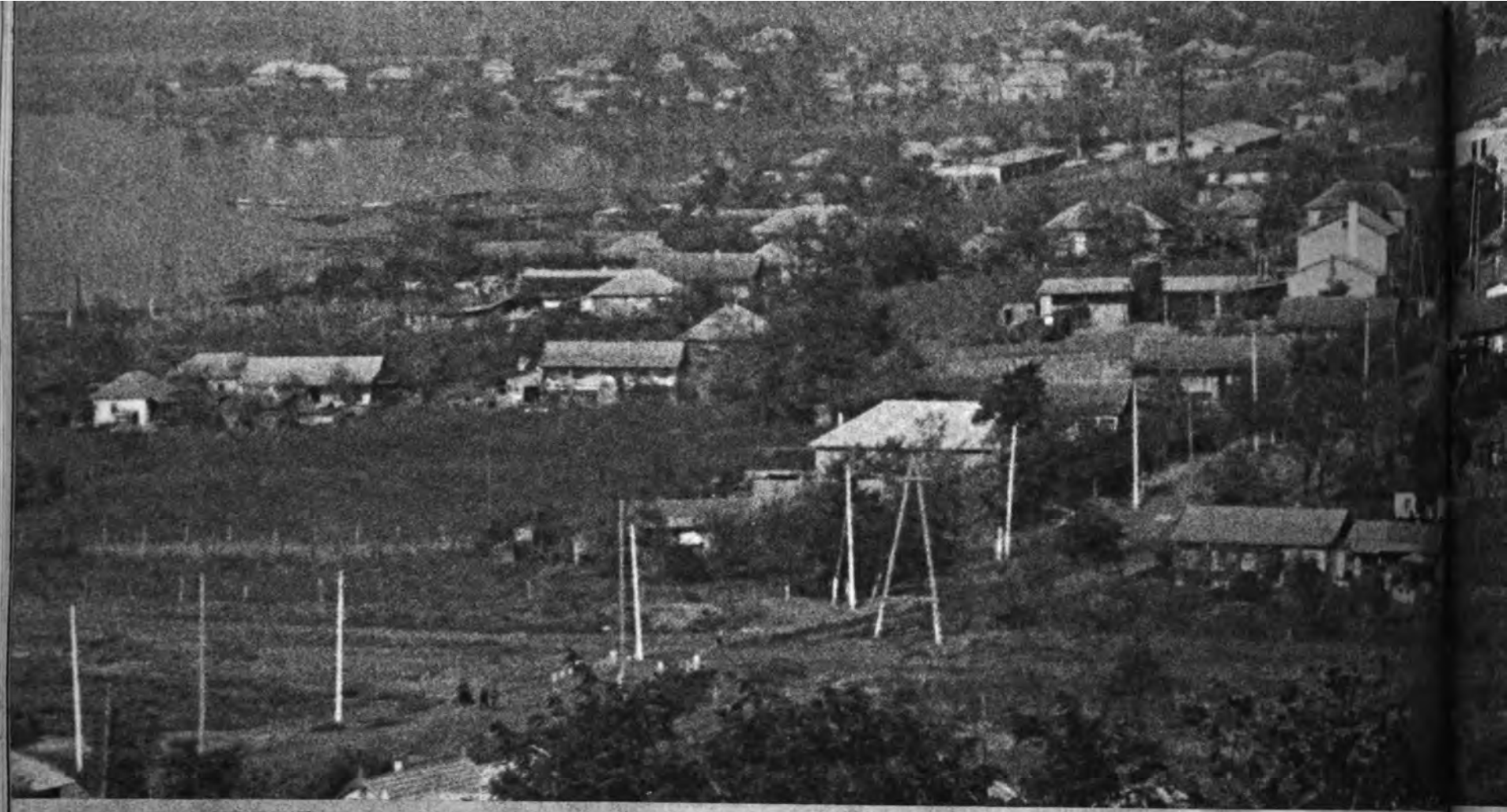
Kishinev, capital of the Moldavian SSR and a large industrial and cultural center, celebrated its 500th anniversary recently.

During the Soviet period great cultural changes have occurred. Almost two-thirds of the population could neither read nor write; now Moldavia has 100 per cent literacy. In numbers of students it surpasses such countries as Britain, France and the Federal Republic of Germany. The republic has its own Academy of Sciences, about 70 research institutions, 2,000 general education schools and dozens of higher and technical schools.

Moldavia's Joc Folk Dance Company, its Doina Capella Choir and its films are popular both in the Soviet Union and abroad.

Besides Moldavians, there are Russians, Ukrainians, Armenians and Gagauz living in this multinational republic.





Where the Gagauz Live

The Gagauz, a numerically small people of the Turkic group, lived in the Balkans for as long as anyone can remember. They moved to the southern Moldavian steppes at the turn of the nineteenth century. These steppes between the Dniester and the Black Sea—scenic, sweet-smelling and overgrown with tall grass—had never been cultivated. But even though the land was rich, the Gagauz eked out a miserable living with their primitive wooden plow.

Photographs by Valeri Shustov

ing to the 1959 census, 135 out of 1,000 marriages in Moldavia were mixed.

Beshalma's main street is lined with tile-roofed, sturdy, well-appointed houses nestling in green orchards and surrounded by vineyards. The village has a secondary school, a club, shops, a polyclinic and its own museum of regional studies.

The Gagauz, who now number 130,000, have a written language of their own. Beshalma's library of over 40,000 volumes contains, along with works by Russian, Moldavian

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guages. After graduating, many young people continue their education at higher schools in Kishenev, the capital of Moldavia, as well as in other cities.

In Turkic Budzhak, the steppe where the Gagauz live, means corner. That's precisely what the Budzhak steppe was 50 years ago—a godforsaken backward, out-of-the-way corner. Nowadays nobody would think of referring to these parts as remote or outlying. The steppe has been transformed.

cruelly the village punished a girl who fell in love with a man of a different nationality.

Twenty-five years ago the peasants of Beshalma pooled their belongings and formed a collective farm. Modern farm machinery replaced primitive tools. The fields grew rich wheat crops, and the collective farm soon turned into a multibranch agricultural undertaking, yielding its members a decent income.

Not only Gagauz live in southern Moldavia, but Moldavians, Russians, Ukrainians and Armenians. The Gagauz are no longer an isolated national group. They are an equal member of the family of Soviet peoples. This has broken down national prejudices. Nobody, not even the older people, will now reproach a Gagauz girl for marrying a Moldavian or a Russian. Incidentally, accord-

Peter Radoglo was the first chairman of the Bashalma Soviet. Above right: Collective farmer Ivan Sara lives in this house with his family of four.

A hothouse for early vegetables. Before Moldavia joined the Soviet Union, the impoverished Gagauz peasants worked the land with primitive wooden plows, barely eking out a living. Collectivization completely changed their lives.

Earth space. Moreover, they have at their disposal ground-based observatories and geophysical stations scattered throughout the globe. Only in this way is it feasible to work out reliable methods of forecasting the phenomena of solar activity.

Space research is expanding as individual problems are studied more intensively. This creates new ways of measuring, recording and controlling processes taking place in space. A project in preparation as part of the joint Soviet-French program Arcade is an example of such a space experiment. It involves probing the Earth's magnetosphere with electron beams and forming artificial polar auroras.

Beyond the Limits of the Atmosphere

The Earth's atmosphere protects us from space radiation, which is deadly to living organisms, but at the same time it sharply restricts the study of space by ground-based equipment. Only visible light and a small section of the radio waves reach ground-based devices from space. Just as it is impossible to listen to symphonic music if all the instruments are muffled except, let us say, the bassoon and drums, it is difficult to understand the essence of the phenomena taking place on distant worlds only from these two narrow portions of the spectrum.

Cosmos 215, the first Soviet astronomical observatory in space, was orbited on April 19, 1968. This launching marked the beginning of systematic investigations in ultraviolet and X-ray astronomy. Related experiments involved the Sun, hot young stars, the intergalactic medium and X-ray sources.

Orbital stations have considerably enlarged the possibilities of astrophysical research beyond the atmosphere. An example is the complex experiment of taking spectrograms of the hot stars Agena (Beta Centauri) and Vega (Alpha Lyrae) and measurements of the characteristic phenomena of primary cosmic radiation. The experiment was done by the crew of Salyut, the first orbital station: Heroes of the Soviet Union Georgi Dobrovolsky, Vladislav Volkov and Victor Patsayev. They investigated the stars using the Orion astrophysical observatory. They took 15 spectrograms all told. A study of the photographs showed that Vega's spectrograms can be used as a reliable standard in a certain area of the spectrum.

We should note that there had been very little previous experimental information on this extremely interesting problem of astrophysics. Only a few sources of gamma rays had been detected. Further investigation of this type of radiation may help us decipher the mysteries of that enigmatic substance antimatter.

Besides fundamental research by orbital stations, our space program also continues research from the less costly piloted Soyuz spaceships.

At the end of 1973 the Soyuz 13 was launched. Cosmonauts Pyotr Klimuk and Valentin Lebedev went on with the investigation of the stars begun by the crew of the Salyut station. They used the Orion 2 observatory, much superior to its predecessor for accuracy and resolution. This was confirmed by the films the cosmonauts brought back to Earth. All in all, almost 10,000 short-wave spectrograms were obtained. Some 6,000 stars were photographed, among them such faint stars as those of the eleventh magnitude and in a few cases even of the twelfth magnitude, the first time this has been done. They give us a view of the stars 1,000 times brighter than from Earth. The high-quality film, which greatly added to the success of the experiment, was a gift to Soviet scientists from George Low, one of the directors of NASA.

Planets and Distant Space

The reason for the interest in the exploration of the planets is obvious. Exploration of the Moon, Mars and Venus gives us a better idea of how our own planet developed, a better understanding of the processes occurring in the Earth's interior.

From the first Soviet probe to the Moon we found that the Earth's natural satellite possessed a highly negligible magnetic field. The Moon has no radiation belts.

This fact was also confirmed by measurements taken from Luna 9, which made a soft lunar landing for the first time in history. The first atlas and globe of the Moon were made by Soviet scientists from photographs of its far side, not visible from Earth, obtained in the experiments of 1959-1965.

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In January 1973 the automatic station Luna 21 brought the second Lunokhod to the lunar surface. The station landed on the eastern edge of the Sea of Serenity inside the crater Le Monnier. Adjoining this area is the mountain-continental massif Taurus. From terrestrial geology we know that the interlocking layers of various structures have the most complicated geological history and are full of traces of various geological events. Research in these layers is complicated but very fruitful.

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The Earth's Twin Sister

Venus is very similar to Earth in such basic astronomical characteristics as mass, size and value of solar energy. So that investigations of Venus were conducted with special interest even before there were descent rockets.

The first automatic interplanetary station launched toward Venus, in February 1961, was the Soviet spacecraft Venera 1. Since then, 10 spacecraft have been sent to the Earth's twin sister, which is eternally covered with clouds. Seven of them are Soviet-made. After Venera 4 our spacecraft were designed mostly to take direct measurements of the parameters of the planet's atmosphere on the route of the parachute descent, both on the dark and sunlit sides of Venus.

It was ascertained that nitrogen was not the chief component of the planet's atmosphere, as had been previously believed, that it constituted less than two per cent. The main component was carbonic acid, 97 per cent; the water vapor near the cloud layer constituted less than one per cent and oxygen, even less.

Projected for the Venera 8, launched March 27, 1972, was a first-time descent on the sunlit side of the planet. This made possible important measurements of the luminosity of the atmosphere on the entire route of descent. It appeared that the Sun's light, although very much weakened, penetrated to the very surface of the planet. There is reason to hope that in the very near future we will obtain a video image of the planet's surface.

These are the basic parameters of its atmosphere: pressure—90 atmospheres, temperature—plus 470°C. Investigations of the physical and mechanical properties of the planet's surface were most successful. The ground appeared loose enough at the landing site, and a high content of radioactive elements was found in its surface layer. This was the first such experiment.

The Red Planet

On November 27, 1971, the Soviet automatic station Mars 2 became the first artificial satellite of the red planet. A few days later it was joined by Mars 3. The vehicle of this station made a soft landing on Mars for the first time in history and transmitted a video signal from its surface.

The scientific program of both stations called for complex investigations of near-planet space, the planet's surface and the properties of its atmosphere. Eleven experiments were carried out, the investigations made from outside the station being of special value. During the period when direct measurements were being taken of the atmospheric and surface characteristics, a heavy dust storm raged over Mars, a phenomenon mysterious in many respects for science. The results were both unexpected and interesting. The dust clouds help to cool the planet's surface and raise the temperature of its atmosphere. This effect was given the name anti-greenhouse, because it differs from the greenhouse effect on Venus, where the atmosphere is heated by the rays of the Sun reflected from the planet's surface.

In the summer of 1973 four Soviet automatic stations were launched to Mars at one time. During the six-month flight to the planet, measurements were taken of the solar wind, interplanetary inert gases, the interplanetary magnetic field and radio emissions of the Sun. This February several million square miles of the planet's surface were successfully photographed from Mars 4 and Mars 5. Many areas of the Martian surface were shown to be diverse in their structure.

A month later a vehicle carried in the Mars 6 station made a soft landing on the planet.

It should be noted that lately not only scientific but general interest in Mars has increased, despite the fact that all hope of finding some form of organized life on the planet vanished long ago. Recently American investigators showed that the dismal appearance of the planet might not be a death mask. Physical conditions on Mars may be subject to a definite but very long cycle. The planet may therefore evolve to the point when the surface pressure rises considerably and becomes almost like that of our own planet and liquid water appears on its surface. As far as the rivers are concerned, their channels have already been prepared. Photographs from American and Soviet spacecraft make that evident. Unfortunately, this hypothesis will take many thousands of years to check. But there can be no doubt that new conclusions, assumptions and hypotheses will be made and confirmed in our time by other such messengers from the Earth.

Pooling Efforts

Recently cooperation between the Soviet Union and other countries in exploring outer space has appreciably expanded.

The socialist countries are working jointly on the Intercosmos program. The nine socialist countries have signed an agreement for an international communications system via the Intersputnik satellites. This agreement became effective two years ago.

Joint Soviet-French work in space has moved even further and in several directions.

An agreement has been reached for a Soviet vehicle to launch an Indian satellite at the end of 1974.

The general improvement in Soviet-American relations has contributed to expanding contacts in a number of spheres, including space research. The Soviet-American agreement on cooperation in the exploration and employment of outer space for peaceful purposes signed two years ago is being implemented. Preparation for a joint flight of the piloted spacecraft Soyuz and Apollo planned for 1975 is in full swing. The creation of compatible means of rendezvous and docking in the process of preparing for this flight will make future space flights safer.

The value of space exploration for science, the economy and mutual understanding is quite evident. With the growth of our knowledge of the environment and of distant worlds it will have even more value. In the long run it will lead mankind to a realization of its noble mission of converting our planet into a creative and fruitful island in the ocean of the universe.

QUESTION: I would like to see an article on Soviet commercial aviation. (R. Turner, Lakewood, California)

ANSWER: The first passenger airline in the Soviet Union was opened in 1923. It connected Moscow and Nizhni Novgorod (now Gorky, on the Volga) and was 250 miles long. Now the entire territory of the USSR is crisscrossed by airlines. Their total length is 500,000 miles.

Many domestic lines are 3,000 to 6,000 miles long. They are serviced by TU-104, TU-114, IL-62, IL-18 and TU-154 airliners. AN-24, YAK-40 and other planes serve the shorter lines.

Our liners carry 80 million passengers annually. With the growing interest in the country's history, its architectural monuments and varied geographical regions, the number of tourists is increasing steadily. There are tourist flights to ancient Russian cities, Transcaucasia (Georgia, Armenia), the Central Asian republics. Group tours arranged by travel bureaus offer a 50 per cent discount. The same discount holds for children, students and the disabled. Air travel in our country is fairly cheap. A flight from Moscow to Leningrad costs only 13 rubles (about 14 dollars), to Kiev 15, and to Odessa 23 rubles.

Air transport is widely used by the health service. Ambulance planes carry doctors, medicines and blood to patients in remote localities and bring emergency cases to hospitals.

From planes geologists prospect for mineral deposits and archeologists look for the sites of ancient cities. From spring to late fall civil aviation planes spray fertilizers and herbicides in farm areas and look for forest fires.

The network of international lines serviced by Soviet passenger planes covers 64 countries. In June 1973, during the visit to the United States by Leonid Brezhnev, General Secretary of the CPSU Central Committee, a protocol was signed providing service between Moscow and Washington. Regular flights on this route began on April 5, 1974. Service between Moscow and New York was established several years ago.

For a more detailed account of our civil aviation see the June 1973 issue.

QUESTION: What is a Communist? (Jerome Frank Slezak, Lakewood, Ohio)

ANSWER: In our country a Communist is a person who accepts the Program and Rules of the Communist Party of the Soviet Union. The theoretical base for the party's Program and its activities is Marxism-Leninism.

The CPSU now has a membership of about 15 million: 40.7 per cent of them are production workers, 14.7 per cent collective farmers and 44.6 per cent white collar workers. Engineers, agronomists, teachers, doctors, scientists, writers and actors account for more than two-thirds of this last category.

People may join the party when they reach the age of 18. An applicant must be recommended by three Communists who have been party members for at least five years. The general meeting of the primary party organization discusses the application and votes on it. Applicants who are accepted become candidate members of the party. They must complete a one-year probation during which they make a thorough study of the Program and the Rules of the CPSU and carry out party assignments. The general meeting then votes on their application for full membership.

Party members are no more privileged than nonmembers. All citizens have the same rights and responsibilities regardless of the services they perform or the posts they hold.

For more information about CPSU membership see the March 1971 issue.

QUESTION: Can a visitor to the USSR tell what the living standards of the population are just by comparing earnings with prices at the shops?

ANSWER: It's not so easy as it may seem. The correlation between prices and living costs in the Soviet Union is different than in other countries. For instance, while the price of cars is high, apartment rents amount to no more than 4 to 5 per cent of a family's monthly income. The price of women's pocketbooks, better shoes and raincoats seems rather high to visitors from abroad, but baked goods, milk, books, medicines, records and many other items are quite inexpensive. This holds for transportation as well. It costs only five kopecks to travel from one end of Moscow to the other by Metro.

The sources of real income are different here. For the most part it is derived from supplements to wages and salaries in the form of various payments and services. Medical care—anything from bandaging a wound to the most complicated heart operation—is free. The cost of some operations, including hospital care for 64 days afterward, may come to as much as 1,700 rubles (the equivalent of a building worker's average annual wage), all of which is paid by the state.

Education, too, is free in the USSR. Students at higher and specialized secondary schools receive monthly stipends, which are also paid during vacations.

Here is another example of "invisible income." The trade unions provide about nine million vouchers annually for accommodations at sanatoriums and resort hotels, either free or at 30 per cent of the actual cost. More than a billion rubles are allocated each year from the state budget for recreational facilities for workers and their families.

The funds spent in the USSR on medical care, education, recreation, the maintenance of clubs, libraries and stadiums, the payment of stipends, pensions and the like are called public consumption funds. In 1973 they amounted to 78 billion rubles, almost five times more than for national defense.

Public consumption funds are increasing twice as fast as wages. In the current five-year plan period (1971-1975) they will grow by 1.4 times.

There are a number of other indices of our living standards. Every third person in the USSR has a savings account. Furs and other expensive items are quickly sold out, and there is also a great demand for new cars. Zhiguli compacts, for instance, which are produced at the rate of 660,000 a year, are bought as soon as they leave the conveyor. The turnover of consumer goods is increasing by at least 6 to 7 per cent a year.

As you can see, the living standards of the Soviet people are rising steadily. By 1975 real income will grow by an average of one-third.

QUESTION: Will you tell us about Khiva. (F.V. Bronner, Riverside, California)

ANSWER: Khiva is a city in the Uzbek Republic, Central Asia. The oasis on which it is situated borders the torrid Kara-Kum Desert in the south and the cold Kyzyl-Kum Desert in the north. This location creates a number of problems: The city is very hot in the summer and cold in the winter, with no more than three to four inches of precipitation a year. Without irrigation, not only farming but the survival of any form of life would be impossible. A system of irrigation canals brings in water from the Amu Darya, the only large river in the vicinity.

Like other Central Asian cities, Khiva is very old. Judging by archeological finds, it dates back to the sixth century, and Arab travelers wrote about it in the tenth century. The city began to play an important role in Central Asian history in the middle of the sixteenth century, when it became the capital of the Khiva khanate.

Since ancient times it has been divided into two sections: Ishan-Qal'eh (Inner Part) and Dishan-Qal'eh (Outer Part). In the oldest section, enclosed by a fortress wall, once lived khans, their retinues, Islam clerics, merchants and wealthy townspeople. Relics of Uzbek architecture, including the fourteenth century Seid'Ala-ud-Din Mausoleum, have survived to this day.

Petty merchants, artisans and poor townspeople settled round Ishan-Qal'eh, beyond its walls. This part of the town was made up of adobe dwellings.

Like other cities in our country, Khiva has changed greatly in Soviet times. Many new buildings have gone up, and the broad streets are fringed with greenery. The town has several general secondary schools, a teachers institute and a medical school, an agricultural high school, a farm machinery school, music school, drama theater and Young Pioneer Palace. The Uzbek Research Station for the Study and Development of Central Asian Deserts is based in Khiva.

Most of the city's industry is related to the processing of farm products. There is a cotton gin and an oil mill.

The collective and state farms in the Khiva area grow cotton—the money crop—on irrigated land and also rice, corn and melons. The local cantaloupe is famous for its delicious flavor.

The population of 25,000 is mostly Uzbek. But there are also Russians, Kazakhs, Tajiks, Turkmens, Tatars—the ethnic mixture typical of Soviet cities.

Khiva is also famous for its jewelers, engravers, stonecutters, woodcarvers, and embroiderers on silk and velvet. The ancient art of Khiva's women carpet weavers has also survived to our day.

The city is growing by a development plan which provides for the preservation of everything that is historically valuable. For instance, its Museum of Regional Studies was once a khan's palace. The entire central part of the town, with its fortress walls, gateways, mausoleums, madrasahs, has been declared a national monument. Along with other ancient Central Asian cities like Samarkand and Bukhara, Khiva attracts a great many tourists and historical scholars.

QUERIES FROM READERS

SOVIET SPACE EXPLORATION:
Results and Prospects

WHILE THERE IS NO COMPARISON between the enormous span of time human beings have lived on the Earth and the few years since the first artificial satellite was launched, the knowledge accumulated about the worlds beyond our planet before and after October 4, 1957, is easily compared.

History is full of momentous insights and brilliant discoveries that have radically changed the development of science and technology. But there has probably been no more effective lever for the fundamental reconstruction of views and methods of investigating the surrounding cosmos than the launching of the first artificial satellite.

In 1961 the first man, Soviet cosmonaut Yuri Gagarin, was launched into space. And only eight years later the first man, American astronaut Neil Armstrong, walked on the Moon.

The achievements of space science have literally revolutionized many branches of knowledge. Now we cannot conceive of progress in chemistry and metallurgy, electronics and medicine without the data obtained from spacecraft. The scope of interests of this science includes such basic problems of theory and practice as the origin of life, the evolution of the universe and the exploitation of the Earth's natural resources.

Before we move to a consideration of Soviet space exploration, we should like to express our great admiration for the achievements of American astronauts in exploring the Moon and the near space planets and investigating distant stellar objects. The program of experiments in the Apollo and Skylab projects and the unique flights of the spacecraft Mariner 10, Pioneer 10 and others have all enriched world science.

Discoveries and Problems

In the early years the equipment available limited the sphere of exploration to circumterrestrial space. The systematic study of the space surrounding the Earth has led to a number of theoretically important findings. Perhaps the most important was the discovery of the radiation belt, the zone of charged particles caught by the Earth's magnetic field.

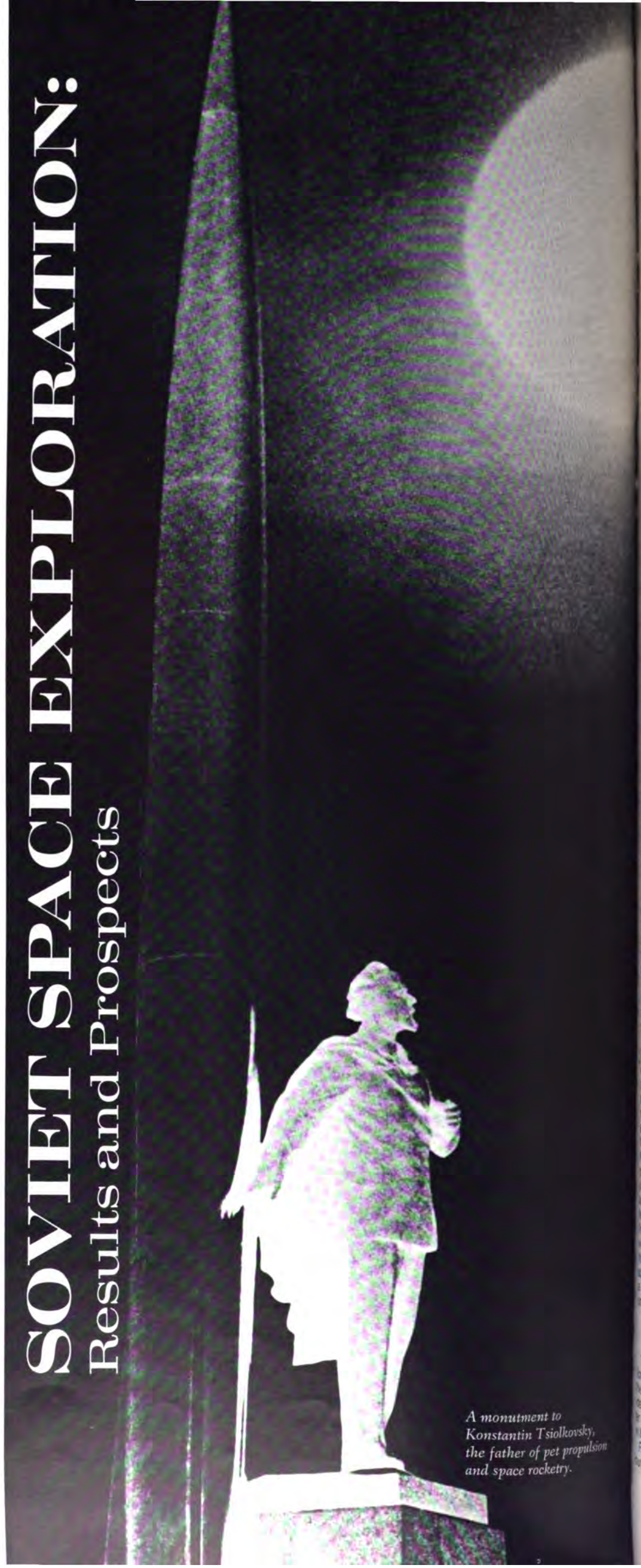
Then scientists found that there is no absolute vacuum beyond the terrestrial atmosphere as was previously supposed but space filled with hot plasma streams coming from the Sun. This discovery, made in 1959 during the flight of the station Luna 2, led to the idea of the solar wind. The concentration and energy of the particles comprising the wind depend essentially on solar activity. "Blowing" past the Earth, the solar wind streams distort the Earth's magnetic field, forming an extended magnetic train on the night side of the planet.

Various external disturbances exert a considerable influence on the Earth's atmosphere. The main ones are the result of solar electromagnetic radiation. Depending on the state of solar activity and the time of day, it heats up the upper atmosphere. With the data of many experiments on board spacecraft, it has been possible to create a model of the ionosphere up to heights of 12,000 to 15,000 miles.

The practice of conducting experiments on spacecraft has had this important effect: In the first years of the cosmic era, any experiment could lead to radically new scientific ideas (*e.g.*, the formation of such new concepts as magnetosphere and ionosphere). Now an experiment may actually resolve a key problem previously formulated only in theory (*e.g.*, the study of Sun-to-Earth connections, mysterious astrophysical objects—quasars, pulsars, hypothetical protostars, among others).

A case in point is the research done from the Soviet space observatories Prognoz to study solar activity and methods of forecasting it. With the launching of satellites of this type, scientists have been able to keep a regular watch on the radiation climate in near-

By Alexander Alexandrov, Candidate of Science (Technology), and Vadim Levsky



A monument to Konstantin Tsiolkovsky, the father of pet propulsion and space rocketry.

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The Earth's Twin Sister

Venus is very similar to Earth in such basic astronomical characteristics as mass, size and value of solar energy. So that investigations of Venus were conducted with special interest even before there were descent rockets.

The first automatic interplanetary station launched toward Venus, in February 1961, was the Soviet spacecraft Venera 1. Since then, 10 spacecraft have been sent to the Earth's twin sister, which is eternally covered with clouds. Seven of them are Soviet-made. After Venera 4 our spacecraft were designed mostly to take direct measurements of the parameters of the planet's atmosphere on the route of the parachute descent, both on the dark and sunlit sides of Venus.

It was ascertained that nitrogen was not the chief component of the planet's atmosphere, as had been previously believed, that it constituted less than two per cent. The main component was carbonic acid, 97 per cent; the water vapor near the cloud layer constituted less than one per cent and oxygen, even less.

Projected for the Venera 8, launched March 27, 1972, was a first-time descent on the sunlit side of the planet. This made possible important measurements of the luminosity of the atmosphere on the entire route of descent. It appeared that the Sun's light, although very much weakened, penetrated to the very surface of the planet. There is reason to hope that in the very near future we will obtain a video image of the planet's surface.

These are the basic parameters of its atmosphere: pressure—90 atmospheres, temperature—plus 470°C. Investigations of the physical and mechanical properties of the planet's surface were most successful. The ground appeared loose enough at the landing site, and a high content of radioactive elements was found in its surface layer. This was the first such experiment.

The Red Planet

On November 27, 1971, the Soviet automatic station Mars 2 became the first artificial satellite of the red planet. A few days later it was joined by Mars 3. The vehicle of this station made a soft landing on Mars for the first time in history and transmitted a video signal from its surface.

The scientific program of both stations called for complex investigations of near-planet space, the planet's surface and the properties of its atmosphere. Eleven experiments were carried out, the investigations made from outside the station being of special value. During the period when direct measurements were being taken of the atmospheric and surface characteristics, a heavy dust storm raged over Mars, a phenomenon mysterious in many respects for science. The results were both unexpected and interesting. The dust clouds help to cool the planet's surface and raise the temperature of its atmosphere. This effect was given the name anti-greenhouse, because it differs from the greenhouse effect on Venus, where the atmosphere is heated by the rays of the Sun reflected from the planet's surface.

In the summer of 1973 four Soviet automatic stations were launched to Mars at one time. During the six-month flight to the planet, measurements were taken of the solar wind, interplanetary inert gases, the interplanetary magnetic field and radio emissions of the Sun. This February several million square miles of the planet's surface were successfully photographed from Mars 4 and Mars 5. Many areas of the Martian surface were shown to be diverse in their structure.

A month later a vehicle carried in the Mars 6 station made a soft landing on the planet.

It should be noted that lately not only scientific but general interest in Mars has increased, despite the fact that all hope of finding some form of organized life on the planet vanished long ago. Recently American investigators showed that the dismal appearance of the planet might not be a death mask. Physical conditions on Mars may be subject to a definite but very long cycle. The planet may therefore evolve to the point when the surface pressure rises considerably and becomes almost like that of our own planet and liquid water appears on its surface. As far as the rivers are concerned, their channels have already been prepared. Photographs from American and Soviet spacecraft make that evident. Unfortunately, this hypothesis will take many thousands of years to check. But there can be no doubt that new conclusions, assumptions and hypotheses will be made and confirmed in our time by other such messengers from the Earth.

Pooling Efforts

Recently cooperation between the Soviet Union and other countries in exploring outer space has appreciably expanded.

The socialist countries are working jointly on the Intercosmos program. The nine socialist countries have signed an agreement for an international communications system via the Intersputnik satellites. This agreement became effective two years ago.

Joint Soviet-French work in space has moved even further and in several directions.

An agreement has been reached for a Soviet vehicle to launch an Indian satellite at the end of 1974.

The general improvement in Soviet-American relations has contributed to expanding contacts in a number of spheres, including space research. The Soviet-American agreement on cooperation in the exploration and employment of outer space for peaceful purposes signed two years ago is being implemented. Preparation for a joint flight of the piloted spacecraft Soyuz and Apollo planned for 1975 is in full swing. The creation of compatible means of rendezvous and docking in the process of preparing for this flight will make future space flights safer.

The value of space exploration for science, the economy and mutual understanding is quite evident. With the growth of our knowledge of the environment and of distant worlds it will have even more value. In the long run it will lead mankind to a realization of its noble mission of converting our planet into a creative and fruitful island in the ocean of the universe.

THE CREWS OF THE JOINT APOLLO-SOYUZ FLIGHT

These are short biographical sketches of the four Soviet crews selected for the joint Soviet-American docking experiment in space. Why four crews? There are several reasons.

First, each of the ships is to be launched from its own cosmodrome. The Soyuz will go into orbit first, followed by the Apollo. If the Apollo is detained, the Soyuz will wait for a day or two. If the delay is longer, the Soyuz will round off its flight and another crew will be launched to meet the Apollo.

Second, the crews must have backups in the event one of the cosmonauts gets sick before the start.

Third, this first international effort, hopefully, will be followed by other space expeditions for which trained crews will be needed.

THE FIRST CREW

Alexei Leonov (right) and Valeri Kubasov.

Commander of the Crew: Colonel Alexei Leonov, Pilot-Cosmonaut, Hero of the Soviet Union

ALEXEI LEONOV was born in the small Siberian village of Listvyanka in 1934. His father was a miner.

After World War II the Leonovs moved to the city of Kaliningrad in the Baltic area, and the cosmonaut-to-be finished secondary school there. Leonov was fond of sketching from early childhood. His interest in art grew with the years. He particularly liked seascapes. He also did a great deal of reading on the subject and has a sizable collection of reproductions and books on art. His sudden turn to aviation is difficult to explain. But there it was. He abruptly left art school for flight training and, upon completing an aviation school, became a professional flier.

Leonov also tremendously enjoyed parachute jumping and made more than 100 jumps of varying degrees of difficulty.

He was very happy to be asked to join the cosmonaut team. With the first group of Soviet cosmonauts, including Yuri Gagarin, Gherman Titov and Andrian Nikolayev, Leonov got down to the arduous business of training for a space flight. In one preflight year he covered more than 600 miles on a racing bicycle, did 125 miles of cross-country running, skied 175 miles and spent hundreds of hours on the running track, trampoline, suspended rings and the centrifuge.

Preparations for the Voskhod 2 flight were in progress. Leonov took part in designing a space suit, pressure lock, control systems and all the auxiliary systems and equipment the earlier ships did not carry.

Then, on March 18, 1965, he made an orbital flight on board Voskhod 2 (commander Pavel Belyayev). On that flight Leonov went outside the ship to determine whether people could move and work in open space. His 12-minute walk opened a new chapter in the history of space exploration.

The flight over, the cosmonaut resumed his work: training and coaching other Soviet cosmonauts. He is presently studying English.

Leonov is a member of the Central Committee of the Young Communist League and a deputy to the Moscow Regional Soviet. His wife Svetlana, a graduate of a teachers institute, now works as an editor. They have two daughters: Victoria, 13, and Oksana, seven.

Flight Engineer: Valeri Kubasov, Pilot-Cosmonaut, Hero of the Soviet Union

VALERI KUBASOV was born in 1935 in the small town of Vyazniki on the Klyazma Riva, 180 miles east of Moscow. His father, a river shipping-line mechanic, often took his son along on trips down the Klyazma and Volga. It was probably then that Valeri, watching his father at work, developed a liking for machinery.

When he graduated from secondary school with a silver medal in 1952, he decided to become an engineer. In six years of strenuous work at the Moscow Aviation Institute he studied experimental aerodynamics, the science of metals, heat treatment, hydraulics, analytical geometry and a host of other subjects to qualify for his diploma of engineer-mechanic in aircraft building, which he was awarded in 1958.

The young engineer got a job in a laboratory where space equipment models were being designed. The theoretical aspect of the work appealed to him. The result was an original paper which got him a candidate's degree in science in 1968. He is the author of a few dozen scientific papers by now, including one on correcting interplanetary trajectories by radial heliocentric velocity impulses.

In the middle of 1966 the staff of the cosmonaut training center was augmented by a group of research engineers. It included specialists in a variety of fields, among them Alexei Yeliseyev, Vladislav Volkov and Valeri Kubasov. As part of his training Kubasov had to figure out how to use an especially designed electric welding unit in space.

In October 1969 he was flight engineer on the Soyuz 6 (commander Georgi Shonin). The cosmonaut won renown as the first cosmic welder. With his Vulcan equipment he tested various methods of welding metals in a vacuum and state of weightlessness. The experiment was a success.

In private life Kubasov is a modest and even somewhat shy person. His hobby is making films. He also is studying English. His wife Lyudmila, like himself, is a graduate of the Moscow Aviation Institute and works as an engineer. The Kubasovs have two children: Dima, a boy of 3, and Katya, 8.

THE SECOND CREW

Commander of the Crew: Colonel Anatoli Filipchenko, Pilot-Cosmonaut, Hero of the Soviet Union

ANATOLI FILIPCHENKO was born in 1928 in the village of Davydovka, Voronezh Region (Central Russia). He had completed only seven years of school when the war broke out. His father went to the front, and he started working at a motor-repair plant to help his mother. He was only 15 when he began operating a lathe.

Influenced by one of his uncles who was a pilot, Filipchenko became interested in aircraft modeling at an early age. He went to an air force school first, then to an air force junior college.

In the air force he advanced from junior pilot to senior pilot-instructor of an air division. He studied at the Air Force Academy by correspondence and graduated in 1961. An experienced aviator, Pilot First Class, Filipchenko has flown many crafts and logged over 1,500 hours in the air. He daydreamed about joining the cosmonaut team but did not think it would ever really happen.

Then, unexpectedly in 1963, after being examined by a special medical commission, he was made a member of the cosmonaut team. Years of training followed. He continued to pilot supersonic planes and reached the rank of test pilot.

In October 1969 Filipchenko made a space flight on the Soyuz 7. He was commander, Vladislav Volkov was flight engineer and Victor Gorbatko research engineer. In the five days of flight the crew carried out a number of scientific and technical experiments in the Soyuz 6, Soyuz 7 and Soyuz 8 group flight. The qualitatively new feature in the flight of those three ships was the large number of maneuvers in orbit, performed on command from the Earth and on the cosmonauts' own initiative. Hand control was used over the night part of the Earth.

Filipchenko is an ardent sportsman and a sharpshooter. He is also fond of underwater spear-gun fishing.

The cosmonaut and his wife Yelizaveta have two children: Sasha, 17, and Igor, 13.

Flight Engineer: Nikolai Rukavishnikov, Pilot-Cosmonaut, Hero of the Soviet Union

NIKOLAI RUKAVISHNIKOV was born in the Siberian city of Tomsk in 1932. Accompanying his mother, a railroad surveyor, to the taiga every spring, he became accustomed to the hardships of camp life from his early years.

His best subjects in school were physics and mathematics. He attended the Moscow Institute of Engineering and Physics in 1951 and graduated with honors. His diploma work was published in a scientific journal.

As an engineer, Rukavishnikov helped develop automatic control systems. The work was absorbing but not challenging enough. He wanted to test in practice the instruments and systems he had helped to create.

Preparations for space flight started in January 1967. Tests on the centrifuge, the rotor and the vibrobench; flights with an instructor on jet planes; parachute jumping, weightlessness training in the "flying laboratory"—this and a lot more before he was approved for space flight.

The program of each space trip is crammed with complex experiments, a considerable number of them related to the physics of the Earth, outer space and near-Sun space. Rukavishnikov, who is a leading specialist in this field, was chosen for one of the crews.

He made his flight in April 1971 on the Soyuz 10 (commander Vladimir Shatalov, flight engineer Alexei Yeliseyev).

During the Soyuz 10 test flight toward the orbiting Salyut station, Rukavishnikov did an excellent job of handling all the experiments in the program.

His wife Nina is a senior technician at a machine-building plant. Their son Vladimir is nine.

THE THIRD CREW

Commander of the Crew:
Major Vladimir Janibekov

VLADIMIR JANIBEKOV is 32. He was born in the village of Iskander in Kazakhstan. Vladimir's father was a fireman, and his mother was a nurse.

After the war the family lived in Tashkent, capital of Uzbekistan, where the boy got a secondary (10-year) education. His interest in aviation, acquired early, grew immeasurably after Yuri Gagarin's flight. In August 1961 Vladimir entered a higher military aviation school. He was an excellent student and after graduation remained at the school as an instructor.

The years of teaching gave the young specialist a wealth of experience, and not only in flying. As an instructor, he got to know people with their manifold and complex attitudes and inclinations.

Vladimir is not likely to forget a group of Indian fliers who came for training. One incidental value of his work with them was that it improved his English. Evenings after flights were spent over textbooks and dictionaries.

For five years now Major Janibekov has been living and working in Stellar Town. Training, class work, flights, trips to design offices and factories, reading technical specifications—all this more than fills his day. He has a hard time squeezing in all the other things he is interested in. He is a radio ham, the prime authority on the subject in Stellar Town. He put together his own hi-fi system. He does a lot of reading on radio engineering and enjoys Shakespeare's sonnets. In the original. He knows many of them by heart. The very long and crowded bookshelves are what strike the eye first in his apartment.

He could have made a fairly good painter, too, but he rarely picks up a brush now. There just isn't time. But his friendly cartoons are a permanent feature in the cosmonauts' wall newspapers.

He is amazingly calm and collected. A flap got stuck in his plane during a training flight back at school. The situation was critical. Under the rules, Vladimir had every right to bail out. But there was a city below, so the cosmonaut-to-be landed his plane.

Janibekov's wife Lilia graduated from a conservatory where she studied choral conducting. She is a school singing teacher. The Janibekovs have two children. Olya, the younger, was born on May 15, this year. Inna, the older child, is five.

Flight Engineer:
Boris Andreyev

BORIS ANDREYEV, 34, is a native of Moscow. Before the boy learned to walk, his father, a rank-and-file infantryman, was at the front. He was seriously wounded at Stalingrad and came home an invalid. His mother has worked as an economist all her life.

As a boy Boris was very good in physics and mathematics and adept at making all kinds of mechanisms and devices. After secondary school he entered the Bauman Higher Technical School. This school has given the world many of its great scientists and engineers, including Sergei Korolyov, the creator of spaceships. Cosmonauts Konstantin Feoktistov, Alexei Yeliseyev and Oleg Makarov also studied there.

Andeyev decided to specialize in automatic control systems. He developed an interest in research as a member of the student scientific society. In his leisure time he went in for sports, track and field being his favorite.

The design office where the young engineer came to work was developing and testing elements of automatic control systems. Boris decided to learn English and took a special course in it. Five years ago, a young but already experienced engineer, he was invited to join the cosmonaut team.

In his free time Boris likes to tinker with his car. He has been driving almost from childhood. His wife is not always happy about the amount of time he spends in the garage, but she shares his interest in everything else, which isn't very surprising since she is an engineer herself and a graduate of the same college as her husband. They have two children: Dmitri, five, and Tatyana, three.

THE FOURTH CREW

Commander of the Crew:
Major Yuri Romanenko

YURI ROMANENKO, the youngest of the eight, just turned 30. He spent his childhood and youth at the seaside. But neither the books on sea voyages nor school vacations on board the ship commanded by his father, a captain first class, made a sailor out of him. He gave his heart to aircraft modeling. It was Alexander Malinovsky, an ex-pilot and a World War II hero, who, quite unintentionally, influenced the boy to forsake the sea. In 1962 Yuri entered an air force school.

One of the top graduates, he remained as an instructor. He spent three years training young pilots and, in process, logged 700 hours in the air and became an ace pilot.

But everything changed when Gherman Titov, Cosmonaut No. 2, visited the regiment. He asked Yuri "to test new techniques." There was no need to convince the young instructor that cosmonautics was the next logical step in the career he had chosen. In 1970 he became a member of the cosmonaut team. His work grew even more demanding, and most of it was not flying.

Yuri puts his whole heart into aviation, and not only at the controls of a plane but even at the bench when he makes aircraft models that can fly. Perhaps that also explains why he does well at everything he tries.

He is an ace pilot, he invariably gets the highest marks in exams in space engineering, and when he goes in for underwater spear fishing, he always gets the biggest trophy even though there are others with more experience. The explanation? Having acquired a passion for the sport, he makes it a point to read everything he can find on the underwater world, on fish and on their ways. He won't permit himself to be amateurish about anything. And he wants his son, only three now, to be like him.

Yuri's wife Alevtina is a singing teacher in a secondary school.

Flight Engineer:
Alexander Ivanchenkov

ALEXANDER IVANCHENKOV was born in Ivanteyevka, a small place near Moscow. Since his father and mother were design engineers, it would seem only natural that their son should take after them. But the continuity of family traditions usually comes from family atmosphere, upbringing. It wasn't so in this case.

Ivanchenkov does not remember his father. He was at the front from the first days of the war and was killed in a battle near Rzhev in 1942. His mother died five years later. The boy was brought up by a grandmother and an aunt.

He was a very serious child. It may be that children who have tasted sorrow too early mature quickly. Whether that is true or not, the boy happily combined a gift for mathematics and physics with diligence.

When he entered the aircraft department of the Moscow Aviation Institute, he joined the student scientific society, where he designed systems for sports planes and gliders.

After the institute he worked in a design office, did engineering computations and studied programming and computers. Ivanchenkov moved ahead quickly as an engineer.

Invited to become a cosmonaut, Ivanchenkov appeared before a medical board. The first comment, on sight, was, "You'd do better to ask for a voucher to a sanatorium, young man. . . ." And, indeed, he always looks rather fatigued, though his health is to be envied.

His choice of sports makes his doctors and cosmonaut instructors unhappy. Mountain skiing may be all very well, but who needs a cosmonaut with broken ribs or ankles?

Ivanchenko has to work more than the other men assigned to the joint Soviet-American flight. He studied German rather than English at school and at the institute.

His wife Rimma is an internist. She has completed a graduate course at the First Medical Institute and will be defending her candidate's thesis. Tanya, the youngest in the family, is six.

Alexander Ivanchenkov (left) and Yuri Romanenko.

THE CRACK IN THE WORLD PASSES THROUGH THE POET'S HEART

By Inna Kashezheva

Inna Kashezheva is a poet, author of five books, winner of a literary prize. A recording of her poems was bought up almost as soon as it was placed on sale. Her poems have been translated into English, French, German, Japanese and other languages.

THE EVENTS of the twentieth century have canceled out the ivory tower concept, the anemic image of the poet as an unearthly recluse. But this certainly does not mean that our age of competition between two systems, two ways of life, has encroached upon the mysteries of the creative process, the artist's isolation.

It is simply that the meaning of this condition has changed.

It was clearly defined by the Soviet poet Mikhail Svetlov: "What is an artist? He is solitude arrived in the collective." In the larger sense, by collective we mean the society which has produced the writer and whose ideals he serves.

The lonely garret with its flickering candle has receded into oblivion. But unfortunately the concept of the garret has remained, or, rather, been absorbed into a new idea: the separation of the artist from society. It is characteristic of some trends in Western literature. Is not divorce from, or the distortion of, reality an attempt to make the artist's lack of ethics look fashionable? Isn't so-called pure art merely alienation? I like Heine's approach better: "The crack in the world passes through the poet's heart."

The twentieth century, by reducing dis-

tances, has added a perception of the planet to our perception of our native land. It has also increased our feeling of responsibility for the world, our recognition that ethics are the province of the writer. Isn't that why publicistic literature—the search for objective truth—is becoming more and more popular?

I have always been more interested in why poems are written than in how they are written. Is the poet thinking of the past or the future? Alexander Blok, who told the intelligentsia to "hearken to the revolution," called the poet a "son of harmony." Indeed, according to the laws of evolution, the physical world strives for perfection. Similarly, poetry is an emotional seismograph of the spiritual development of society, and the apogee of this development is harmony, social harmony. Poetry, as we see it in the USSR, should not only create a particular world out of the natural and ethical environment, but should make this world a crucible in which everything interfering with the development of the new human being is rejected. Pushkin demanded that the poet "sweep the rubbish off the street." This same idea was used by Mayakovsky to express the spirit of his turbulent times: "I am the nightman and water carrier mobilized and summoned by the Revolution."

Rather than interfering with the poets' creativity, this approach tunes them with the most sensitive of tuning forks—the needs of their contemporaries.

It turns the confusion of sound into poetry, reflecting the readers' own thoughts, experiences and aspirations. This is the kind of art that unites people. All the events of an era, large and small, are concentrated in its poets: They are the accumulators of reality and the transformers of time in its three dimensions: past, present and future. The fourth dimension is the result: the poet's work. But creativity is not enough: the results must be genuine. Particularly for poets, untruths or, what is still worse, distortions, are a betrayal of their time.

With their first clumsy drawings, children try to express themselves. Whether they will draw an amusing animal or a monster depends on the concept of life they have been taught.

Thus literature, and in this specific case, poetry, mediates between the individual and society, between the inner world of humans and their environment. Spiritual integrity and civic consciousness are, I feel, the creative compass of today's poetry.

Every line shows the imprint of the writer's world outlook, so that literature is actually the personal beliefs and emotions of the readers returned to them. But while poetic inspiration makes it possible for one person to move thousands of others, there are not thousands of truths. And because truth is one and indivisible, the deceitful artist is always rejected.

At this point the question arises: What is truth?

For me it is synonymous with humaneness, with goodness in the broadest sense of the word, which sometimes includes Hamlet's "I must be cruel, only to be kind." Truth is not frivolous, it is an incisive probe of the very essence of life. Because they are aware of this, contemporary Soviet writers use their creativity for the sake of the people, the ethics, the society of the future.

PRAVDA PHOTOGRAPHY COMPETITION OPEN TO ALL

WE HAVE BEEN ASKED by the editors of the newspaper *Pravda* to announce PRAVDA-74, a new international amateur and professional photography competition. The idea of the contest is to record in photographs characteristic features of our times, the creativity and militancy of people today and the major events of the year.

The editors hope to receive photographs whose themes will be the people's struggle for peace and social progress and the joys, concerns and aspirations of today's worker.

The winners will receive the following prizes:

FIRST PRIZE—A TWO-WEEK TOUR OF THE SOVIET UNION
SECOND PRIZE—250 RUBLES
THIRD PRIZE—THREE ZENITH-B CAMERAS (OR EQUIVALENT PRIZES VALUED AT 100 RUBLES EACH)

Additional prizes of 150 and 100 rubles will be awarded for each of the following categories:

PORTRAIT OF OUR CONTEMPORARY
PHOTOREPORT FROM THE SCENE OF AN EVENT
MAN AND NATURE
SPORTS

There will also be special prizes of 150 rubles each for a photograph or a photoreport on the following subjects:

WE ALL NEED PEACE
FOR DEMOCRATIC RIGHTS, FOR SOCIAL PROGRESS

Participants may send in as many photographs as they wish. The most interesting of them will be published in the newspaper.

Entries must be black and white prints of any size, but not less than 18x24 centimeters.

All entries must include the title of the picture, the date it was taken and the photographer's last name, first name and address.

Photographs must be received by December 1, 1974. They will not be reviewed or returned.

Send all entries to

PHOTOCOMPETITION
PRAVDA EDITORIAL OFFICE
24 PRAVDA STREET
MOSCOW A-47

Around the Country

TURISHCHEVA WINS ANOTHER GOLD MEDAL

The USSR Gymnastics Championship was held recently in Rostov-on-Don. Lyudmila Turishcheva, world and Olympic champion, won the title of all-around champion of the Soviet Union. Olga Korbut won the silver medal and Nellie Kim, a schoolgirl from Chimkent, Kazakhstan, took the bronze medal.

USSR-FRANCE SPACE EXPERIMENTS

Soviet and French scientists are doing joint research on the planets and space meteorology, space communications and geodesy, space biology and medicine.

At the end of 1974 or the beginning of 1975, geophysical probes will be launched in accordance with the joint Arax program from France's Kerguelen Island in the Indian Ocean. This time circumterrestrial space will be explored by a French probe. Devices designed by Soviet scientists will discharge flows of electrons into the Earth's magnetosphere. These electrons will be captured by the magnetic field of our planet and will run along its lines of force. A group of Soviet and French scientists will be watching their behavior from a station in Sogra, a settlement in the North European part of the USSR. (Kerguelen Island and Sogra are magnetically conjugated points of the globe.)

MOUNTAIN CANAL

Construction of an 80-mile irrigation canal has begun

YAK-42 JETLINER

A new jetliner is taking shape at the design bureau headed by Alexander Yakovlev, twice Hero of Socialist Labor and Lenin and State Prize winner.

The tendency till recently was to design heavy and superheavy jets for long-distance travel and to service local airlines with comparatively small piston-engine planes like the American Douglas DC-3 Dakota. The YAK-40, the first passenger plane of its class in the world, brought the jet aviation age to local airlines.

The YAK-42 looks very much like its predeccessor, the YAK-40. It has three engines—two on the sides and one inside the fuselage —and the same high-positioned stabilizer. The wings are closer to the tail, but unlike those in the YAK-40, they are swept, not straight. The new plane's normal flying range is 1,100 miles, and its maximum 1,700 miles. The cabin has 120 seats in rows of six, with an aisle down the center. Passengers will waste no time on the ground waiting for their baggage, they will take it with them. Provisions are also made for containerized freight. An important feature of the new plane is its independence of ground services: It even has its own built-in ramps, one inside the tail unit, the other alongside the pilots' cabin. The crew consist of just two people, and fuel consumption is very low.

The YAK-42 can be used in a variety of climatic zones.

RED SQUARE RENOVATED

The reconstuction of Moscow's Red Square is under way. Its pavement needs repair: In the last 40 years the basalt cobblestones have sunk in some spots and bulge slightly in others. The present sand bed is being replaced by a concrete one in which new stones will be set.

UKRAINIAN GINSENG

That famous specimen of Far Eastern plant life, ginseng, also known as the root of life, can be grown in the Ukraine. The

ALBINO FROGS

Rare white frogs are being bred at the USSR Academy of Sciences' Institute of the Biology of Development. They derive from mutant tadpoles. Several generations of albino frogs have already been bred.

Apart from their scientific interest, the albinos have practical value: They are better for experimental purposes, since all pigmentary factors are excluded.

OLD CITY IS FOUND

Specialists consider this discovery sensational: a city in the Eastern Pamirs at an altitude of more than 13,000 feet, where historians thought there had never been any permanent settlements. Manuscripts found in its stone buildings date back to the tenth and twelfth centuries. The alphabet is Arabic, the language Pharian-Tajik, which means they were written by Tajiks, the ancestors of today's Pamirians.

Archeologists have established that for two centuries the city mined silver and maintained close commercial and diplomatic relations with neighboring Afghanistan, India and Iran.

The lost "silver" city left behind considerable evidence of the way of life of its inhabitants. The temple in its center has a fire sanctuary, proving that the Pamirian Tajiks were fire worshipers until the twelfth century, when they adopted the Moslem faith.

NONPOLLUTING TANKER

The *Krym*, a 200,000-ton tanker built in the USSR, has been launched in the Black Sea. It has a speed of 17 knots and is the world's fastest tanker of its class. Despite its size (about 1,000 feet by 150 feet), the ship has good maneuverability.

The designers paid special attention to fireproofing. For this purpose and, at the same time to

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oskva (Moscow), won
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ernational competition

ARCTIC AMBER

A large new amber deposit has been found in the Arctic tundra, on the Yugor Peninsula. A thick seam cropped out on a sandbank of the Peschanaya River.

Grains of amber, which is widely used in the pharmaceutical, perfume and paint industries, have been turning up along the Arctic coast for some time, but this is the first real deposit. Specialists say it is between 50 million and 100 million years old.

VILLAGE OF STONECUTTERS

A fairy tale gnome and a shepherd blowing his pipe, a little bear on a birch stump and a Russian warrior are some of the creations in stone by Anatoli Ovchinnikov, a young Ural sculptor.

Ovchinnikov's village, Krasny Yasyl in Perm Region, is located near a quarry where calcite, talcochlorite and anhydrite are mined. This soft rock is excellent for carving. Most of the villagers are stonecutters.

POWER PLANT ON A VOLCANO

Soviet scientists have worked out plans for an electric power plant that will operate on subterranean thermal energy. The first such plant will be built on a volcano on the Kamchatka Peninsula (Soviet Far East). The temperature of the molten rock here, at a depth of 11,000 feet, is some 600° Centigrade.

Several wells will be drilled into the volcano's slope. They will merge at a point where a kind of fire-breathing boiler will be created by means of several powerful explosions. Water from a neighboring river will be directed into this "boiler" and converted into steam, which will turn a 300,000-kilowatt turbine.

The new power plant will not only generate industrial electricity but will heat the peninsula's administrative center, Petropavlovsk-Kamchatski, and adjacent areas.

BRIDGING THE AMUR

A railway bridge across the Amur is under construction near Komsomolsk, a town in the Soviet Far East. It will connect the Trans-Siberian line with the coast of the Tatar Strait.

This project is unique. The Amur differs from rivers in the European part of the USSR and Siberia: It is much deeper and subject to severe flooding. For the first time in Soviet bridgebuilding, the steel supports were erected atop ferro-concrete pipes,10 feet in diameter. The pipes were anchored in holes bored into the bottom rock and filled with concrete.

demonstrated by scien-
g at the State Medical
on near Poltava.
was planted there 15
nder conditions closely
those in its natural
e first crop indicates
adapted well to the
climate. The medicinal
of the experimental
as good as those of
tern variety, and they
ears less to mature.

EK PRESERVE

preserve in Uzbekistan's
-Tau Mountains, on an
almost 100,000 acres,
rgali (mountain sheep),
marten and the Leba-
whose venom is used
al preparations.
g Uzebekistan's nine preserves are several rare animals listed in the Red Book of the Intertional Union for the Conservation of Nature and Natural Resources —the Bukhara deer, the caracal and the red wolf, among them.

THE EARTH IS OLDER

Leningrad's scientists have made a discovery that revises traditional conceptions of our planet's geological past. In Enderby Land, the Antarctic, they collected rock specimens which, analysis shows, are four billion years old. The most ancient mineral formations known until now were 500 million years younger. Scientists believe that the specimens just found crystallized during the first stage in the formation of the Earth's crust and can therefore provide imporant data on the planet's history.

At the same time the discovery is additional proof of the hypothesis that the Antarctic was the core of the prehistoric supercontinent Gondwanaland, which, scientists think, broke up to form the continents of the Southern Hemisphere.

STUDYING ENGLISH IN A KAZAKH VILLAGE

A specialized secondary school where the main subjects are taught in English has been opened in Uzangach, a village in Kazakhstan.

Use is being made of audio-visual aides: records and television. Reading material includes books, newspapers and magazines published in English. As extracurricular activities the students put out a school newspaper, broadcast from the school radio station and arrange get-togethers in English.

ANCIENT JUNIPER

A giant thousand-year-old juniper is growing in the small village of Tim, in the Zaravshan Valley, Uzbekistan.

The plant life of Uzbekistan includes over 400 species of trees and shrubs. Many of them—the Oriental plane, the smooth-leaved elm, the mulberry tree and the juniper—survive for centuries. In Bukhara, for instance, there are several 350-year-old mulberry trees.

The Nature Protection Society of the Uzbek Republic has for several years been keeping a record of long-lived trees and other valuable specimens of Uzbek plant life. Special state preserves and forests are being established to protect them.

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rt gas prevent the for-
explosive mixtures, and
is a double bottom.
d tanker of similar de-
arger, is already being
new ship will be able
00,000-350,000 tons of

JUNIOR
S CHAMPION

s of Nona Gaprindash-
d champion, and Nana
contender for the title,
to chess players all
orld. Add a new name
also Georgian: Maja
ze, a 13-year-old sixth
n Tbilisi.
he youngest chess player ever to win the title of Master of Sports. Her father is an agronomist and her mother a teacher. Maja was very young indeed when she first joined a chess club in the Palace of Young Pioneers and Schoolchildren. In 1971, at the age of 10, she won the Georgian girls' championship and took fifth place in the republic's women's championships.

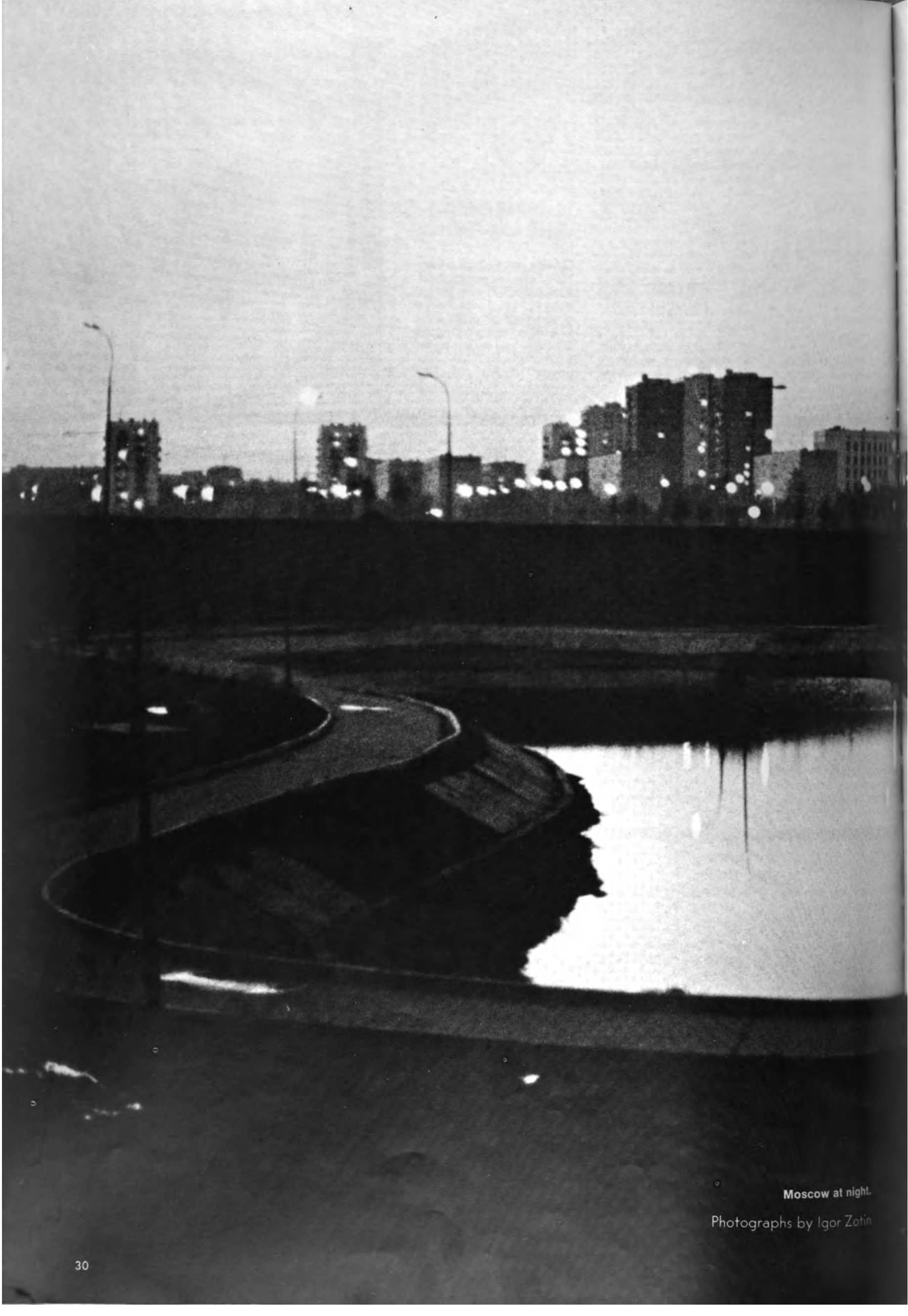
COBRA VENOM ANALYZED

Working with colleagues from Moscow, Uzbek scientists have analyzed the venom of the Central Asian cobra, one of the most dangerous snakes. It was found to be a protein differing from others in the pattern of its amino acids.

At the same time, the researchers discovered how cobra venom works. It affects connections between nerves and muscles, thus blocking the passage of impulses from the brain. Now that they know the structure of the venom's molecules, scientists hope to produce more efficient antivenins. This is good news since according to the World Health Organization, nearly half a million people suffer from snake bites every year; some 30,000 to 40,000 are fatal.

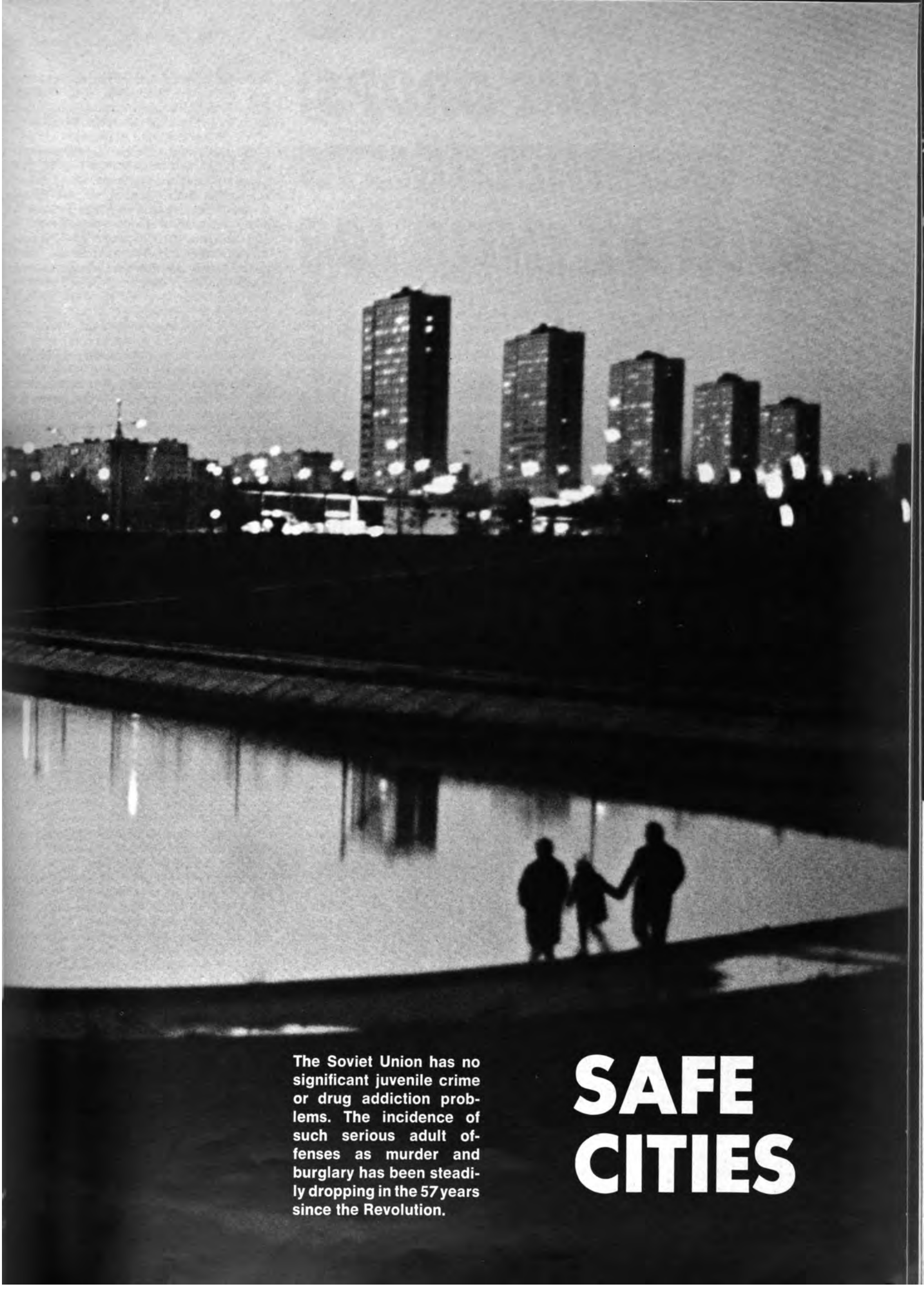
MUSEUM IN THE WOODS

An unusual picture gallery has been set up in the Lettish village of Kaive, in the wilderness of the Baltic coast. The population consists of some two dozen families, mostly foresters. They are the originators of the exhibition, which attracts people from different towns of the republic. Exhibits in the museum are changed every six to eight weeks. They come from the mobile collection of the Lettish Museum of Arts.



Moscow at night.

Photographs by Igor Zotin



The Soviet Union has no significant juvenile crime or drug addiction problems. The incidence of such serious adult offenses as murder and burglary has been steadily dropping in the 57 years since the Revolution.

SAFE CITIES

CRIME DROPS: CRIMINOLOGISTS LOOK AT THEIR JOB

By Alexei Flerovsky

THE NAME PLATE reads: USSR Research Institute for the Causes and Prevention of Crime. I am at the entrance to a five-story building on the corner of Zvenigorodskaya, a quiet Moscow street.

I talked to the deputy director for research, Vladimir Zvirbul. He suggested that a visit to the institute's various divisions would give me an over-all idea of what they were doing; we could then have a talk together.

"Begin with Professor Sakharov," he said.

Current Trends

Alexander Sakharov heads the division that analyzes the present state of crime and its trends. There crime prevention principles are hammered out.

"What are current trends as your division sees them?"

According to Professor Sakharov, crime in general in our country is steadily decreasing. The percentage figure for serious crimes—murder, rape, assault and battery and burglary—has also been steadily dropping over the years of Soviet power. The number of repeated offenses is likewise on the decrease.

His general conclusion is that the downward trend will continue. A number of significant changes, he points out, have been evident in recent years.

"Would you be specific, please."

"Take, for instance, the data the institute received from Estonia. In the last two years murders have dropped by 38 per cent, attacks involving serious bodily injuries by 24 per cent, rape by 17 per cent (40 per cent over the last five years) and cases of persistent hooliganism by 50 per cent.

"The Estonian example is typical of the entire country," he went on to say, "give or take minor differences."

"What does the institute conclude are the causes of crime?"

"Now that is a complicated question," the professor replies. "There is no one single cause but a complex of causes, the interaction of various social factors in different areas and at different levels—everything that makes for the continued existence of crime as a social phenomenon and the commission of concrete crimes."

"True, but what, specifically, are the causes?"

"Well, let's start out with those we have eliminated. The experience of Soviet criminologists over a great many years has confirmed the fact that, with very few exceptions —this conclusion is based on statistics—no crimes are committed in the Soviet Union because of poverty, destitution and social inequality. In other words, the root causes of crime have been eliminated. This is as obvious a fact as the eradication of organized professional crime in our country."

This last statement by Professor Sakharov warrants a short historical digression.

In the twenties, the militia waged an unremitting war against professionals of the underworld in Moscow, Leningrad, Rostov and other big cities. That is one of the reasons today's detective story writers turn to that period for gripping plots and hair-raising situations (chases, shootings and the like). By the mid-thirties organized crime had been done away with. Thanks are due not only to the skill and organization of the militia. The roots and nutriment of professional crime—unemployment, homeless children and glaringly disparate living standards —had been dug out and destroyed. Another reason, and an important one, for the militia's successful efforts was socialist society's moral climate, the Soviet people's intolerance of parasitism.

The militia, of course, still had to deal with lawbreakers for whom robbery had become a trade. But it was a fight against lone operators. Organized crime had become a thing of the past.

Social Conditioning

However, to return to the causes of present-day lawbreaking. According to Professor Sakharov and his colleagues, many instances of violations of law are the result of certain objective living conditions and of shortcomings in education.

Sakharov does not try to argue away certain negative consequences that come with present growth rates resulting from scientific and technological progress. But he is not inclined to give too much weight to accelerated growth as a cause of crime.

For instance, we know that every year no less than 15 to 16 million people migrate from one part of the country to another. A considerable fraction heads for the new cities that grow up around big construction projects. Professor Sakharov and his assistant Mikhail Babayev, a criminologist and demographer, suggested that we consider a typical situation. Several thousand workers of different ages and skills (many to be employed on auxiliary jobs) come to a large construction project from different parts of the country. Difficulties of adaptation, a certain estrangement caused by the severing of former ties, may increase violations of the law. But that readjustment doesn't last long. As the collective of workers stabilizes, as the mass organizations—party, trade union and YCL—start functioning and various forms of social organization take hold, the situation changes for the better, of course.

"Would you give some examples?"

"Togliatti, which is in the middle reaches of the Volga, and Naberezhniye Chelny, between the Urals and the Volga, where large automobile plants are going up, and cities in the Tyumen Region in Western Siberia under intensive industrial development," says Babayev. "The population of Naberezhniye Chelny, for example, more than doubled over the last few years, but the militia has not increased. In fact, there is even less crime there than in our old cities."

Juvenile Delinquency

Professor Genrikh Minkovsky heads the juvenile delinquency division. In many Western countries crimes by young people present the most explosive problems, according to criminologists at a recent international congress in Belgrade. A three- to five-fold increase in teenage delinquency, as compared to the last prewar year, is a typical index; the same figure persists in its place in over-all crime.

What do the reports of Soviet criminologists have to say in this regard?

As of 1940 the number of offenses by 14- to 17-year-old lawbreakers dropped by no less than a half. The figure remains stable and does not exceed 9 to 12 per cent of all crimes. Only two to five per cent of the offenses are committed by girls. The percentage of recidivism is three times lower than that of many Western countries.

There is no problem of youth gangs of a permanent criminal structure nor of drug addiction in the Soviet Union.

These are the facts. What about the conclusions?

According to Professor Minkovsky, ours differ fundamentally from Western criminologists' long-established views on juvenile delinquency. Some hold, for instance, that there is an automatic and, hence, inevitable connection between levels of urbanization and the incidence of juvenile crime in any society.

But the results of studies conducted by this division over the last 10 years in Moscow, Leningrad and Kiev show these cities growing, yet the number of juvenile violations is dropping: in Leningrad, for example, by 40 per cent. This figure is one indication of the effectiveness of the crime prevention program (with emphasis on early prevention), a state and mass organization joint effort. The complex of general and special measures employed included setting up a network of teenage-interest clubs, summer camps and schoolchildren's production teams supervised by skilled and qualified workers.

No Incorrigibles

The Soviet criminologist also has a different approach to the personality of the lawbreaker.

Genrikh Minkovsky likes to quote the well-known Soviet educator of the thirties, Anton Makarenko: " 'There is no standard lawbreaker. There is a normal teenager who finds himself in abnormal conditions.'

"It is no good looking for the roots of

crime in biological, psychological and age factors," said the professor. "All young people share the same age grouping, but only a few take to crime. An optimistic social outlook and purpose distinguish Soviet youth. That is why the overwhelming majority of our teenagers quickly and painlessly assimilate our standards of social behavior, the values of socialist society.

"We reject the concept that crime has its origins in the sexual pathology sphere and the aggressiveness of youth, as we often hear. When all is said and done, crime is always the deformation of a specific individual caught in unfavorable circumstances.

"Peculiarities of age and personality may play the role of catalysts, but they are never the primary cause of unlawful behavior. That is why a system of preventive measures cannot be based on arbitrary medicopsychological diagnostics divorced from the living conditions, education and upbringing of the young lawbreaker. Such diagnostics can serve only as an auxiliary aid in probing an individual's behavior."

Professor Minkovsky and his colleagues define four groups of juvenile delinquents, each with certain distinguishing features:

1. The juvenile's personality is oriented toward lawbreaking and actively seeks a criminal situation (from 10 to 15 per cent of the total number of juvenile delinquents).

These require special attention. But the conviction of Soviet criminologists that there are no incorrigibles holds even for this type.

2. A primarily antisocial orientation. Inclined to pass the time aimlessly. Becomes criminally involved by "sailing with the current" (30 to 40 per cent).

A radical change of environment and living situation are called for here.

3. An unstable personality, subject to "conflicting aims and motives," influenced by both a positive environment and antisocial elements (25 to 35 per cent).

Can be reformed by strengthening the influence of the positive environment.

4. On the whole a personality with a positive orientation, commits a crime accidentally, most frequently because of ignorance of the law (25 to 35 per cent).

This classification would seem to assume specific types of punishment. Practical experience confirms the value of replacing the conventional penalties with compulsory educational measures for more than 20 per cent of the delinquents. And of those who are tried, another 30 per cent are given a suspended sentence (so-called conditional conviction) and are not deprived of their liberty.

Strict control by the proper collective and one-to-one supervision by the militia and court are combined with efforts to draw such teenagers into cultural and social life, at the same time trying to change or channel their interests.

"We do not want to isolate difficult youngsters from their peers and put them into a kind of special group, as is done in some Western countries," Professor Minkovsky noted. "What they need is the businesslike atmosphere of a collective of working people with well-organized educational facilities. For instance, the inclusion of difficult teenagers in student building detachments has been completely successful."

And one more complex problem the criminologists of this division have to deal with: shortsightedness in bringing up children.

There are any number of small families (those, say, with a single child) in which the paragon is pampered with expensive gifts, the satisfaction of every whim and caprice, other indulgences. The child becomes selfish and self-seeking and can easily fall into antisocial behavior.

What are the practical recommendations?

The professor holds that all parents, without exception, should have pedagogical training, the kind, of course, depending on their age, educational background and other relevant factors.

These courses for parents have already started in some large cities. Still experimental, they are being taught by educators and criminologists.

Forms of Public Control

Public control, according to Vladimir Kriger of the Division for Cooperation with Mass Organizations, utilizes to the fullest extent possible the system of social ties that has taken shape in socialist society in the job of fighting crime. "With prevention having priority over repression," as a senior researcher of the division put it.

Vladimir Kriger is now classifying the specialized forms of public control and assistance. Let's look into some of them.

Comrades' Courts. These go back to 1917. The judges, elected for two-year terms by general meetings of workers at factories and offices, are those workers who have earned the respect and esteem of their fellow workers. Comrades' courts try lawbreakers for minor offenses. The trials are open to the public, and public censure is an important element. Practice has shown that more than 80 per cent of those who appear before comrades' courts do not break the law again, certainly a good measure of their effectiveness. Coincidentally, it should be noted that Soviet law demands that comrades' courts strictly observe the defendant's rights.

Commissions for Minors. These bodies, set up by the Soviets of Working People's Deputies, are comparatively few. Their function is largely preventive. Difficult youngsters are assigned individual sponsors.

Public Responsibility and Education. For a minor misdemeanor, the court may suspend sentence at the request of a mass organization; the fellow workers of offenders assume responsibility for their behavior and re-education. The court here holds that public censure and influence are sufficient for achieving correction.

Supervisory Commissions. This is a form of public control over corrective labor institutions. Collectives of industrial enterprises frequently assume sponsorship, helping the institutions to set up facilities for work education.

Volunteer People's Patrol. The first volunteer group to keep public order was organized at Leningrad's Kirov Plant in 1958. Similar squads soon appeared in many other cities, thus developing into mass organizations for public order. There are 170,000 volunteer people's patrols in the country, with over six million members. Their job is to help the militia in streets, stadiums, parks and other public places. They patrol and make spot checks.

Councils for the Prevention of Law Violation. This is the newest form of public control and public assistance, but the councils have already earned a reputation for good work. Made up of deputies to District and City Soviets, representatives of mass organizations, public procurator's offices and the militia, they coordinate the efforts of various crime prevention agencies.

There are, then, many different forms of public control, but they have one thing in common—public pressure is brought to bear, not just for punishment but primarily to reform and re-educate the lawbreaker.

Can Crime Be Controlled?

And finally a talk with the institute's deputy director for research. Professor Zvirbul's special area is forecasting and controlling crime.

The term control with reference to crime may seem strange to the reader. There is a widespread idea that there are limits to what society can do with the chaos of crime: that it can restrain it, keep it below the critical point.

Soviet criminologists believe that the process of combating crime can be positively controlled by using the advantages of the socialist system, its economic and social planning. What they have in mind is not only a program of special measures to fight crime but an entire complex of measures—economic, social and psychological—to do away with the roots of crime.

Under socialism we can direct production, transform society, shape culture, all through centralized planning. Socialism can not only activize positive social processes, it can also root out negative phenomena.

According to Vladimir Zvirbul and his colleagues, purposeful work in crime prevention and the eradication of conditions leading to criminal acts are an integral part of social development in a socialist society.

Theory Plus Practice

These are not just theories dreamed up by criminologists but conclusions based on practical experience.

According to Professor Zvirbul, the institute's scholars are working on long-term social development plans which are being adopted on an enterprise, city, region, republic and countrywide scale.

The effectiveness of the preventive measures criminologists propose depends to a considerable extent on how deeply their analysis probes the social processes which, directly or indirectly, lead to the decline of crime. The professor holds that the simple extrapolation of facts, a method widely employed by Western criminologists, cannot ensure the reliability of long-term prognosis. All the processes, phenomena and factors which influence crime must be studied in their entirety and interconnections.

The institute has a reputation for comprehensive research and a systematic approach to problems. The backgrounds of its 300 staff members are imposing: Twenty hold doctor's degrees and 70 are candidates of science. It is not surprising that the USSR Academy of Sciences gave the institute this important job: to coordinate the research of 170 criminological laboratories functioning in various parts of the country.

QUALIFIED FOR MILITIA SERVICE: THE MOSCOW MILITIA SCHOOL

By Yuri Nekrasov

Courage, patience, self-discipline, a concern for people. These are some of the qualities the militia school looks for in its applicants.

A LIGHT flashes on the control panel. The alarm goes off.

"Group ready at the exit!" resounds the order.

In a matter of seconds, the yellow and blue Volga is racing along the highway with its siren sounding. Its destination is a warehouse on the outskirts of the city whose door has been broken open. The trail is still fresh, and after a short pursuit the criminal is overtaken.

The lights went on in the room. I had been shown an excerpt from an instructional film for students at the militia school.

The man who had arranged the showing grinned.

"The alarm, the chase, the revolver knocked out of the thief's hand. Everything that detective story fans look for!"

But there was sarcasm in Lieutenant Colonel Yuri Grechaninov's tone. The deputy head of the Moscow militia specialized secondary school was saying that those who are attracted to the service by the promise of adventure are the first to be sifted out.

A number of methods are used to help us explore a person's suitability for the police force.

The lieutenant colonel pushed toward me a pile of records of students chosen in 1973. I leafed through them. The most interesting entries were the references.

—Turner. Worked at the Manometer plant in Moscow. A reliable friend. A good athlete. Member of the volunteer people's patrol.

—Driver. Learned to drive in the army. Quiet and helpful. Active in community affairs. Editor of a wall newspaper. Member of the volunteer people's patrol.

—Secretary. Shows initiative. Attentive, thorough. Reads a great deal. Member of the volunteer people's patrol.

It was by no means accidental that in each short reference membership in the volunteer people's patrol was mentioned. While this is not an entrance requirement, it does reenforce the decision the school has already made. Naturally, someone with experience in the patrol is already familiar with some of the basic principles of a militiaman's job.

All applicants must have a secondary education, and young men must have served in the army. The average age of entrants is 22 to 24. According to Grechaninov, this is the best age because the student, while still young, is already capable of mature decisions.

"All the same, probably not all the people who apply are sure they've made the right choice?"

"Not all of them," agrees the lieutenant colonel. "But only about four or five per cent drop out."

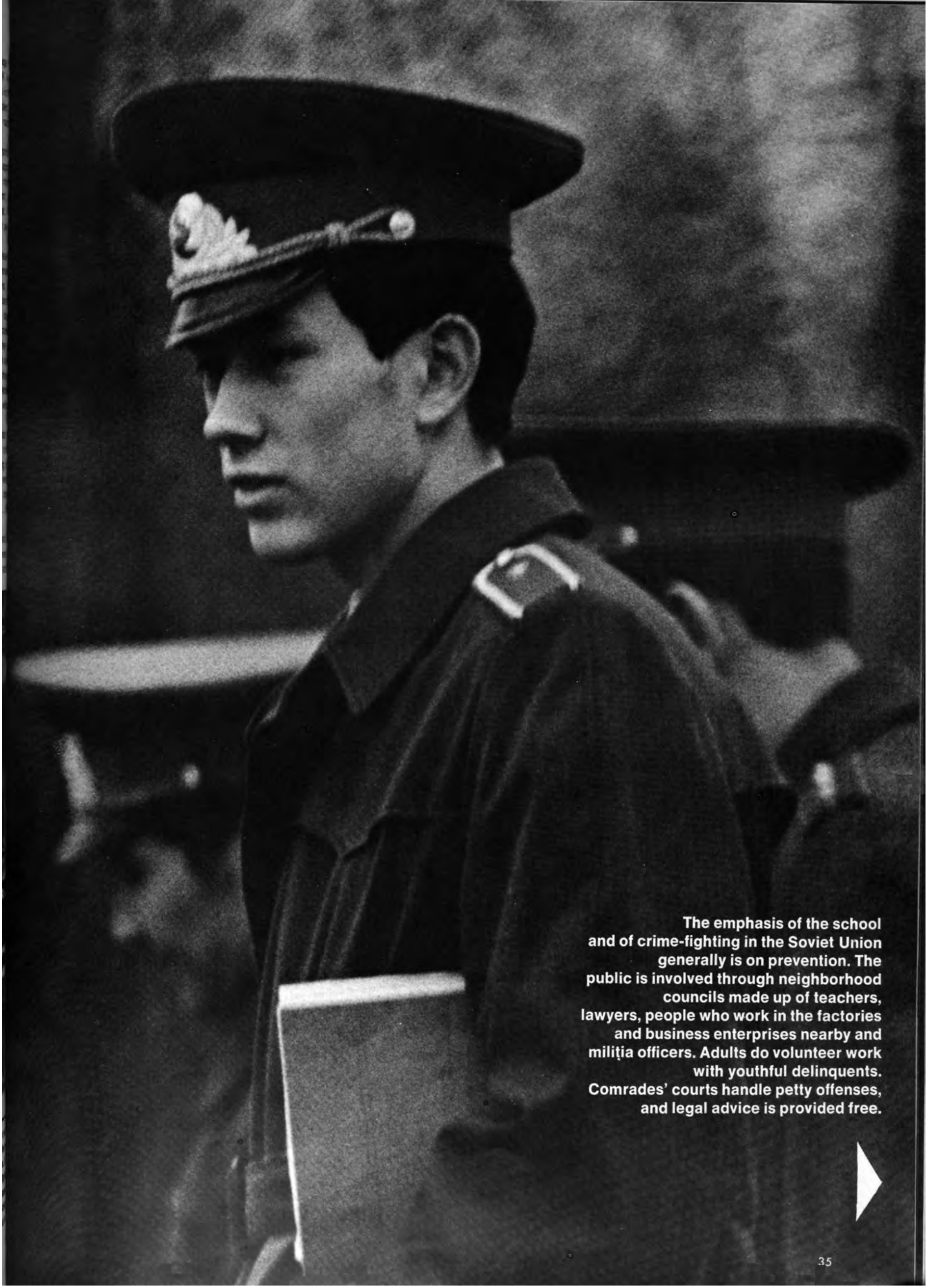
Why do they leave? Judging from his own observations, there are three reasons. Some are looking for adventure and find a lot of rather dull detail. Others are not up to the course of study. Still others find they have traits of character which are not suitable for the profession. They might be quick-tempered, for instance, or act without thinking.

Grechaninov listed these criteria for an officer in the militia:

An understanding of duty, implicit in the oath every student takes: ". . . to be honest, brave and disciplined, . . . to observe socialist law."

An analytical mind. Not just the ability, but the need, to study, compare, analyze and come to

A future militia officer puzzles out a problem in one of the crime detection laboratories. Left: A class in sound recording. Opposite page: Mikhail Baikov, 24, passed the entrance exam for the militia school last fall. Before then he worked in a factory.



The emphasis of the school and of crime-fighting in the Soviet Union generally is on prevention. The public is involved through neighborhood councils made up of teachers, lawyers, people who work in the factories and business enterprises nearby and militia officers. Adults do volunteer work with youthful delinquents. Comrades' courts handle petty offenses, and legal advice is provided free.

the very best possible decision.

Patience, a concern with people.

The course at the school is arranged to elicit and develop these qualities of the good militiaman.

Trackers

Let us begin with the ability to compare and analyze. Lieutenant Colonel Semyon Potashnik, who teaches crime detection, is a specialist with 13 years' experience in the field and has earned his candidate's degree in law. He has a related interest, you might call it a professional hobby: locks, or to be more precise, the traces left on broken locks of every possible kind. Potashnik's book on the subject is a reference guide for experts.

It was after seven o'clock in the evening, but the lights were still burning throughout the school.

"Classes end at six. This is homework time," explained Lieutenant Colonel Potashnik.

Students, particularly those studying crime detection, have to master a curriculum much like that of a school of higher education in two years. This is besides the practical work. The ratio of theory to practical work is approximately three to one.

Evenings the student crime detection experts sweat over their homework. They check a scrap of a document under the microscope, identify types of handwriting or study the characteristic marks left by bullets from various weapons. They compose a verbal portrait; they develop photographs and movie films.

The school is well equipped—all the latest Soviet devices and many foreign ones from the test units of our various crime detection services.

Potashnik thought, by the way, that the investigations made by our state institutions, working in close contact with one another, are better organized than in Western countries. The expensive equipment of our state laboratories, he pointed out, is not always available to the private laboratory.

The examinations that the future crime detection experts take begin the process of elimination as early as the first year of study. I was shown machines that looked much like the information devices in subway stations. You press the button, and a screen lights up giving you the route you need with all the stops. But here each button had its own inscription: "traces of the weapon," "handwriting," "housebreaking." In short, a kind of mechanical pony. The teachers not only evaluate what students have learned, but how quickly and accurately they can apply it.

The student's growing skill is tested at practicals. Probably no store anywhere has been subjected to as many attempted crimes as the simulated grocer's shop at the school. Its stock is a variety of attempted burglaries and other criminal offenses. Every clue is tracked down. If the students lack the skill, the teacher finds the clues and explains what led him to them.

After eight weeks in the crime detection laboratory the students take five final tests built around actual crimes.

Then, with brand-new lieutenant's shoulder straps, they leave the school.

"Our experts are in great demand," says Potashnik, "because the work of the militia is becoming more complicated from the technical point of view. Our school is 25 years old now and has built itself a fine reputation. Its graduates are in great demand. Judge for yourself. Two of our experts who graduated in the late fifties are now colonels."

The Key Figure

The militia school also trains inspectors for the regional criminal investigation departments, inspectors for the special service to combat theft, and

One of the requirements for graduation is a mastery of sambo wrestling. It does the job even with armed criminals.

From top:
A squad prepares for a training mission. Practical work is a major part of the course of study.

Vasili Ivanov, a freshman, will soon have to make an independent analysis of an actual crime. He is checking through fingerprint textbooks in preparation.

The entrance requirements are the same for women as for men, with the exception of army service. Most applicants develop an interest in the militia as members of the volunteer people's patrol.

Student brass band.

just plain divisional inspectors.

Lieutenant Colonel Semyon Markvitchev obviously did not like the "just plain."

"Divisional inspector," he explained rather brusquely, "is a job for which we recommend only the best people." From the very first day, he and the other teachers gradually take the measure of the students, size them up as possible divisional inspectors. Everything counts, their cultural background, personality, and especially how they relate to people.

Twenty years ago Markvitchev began as an ordinary militiaman, and he knows how essential such experience is.

This is what Markvitchev covers in class:

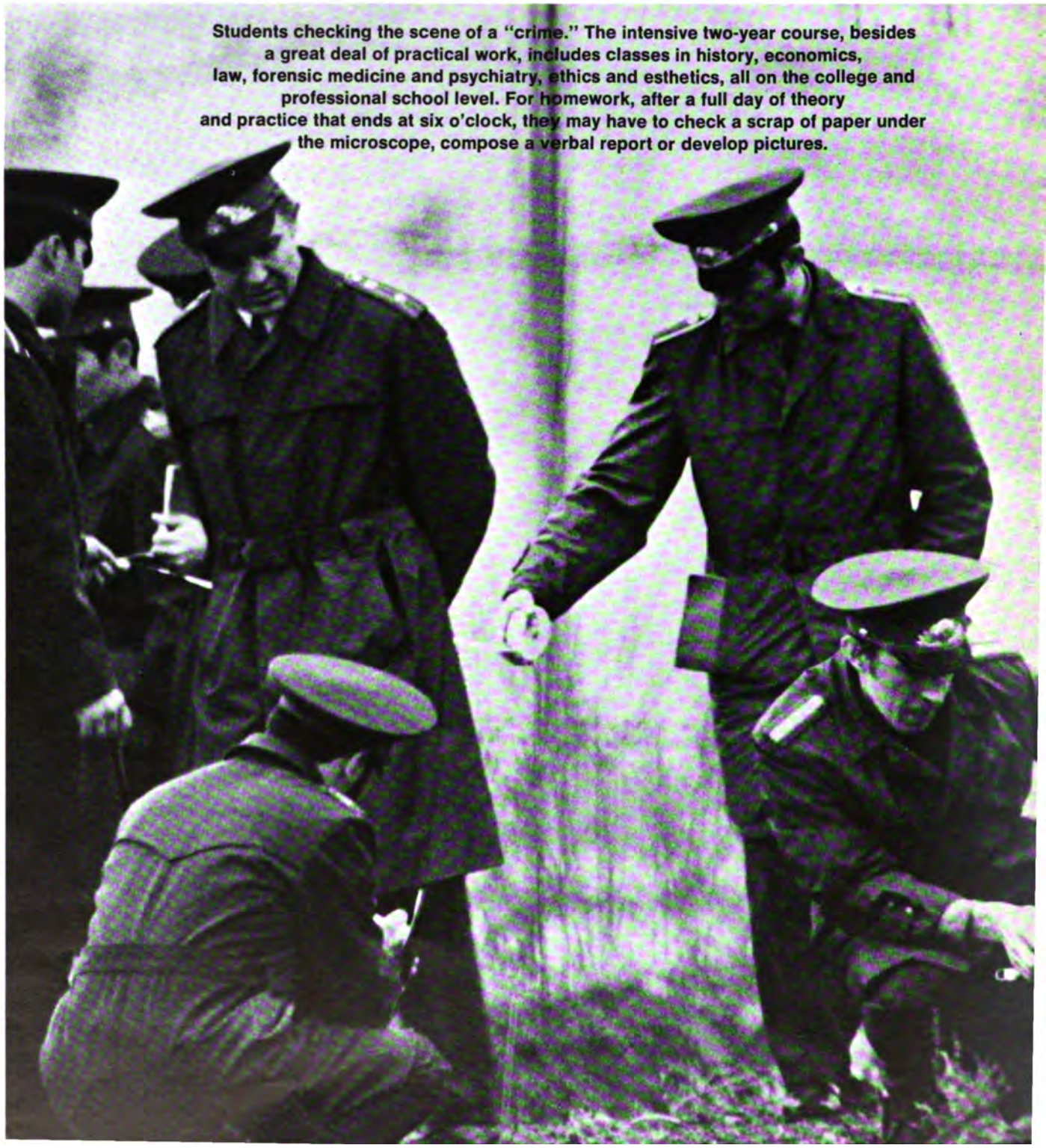
History and the social sciences, collective farm and land law, various branches of civil law, administrative law, the principles of building Soviet socialist society, forensic medicine and psychiatry, ethics and esthetics.

More than 300 hours are devoted to socioeconomic studies and around 800 to legal studies. Much of the course material is taken from textbooks used in schools of higher education.

"Does a divisional inspector really need all that?" I asked.

"No question about it," replied Markvitchev. "What's more, almost all our graduates continue their studies at evening institutes even after they start working. They find they need to for the job."

He explained. One of the main goals of the militia has always been crime prevention. Too often the militiaman comes on the scene when the law has already been broken. Why is that? Because of insufficient experience, lack of special knowledge and inability to foresee situations. "We often judge the work of divisional inspectors by the number of violations of the law discovered by them or with their help. When a crime is discovered, the first question we should ask is: "Why did it occur at all? Were



Students checking the scene of a "crime." The intensive two-year course, besides a great deal of practical work, includes classes in history, economics, law, forensic medicine and psychiatry, ethics and esthetics, all on the college and professional school level. For homework, after a full day of theory and practice that ends at six o'clock, they may have to check a scrap of paper under the microscope, compose a verbal report or develop pictures.

the necessary preventive measures taken?" The divisional inspector is not only an executor but also an organizer who is expected to combine the best efforts of the militia and the public."

How is that done?

Crime prevention centers have been set up in microdistricts around the school. There the future divisional inspector is broken in. A council made up of local people—teachers, lawyers, representatives from factories in the neighborhood—is in charge of the center. Its chairman is a deputy to the District Soviet.

The center also has a militia children's room staffed by volunteers, a comrades' court which takes care of petty violations of law at open meetings, and a free legal advice bureau.

Teachers and students from the militia school advise the neighborhood council. The divisional inspector serves as the council's deputy chairman.

Unarmed Combat

Naturally, the militia students do not spend all their time studying. They relax from their hours with textbooks and microscopes at the theater, at dances, on walks along the banks of the Moskva River and at parties.

And with sports, of course. Senior lieutenant Nikolai Konstantinov, a Master of Sports, teaches unarmed combat. Seventy-two hours of the course are spent on methods of self-defense, plus additional hours when the students work out on their own. Women students also take this training. They all have to know how to handle themselves in a skirmish with an armed criminal.

In April graduates are required to participate in a training operation called Spring. Each squad is given an individual assignment which demands all-round expertise. Of course, this is a game, but it simulates real conditions as fully as possible. Operation Spring starts with an alarm signal at the communications panel.

Training in traffic control from the glass booth on Moscow's busy Kalinin Prospect. Students at the militia school get more than a sampling of practically every aspect of militia work before they graduate. Many of them go on to advanced study in criminology and law.

PREVENTING CRIME, REMADE

Dr. Igor Karpets, Professor of Criminal Law and Merited Scientist, has attended many international congresses and symposiums. He is a general in the militia, a member of the Collegium of the USSR Ministry of Internal Affairs and Chief of the All-Union Criminal Investigation Board. Here he is interviewed by a SOVIET LIFE correspondent.

Q: Before coming to see you, we went through letters from our American readers asking about the work of the Soviet militia. We picked the most typical questions.

Let me begin this interview with a somewhat personal question, however: What prompted you, a theorist known for your scholarly publications, to plunge into purely practical work? What made you want to head such a complicated and responsible service?

A: That "purely practical work" has a thorough basis in theory—it makes use of all the relevant findings of science. I don't think you can be a real scholar or scientist if you divorce yourself from practice. Nor can you fight crime effectively without mastering the fundamentals of such a science as criminology. A criminologist who does not practice does not deserve the name. With that belief, I had no second thoughts about becoming chief of the Criminal Investigation Board.

Q: Is yours a typical case? Does it reflect the new trend in militia work? Or is it an exception to the rule?

A: A typical case? I'd be inclined to say Yes. The USSR Ministry of Internal Affairs staff includes eight people with a doctorate in law and many more who have a candidate's degree. Take the Criminal Investigation Board: Two out of its seven department chiefs hold a candidate's degree. Besides, several research institutes have been set up by the Ministry of Internal Affairs. They are staffed by highly qualified scientists who know the practical side of the work as well.

Q: You were the first director of the All-Union Research Institute for the Causes and Prevention of Crime. One of the key functions of the institute is the application, in such areas as militia work, of preventive measures suggested by criminologists. That apparently interests many of our readers. For example, Frank A. d'Andrea, a New York policeman, asks whether, besides just catching criminals, our militia is also responsible for crime prevention.

A: Indeed it is. I was the first director of the crime prevention institute, and I know how much it has done to develop scientific principles for controlling crime, that very complicated social evil. Prevention has always been the main purpose of the militia. Merely to catch the culprits after they do their damage to society is not enough.

Q: What forms does preventive work take in the militia?

A: The militia is required by law to keep anyone convicted of a definite offense under open surveillance. When offenders, by their attitude toward work, family and community, show they realize how unworthy their former behavior was, then, after a period also defined by law, the administrative supervision is discontinued.

The militia also keeps an eye on lawbreakers, disturbers of the peace and drunkards. In this preventive work members of the criminal investigation service, the district inspectors and others depend on the help and support of the public. One of the new and, to my mind, very promising, forms of activity is the crime prevention center in residential neighborhoods. At these centers the militia is assisted by public councils for crime prevention, volunteer people's patrols, comrades' courts and other mass organizations, and deputies to the local Soviets.

When public efforts prove inadequate, the government steps in. But even in these cases, we rely on the educational influence of the people in the offenders' communities and at the enterprises where they work.

In fighting antisocial behavior and crime, wherever possible we use persuasion and education rather than coercion. The penalties for serious crimes, of course, are severe. But for serious ones only. We keep our approach as humane as we possibly can.

As long as crime exists, it's the duty of the state to protect the interests, welfare and dignity of its citizens and of society as a whole. But we're well aware that it's illusory to think we can solve so complicated a social problem by coercion alone.

Q: The readers of our magazine are particularly interested in juvenile delinquency, in the relation of teenagers to the militia. Judging by the letters we receive, some readers have jumped to conclusions quite contrary to the real state of affairs. They write, for example, that the Soviet militia deals particularly harshly with teenagers. The militia, they say, is very quick to punish people, now and then resorting to fists and nightsticks.

A: A militiaman who used his fists would be severely punished. And as for clubs, our militia doesn't carry them. The fist and nightstick stories, which some of your more gullible readers believe, are just not true. In dealing with teenagers, we're very much aware of their age. Even someone unfamiliar with legal matters, leafing through the Criminal Code of the Russian Federation, will see that minors in our country always get milder treatment than adults. Many punishments they are not subject to at all. In the overwhelming majority of court cases, offending minors are placed on probation under the supervision of the public. With the exception, of course, of those guilty of serious crimes, but even in these cases the penalties are milder.

Generally speaking, for young people we rely on education by state and public organizations. As a rule, large and medium-size towns work out comprehensive programs for preventive educational work with teenagers through hobby clubs, summer camps, sports competitions and the like. These programs are producing results—the number of offenses committed by teenagers is diminishing.

I do not want to dress up the situation. But the undeniable fact is that compared to Western countries, we have a much lower rate of juvenile crime. Of course, it is a problem of concern to us too, if only because we have always attached so much importance to the moral health of young people.

As for harsh penalties, those we reserve for adults who draw young people into crime, who incite them to crime. In such cases we are very harsh indeed.

Q: One way of appraising services whose duty it is to keep public order, to protect people and property, is by the percentage of offenses cleared up. How does our militia compare with foreign police force criminal-investigation units?

A: Since the approach is different in different countries, comparison is difficult. But in general our performance, in percentage of offenses cleared up, is pretty high. For example, 97 out of 100 murder cases are

solved. Many urban and rural militia stations are on record for having cleared up all murders to date. But this is a very uncertain indicator, it changes from one year to the next.

We're also well aware of our shortcomings. The most difficult thing is clearing up thefts, particularly petty thefts. We can't make comparisons here. Under the USSR code all thefts, both big and small, professional and unprofessional, are recorded together, while in the USA, so far as I know, they are recorded separately.

Q: Frank d'Andrea also asks: How does the Soviet detection service operate? Does the militia have specially trained detective units? And are there private detective agencies and private detectives in the Soviet Union?
A: Obviously, our crime detection service has certain similarities to, and certain differences from, those in other countries. These are the characteristics of our detective service: First, the strictest observance of the legal code. Violations of constitutional and legal guarantees are rare.

Secondly, the Soviet detective service tries to make maximum use of the latest

THE OFFICER

Interview with Igor Karpets
Chief of the All-Union
Criminal Investigation Board

developments in crime detection. Thirdly, our detective service has the help of the investigative, technical and other agencies of the militia. Lastly, the detective service, like the militia as a whole, counts on the assistance of the public.

We have no private detective services. Nor is there any necessity for them. The militia is available to every citizen who needs its help and services.

Q: Many industrially developed Western countries are troubled by the growing crime in large towns and cities. Our readers ask: "Are there in Moscow, Leningrad and other cities with a multimillion population districts or neighborhoods that give the militia special trouble?" "How does the militia tackle the problem of organized crime?" "How safe are the streets in Moscow or Leningrad at night?"
A: This is a large question, it touches on the causes of crime. To be brief, I will say that the causes are not the same in capitalist and socialist countries. They are as different as the sociopolitical systems.

Authorities in the Western countries believe that the causes of crime are inherent in such phenomena as the scientific and technical revolution, urbanization and industrialization. They proceed from the fact that the crime rate is higher in the cities than in the countryside and that the cities in the West have, indeed, become high-crime areas. But we believe that the basic cause is not urban development, industrialization or similar processes. These processes take place in the framework of a certain social system, and their positive or negative consequences are determined by the laws of the particular system. The steadily rising crime rate in many Western countries is a fixture of capitalist society.

Nor is this denied by noted Western sociologists, who list social inequality, unemployment, the concentration of the poor in urban slums among the main factors that nourish crime in capitalist countries. The socialist system is free from these ills. And this furnishes the answer to your readers' other questions: Neither in Moscow nor in Leningrad nor in any other big Soviet city are there high-crime districts as distinct from other "safe" neighborhoods. Nor do we find the organized gangs or the racketeering that plagues capitalist society.

The streets and parks of Moscow and Leningrad are safe both in the daytime and at night. This, by the way, has been noted repeatedly by journalists from the U.S. and elsewhere who visit here. Two years ago I had the pleasure of receiving a group of American newspapermen. After a talk with them I took them to the militia station at the Moscow Board of Internal Affairs. They spent an hour watching everything that was happening in this city with millions of inhabitants. Well, during that hour there were only two incidents, an automobile accident and a not too serious theft. When they left, the journalists told me how impressed they were. Within the same hour, they said, any Western city with a population of a million or more would be the scene of several dozen dangerous crimes.

Q: Let me turn to another point that interests our readers. How much control is there of the actions of the militia? What check is there on the individual members in case of illegal actions? Take this possible situation: A group of citizens (or a single individual) complains to the district militia about what they describe as arbitrary actions by one or another militiaman, let us say, a complaint of rough handling or abuse, with a request that the offender be punished. What would happen?
A: First, let me repeat that the militia must act strictly within the law. Its activity is controlled by the procurator's office. Besides, complaints concerning the performance of the militia are investigated by higher ranking militia officers.

Now, in the concrete situation you suggest. A citizen's complaint will be looked into without delay. If it is justified and abuse by a militiaman is proved, he will be given punishment commensurate with his offense, in some cases dismissal from the force. Or he might be indicted if his actions are considered criminal.

The militia is answerable to the Soviets. The appropriate committees of the Soviets check regularly on complaints against the militia and the disposition of these complaints. It occasionally happens that a serious violation will occur and the complaint will be passed over or the offending militiaman given a purely token punishment. In that case, the committee of the Soviet recommends punishment not only for the militiaman, but for his superior officer who has neglected the complaint.

Q: The performance of militia personnel is determined also by their special training and general education. What is the trend in this regard?
A: Five years ago only 12 per cent of rank-and-file militiamen had a complete secondary education. Today more than 60 per cent have. Most militia officers have a higher education, a must for the chiefs of city and regional bodies of the Ministry of Internal Affairs. Special training—a minimum of five to six months—is obligatory for a militiaman of any rank. In recent years a number of higher educational institutions have been set up by the Ministry of Internal Affairs: the Militia Higher School at Omsk, which trains personnel for the criminal investigation services, and law schools at Gorky and Ryazan. There is a network of specialized schools for retraining prospective militiamen with a specialized secondary education. Not long ago an academy of the Ministry of Internal Affairs was established for raising the qualifications of senior officers.

Q: And the last question. How are militiamen recruited? Who joins the service, and how do young people rate militia work as a profession?
A: Judging by the number who want to join, the militia's rating must be pretty high. The general practice is for factories, offices, and mass organizations to recommend young people. Those recommended are, of course, eager to serve in the militia, and they're chosen because their associates feel they'll be worthy of the trust. The people selected report back from time to time to their former associates, and this tends to strengthen the militia's bond with the public.

FATIMA KOZNYAKOVA
"THE
HOPELES
JUVEN
DELINQUENTS

By Alexander Aronov

FIRST GRADER Zhora Koznyakov's grandmothers belong to two different schools of thought: One is dictatorial, and the other highly permissive. As a result, Fatima Koznyakova says half in jest, her son is now a "split personality."

Mother is in a position to make comparisons: She is a militia captain and children's room inspector at the 62nd Militia Precinct in Pervomaisky District, Moscow. Not only does Koznyakova see the whole spectrum of so-called "difficult" youngsters, they are her job.

Indians in Priozyorsk

Volodya Leonov ran away from home when he was 12. Four days after he disappeared, his father received a telephone call from Priozyorsk, Leningrad Region.

It turned out that the idea of running away had originated almost a year before, at a Young Pioneer camp. It was there that Volodya and his friend decided the hunter's and trail blazer's life was the only one worth living. A year went by in preparation.

In April the future runaways had 10 rubles each saved up from school snack money, a store of sugar and crackers and even some "experience." They had joined an archery club, mastered the sport and acquired a real bow and arrows.

They didn't travel to Priozyorsk as stowaways, but bought train tickets. It was April and cold. Campfires couldn't really keep them warm. The young explorers lived in the hills and spent the nights at a nearby railroad station and a tourist center. After three days, local adults finally caught on that something was wrong.

When Volodya's father turned up to take them home, he could hardly lift their knapsacks.

"What have you got in there, bricks?"

The knapsacks were full of books, mostly by James Fenimore Cooper and Mayne Reid.

Fatima Koznyakova, head of the children's room at a Moscow militia precinct, scores a victory: the first smile from a young visitor. Top left: Meeting with an old friend and one-time problem. Center left: A talk with a high school class.

Opposite page, left (top to bottom): The militia captain listens to a complaint about "the boys—those troublemakers." Her duties also include speaking engagements with parents, teenagers, and students at a nearby school for the deaf.

Opposite page, top right: A conference with some of the adults who have volunteered to sponsor problem teenagers.

Opposite page, bottom right: A bridal couple at the district registry office. Militia officer Koznyakova is also a deputy to the District Soviet.

"Why did you run away in April when it was still so cold?" Fatima Koznyakova asked them.

"There wouldn't be any ducks later, and we had to shoot ducks for food."

"Do you have any more such plans for the future?"

"We don't know yet. . . . But one thing is sure, we won't start out again without a tent." And the young explorer shuddered as he recalled his escapade.

This is probably reminiscent of Tom Sawyer and could serve as the plot for a children's film. But Koznyakova must also deal with adventures of a different kind.

A Much More Serious Matter

Seventeen-year-old Yuri Makarov is now serving a second prison sentence. He and a friend had decided they didn't like school. They were bored, ashamed of poor marks and scoldings. They dropped out.

When they were 15, they committed their first petty theft: They broke into a builders' railroad car and made off with two geodetic levels, expensive instruments they had absolutely no use for. They took them apart and threw the parts away.

When Yuri got back from the corrective labor colony, he was given a job as an apprentice at a factory. Sponsors kept an eye on his behavior at work and in the house where he lived. But he went on to commit another crime in another part of Moscow: He took a leather jacket away from another boy by force. His own jacket, by the way, was just as good.

Koznyakova sees not only the difference between the two cases, but also a similarity, hardly noticeable at first. There are problems in the families of both would-be explorer Volodya and two-time lawbreaker Yuri. Volodya lives with his father and grandmother, but without a mother. Not once in his year of preparation did he want to share his secret with them.

In Yuri's case it's even worse: His stepfather is younger than his mother and has no paternal feelings for the youngster. Koznyakova discovered that he had even beaten Yuri a couple of times. Yuri's mother, unsure of herself, has been unable to create a decent family environment.

Talking to Yuri, Koznyakova was startled by his bitterness and rudeness. Speaking in a calm and friendly tone, she managed to get him to lower his voice, but there was nothing she could do to change his harsh and hostile attitude. He was neat, good-looking, but so malicious, so bitter. . . .

To this day Koznyakova can't get over her failure with young Makarov. The fact that she managed to determine the cause of his problem is no consolation.

She found nothing she didn't expect. It's Koznyakova's conviction that all "difficult" children are the product of an unhappy family life. Actually there are about as many theories on what makes "difficult" teenagers as there are theoreticians. But Koznyakova sticks by her hypothesis: The family's influence is the most important. The school, even a poor one, she feels, is only a catalyst. The street? There, too, it's someone's children who are the bad influence. And, after all, the youngsters who look for understanding and sympathy in the street are those who can't find it at home.

"Isn't that a pretty broad statement?" I asked. "Don't lawbreakers sometimes come from happy families?"

"But what do you mean by a happy family? One in which the children are well fed and clothed? A family with a nice apartment? There was a time, probably, when people thought these were the most impor-

tant factors. Say, in the hard years right after the war. But nowadays that's certainly not the answer because almost everybody has a reasonably good standard of living. The acute problems now are the moral ones."

Whose Influence?

"Lysenko, 14 years old," said the inspector's report. "Rode his friend's bike into the yard of the school he once attended. He was about to throw a brick into a window at which two elderly women were standing. When one of them came out and lectured him, he picked up a stick and began circling round her on his bike demanding 20 kopecks."

"We looked into the incident," Koznyakova continued. "The first thing I did was insist that the boy himself find the women and apologize to them. His father, who was in my office too at the time, said to him, 'You see, just because of some foolishness you're going to have to apologize to someone.' It told me quite a bit. So that's where the son got his disrespect for other people. . . . Well, I didn't try to frighten him—I don't like to do that in any case, I'll tell you why afterward—but I asked him to step outside for a few minutes and gave the father a piece of my mind. He began telling me what a wonderful parent he was, and I tried to show him what had motivated his comment. He was just trying to win his son over cheaply: 'You see, I'm defending you!'

"This case isn't unusual. We generally have to begin the education of children with the education of their parents."

Help from the Public

Koznyakova has many re-educated teenagers and parents to her credit. But she does not work alone.

Once every two weeks, deputies to the District Soviet, doctors, teachers, lawyers—all members of the Commission for Minors—gather for a meeting at the Executive Committee offices of the Pervomaisky District Soviet.

An inspector, Koznyakova, for instance, reports on a particular case. She doesn't appear alone before the commission, she comes with everyone concerned: parents, teachers, neighbors, people from the factory or office where the parents work, and sometimes the youngster's sponsor—generally someone with energy, experience, and teaching abilities and inclinations. The commission hears the sponsor too. After the case has been thoroughly analyzed, the necessary steps are taken. The culprit and the parents may be reprimanded, officially. The parents may be fined. A job may be found for the teenager or medical care arranged for. Only in extreme instances is the case turned over to the courts.

In court the commission may demand that the parents be deprived of parental rights. If that happens, they are required to pay for their child's maintenance while he or she is brought up by the state. This rarely happens, and if the mother and father prove that they really love and can be responsible for their child, their parental rights are restored.

Only the court can sentence a teenager to a reform school—a labor colony for minors—and then only if the child is considered a danger to society.

But I repeat, such cases are few.

With the help of the commission, which has considerable power, Koznyakova can accomplish a great deal. She can also appeal to the comrades' court at the place of work or residence of the culprits or their parents.

She has harsher options as well, but it's obvious that neither threats nor intimidation appeal to her.

"Why?"

"Because, in the first place, it would amount to lying. I don't have the power, for instance, to send a minor to a colony. That can be done only by the court, and there must be very serious grounds to even bring the case to court.

"Then there's another side of the problem. The 'difficult' youngster is used to threats, to 'tough talk.' The neighbors at home and the teachers at school have been using this approach all along. Children who are finally summoned to the militia know that they're in for it. They prepare themselves, put on their armor. What they don't expect is kind words, good will and an interest in their life, which certainly isn't an easy one."

"We're Not Enemies"

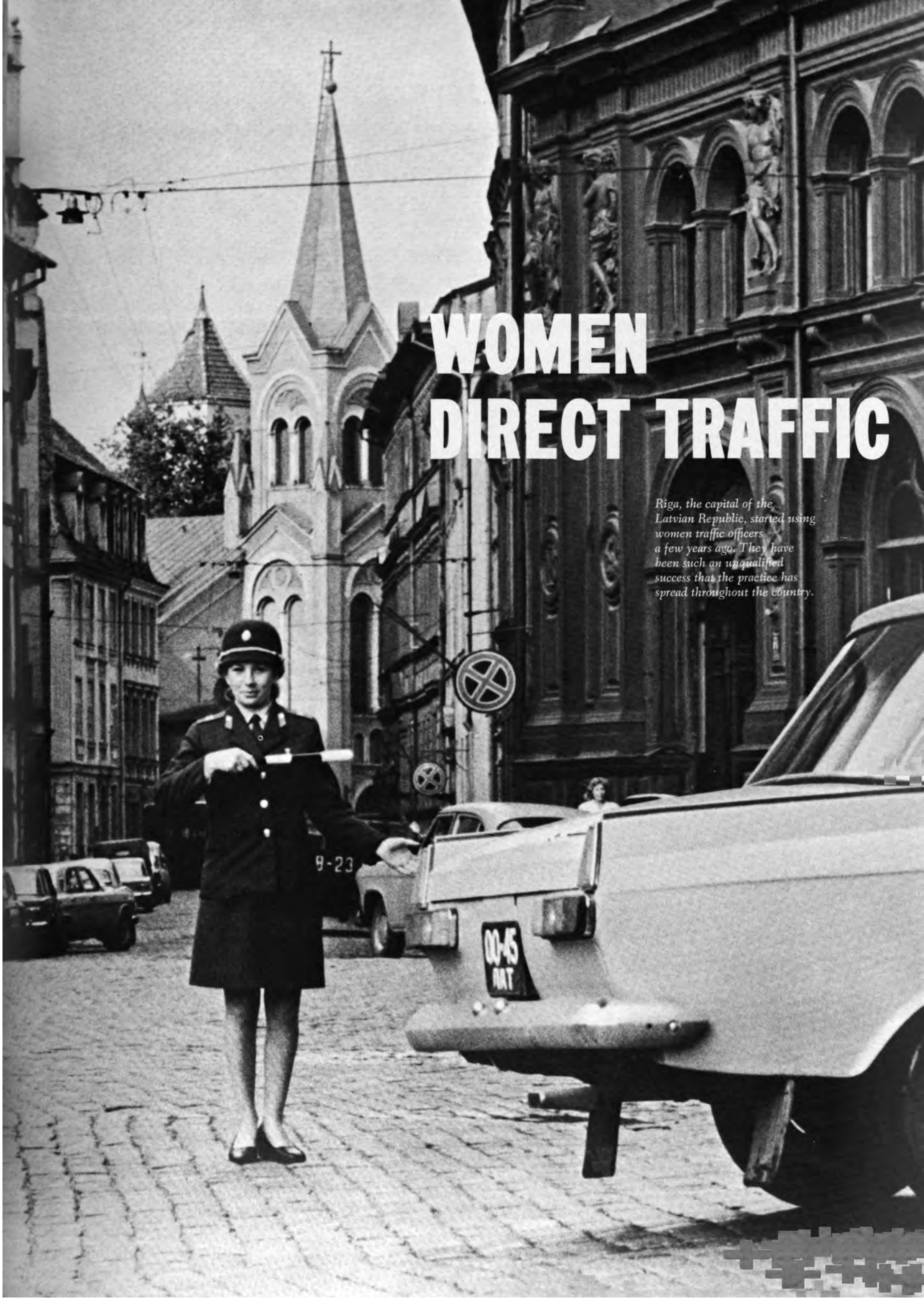
"But all this is tactics. What really matters is that I don't believe there are any hopeless juvenile delinquents," said the inspector. "In many ways we adults must blame ourselves. I may not tell that to the children, but I never forget it.

"It's very important for them not to see me as an enemy. We have a common interest: to remedy situations that are bad for them and for the community. We must help the youngsters see their own lives differently. I've found that the parents sense this, even though I may sometimes insist they be deprived of their parental rights. One mother, for instance, happened to be a neighbor of mine. She is looking forward to the return of her child and asks me for advice. Teenagers write to me from the corrective labor colony and visit me when they come home."

Koznyakova sees people in her office, visits homes and places of work educating "difficult" youngsters, and no less difficult parents. Often she spends an hour or more at somebody's home discussing and thrashing out a problem.

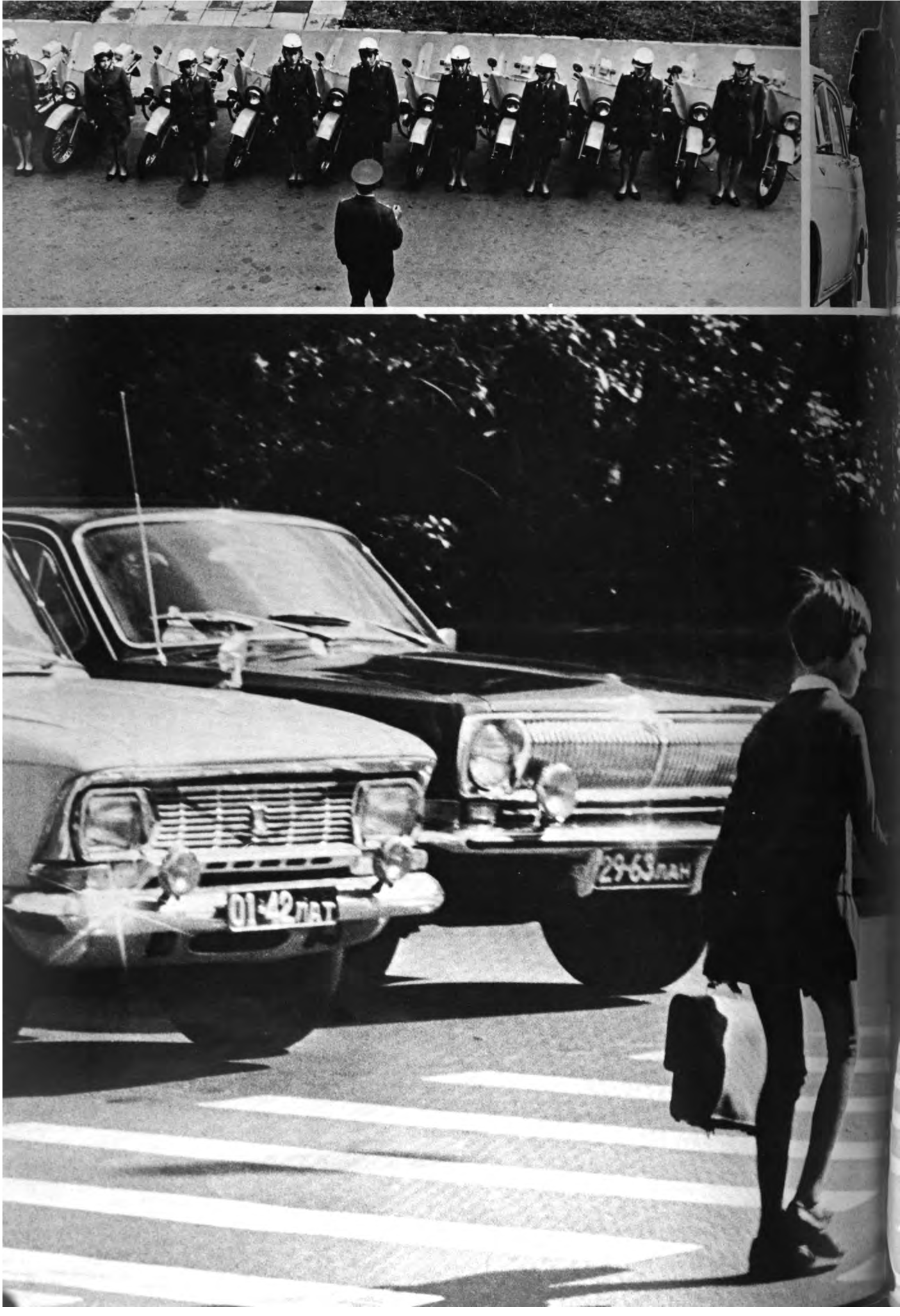
As for the inspector's leisure time, most of it is spent with her husband and seven-year-old Zhora.

The militia captain with her husband Victor and seven-year-old Zhora. One of Zhora's grandmothers permits everything, the other is highly demanding. Koznyakova jokes that her son is becoming a "case."



WOMEN DIRECT TRAFFIC

Riga, the capital of the Latvian Republic, started using women traffic officers a few years ago. They have been such an unqualified success that the practice has spread throughout the country.



The patience of women traffic officers has lowered the number of loudly protesting offenders and seems even to have reduced accidents. Ara Kuznetsova, 27 (at left), has been directing traffic for five years. Right: Such gentlemanly scenes are not unusual. Far left: Andrei Kazakov heads the women's motorcycle squad in Tashkent. Below: Children are a special concern.

IN A NUMBER OF OUR CITIES women militia officers direct traffic. A few years ago one of the Baltic republics began hiring women for this job, and soon other republics followed suit. Traffic inspectors are pleased with the results.

An officer raises her baton, and the car stops. The driver, a young man, jumps out and tries to explain away his violation. It's the usual episode, but with a difference: The traffic officer is in no hurry to punch the driver's license or fine him. Calmly she explains the traffic rules as he listens with an embarrassed smile. None of the glibness or gestures of the offender trying to prove his innocence.

Women in the traffic service, inspectors say, have reduced the number of accidents, and there are also fewer arguments with drivers.

ARE AIRSHIPS PRACTICAL?

The phenomenal growth of the aviation industry after the Second World War seemed to bury for all time the idea of building dirigibles, but it cropped up again some 10 to 15 years ago. One quality of dirigibles that attracts designers is the relative ease of creating lift—the same factors hold that make a ship float on water. Many specialists, however, argue that airships only seem easy to operate and cheap to build. Economic calculations often fail to include such hidden costs as the expense of setting up whole industries and complex systems of ground servicing.

We normally associate progress in flying-machine design with improved weight-to-volume ratio. The payload of a modern heavier-than-air craft is over 35 pounds per cubic foot of airframe, while for a dirigible, even if it is built from up-to-the-minute materials, the figure will be a mere 1.1 ounces, the weight of the one cubic foot of air it displaces.

Still, despite all objections, enthusiasts continue to develop new designs. In the USSR numerous design bureaus operating on a voluntary basis have been trying for a number of years to build a reliable and maneuverable airship.

A dirigible designed in Kiev, for example, will carry 100 passengers or more than 11 tons of freight, develop a speed of 125 miles per hour, and have a nonstop flight range of about 1,900 miles.

A Leningrad design bureau headed by engineer Valentin Murychev and pilot first class Victor Kirsanov designed an airship that lifts 110 tons. They also built and tested a 40-foot model of the dirigible.

The possibility of using a nuclear engine to power airships was discussed in the popular magazine *Tekhnika Molodyozhi* (*Engineering for Young People*) by Gennadi Nesterenko. Nesterenko, who has a candidate's degree in technology, sees the nuclear-powered airship as 1,000 feet long and 200 feet in diameter. It would carry about 600 passengers first class or 1,800 in a tourist version, develop a speed of 185 miles per hour and have an unlimited range of flight. A 200,000-kilowatt nuclear reactor with adequate radiation shielding would be required for this type of craft.

However, no design developed thus far offers solutions for the two cardinal pro lems of lighter-than-air machines: vertic and low-speed maneuvers. When a 110-t cargo has been delivered and unloaded, t airship will rise suddenly from the surfa (assuming it has no cargo for the retu flight). To come down again, it will have release into the air 4.2 million cubic fe of costly helium, which will have to be r placed for the next flight.

Steering an airship at low speed is t second problem. The slower it flies, the le effective are its control surfaces. This ca for a number of additional elements in t design which reduce reliability.

And an additional shortcoming. The a ship is absolutely safe in good weather b moves with difficulty in even a slight win consuming enormous quantities of fuel. is highly susceptible to sudden gusts.

Dirigible designers either brush the problems aside altogether or say that the can be worked out.

Can airships be adapted for commerci service? For the moment, we are afraid nc Their shortcomings still outweigh their a vantages.

FUEL AND PLAN

At a time when many countries are going through an energy crisis, the Soviet Union has plenty of fuel. There are no restrictions on gasoline sales, no unheated apartments.

This does not mean, however, that we have no energy resource problem. Although our country is rich in minerals, any resource becomes scarce if it is not used rationally. Besides, much of our underground treasure is located at a considerable distance from the industrial centers and therefore hard to get to. In short, there are problems aplenty.

One of them is how to maintain a proper balance between demand and available resources. Economic planning helps, but estimating needs is a very complex process. We must therefore use our natural resources as efficiently as possible.

A few examples. In 1961-1973 freight transportation by motor vehicles increased by 2.9 times and gasoline consumption by 2.4 times. The use of boiler and furnace fuel in 1973 was 1.9 times higher than in 1960. But fuel input per one billion rubles' worth of industrial and agricultural products decreased by 11.5 per cent.

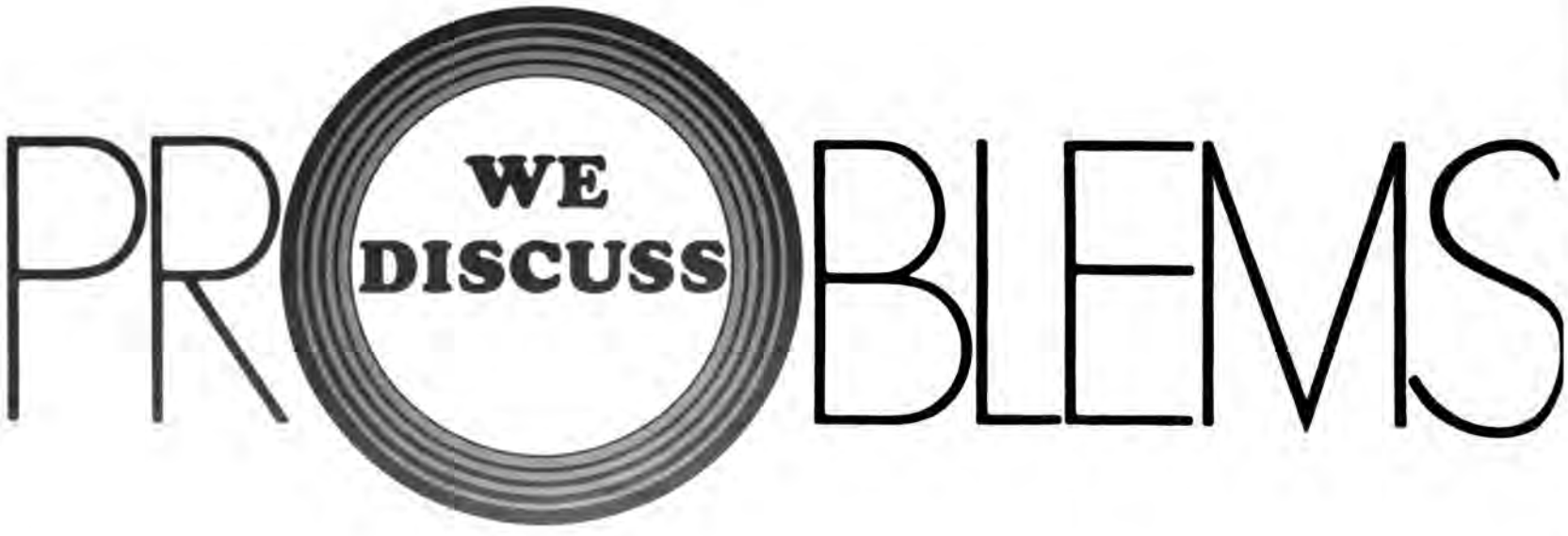
To effect such savings, the structure of electricity production had to be improved, fuel consumption rationalized, fuel losses reduced. These and a number of other measures were foreseen by the national economic plan.

The plan also takes into account the changes in fuel requirements in individual sectors. Residential gas consumption, for instance, has been rapidly expanding. In 1965 some 50 million people used gas and in 1970 twice as many; in 1973 the number increased by another 38 per cent. One of the advantages of gas over solid fuel is that it saves each family an average of 60 to 80 rubles a year.

An important aspect of the plan is balancing requirements against known reserves. The situation here is good and will be fc a long time to come, but the Soviet Unio is continuing its intensive exploration. An nual additions to the known stocks of fue are several times the current output, s that we can make long-term projections

Planning allows for a better combinatio of various types of energy resources in th country's fuel balance. In 1965 the shar of oil and gas in fuel output was 51.4 pe cent, and by 1973 it was 63.4 per cent. Ha this shift not occurred, we would have ha to spend an extra six billion rubles on fue production.

The planning agencies pay a great deal o attention to the rational siting of fuel plant so as to bring sources and consumers as close together as possible. Oil, for example, which before World War II was extracted mainly in Azerbaijan and the Northern Caucasus, is now produced in almost all the Soviet republics.



Vsevolod Meyerhold. Portrait by Yuri Annenkov, 1922.

VSEVOLOD MEYERHOLD'S THEATER: "MAGNIFIER, NOT MIRROR"

By Igor Ilyinsky
People's Artist
of the USSR

DOCTOR DAPERTUTTO, maitre, the old man, the master—teacher, theater magician and wizard, improviser, mentor, philosopher. All this is one person—Vsevolod Meyerhold.

Nineteen seventy-four marks the birth centennial of this gifted Soviet actor, director, People's Artist of the Republic.

Here we see him as the dandy in the portrait by Boris Grigoryev, wearing a tail coat and top hat; and here he is in a fez, bent over a copy of a play; in a peaked cap with a red star, a Budyonny-style helmet, or a work jacket behind the director's table. He is different everywhere, elusive. Is he compelled to disguise himself, is it affectation? Just the opposite, this is the restless spirit of the artist, concealing in perpetual contradictions his powers and weaknesses.

Meyerhold was extraordinarily sensitive to the events taking place in the country. He absorbed everything significant in literature, music and painting. He was always searching for the elements that gave the theater its power, the secret of the influence exerted on the spectator by the actor's skill, the director's staging. He tried everything—I don't think there was a single theatrical trend or genre with which he did not experiment. Nothing was out of reach of his ingenuity.

It would seem to all of us who worked with him—his pupils, colleagues—that he had finally arrived at the perfect answer, when all at once he made a complete turnabout, started over. He constantly sought for the new, made mistakes and searched again. What he was searching for was the truth.

Then, in 1917, came the Great October Socialist Revolution. To welcome it or not? Meyerhold had no trouble answering that question. On November 9, 1917, a handful of people came to Smolny, the headquarters of the Revolution, to a conference of the literary-artistic intelligentsia of Petrograd (now Leningrad). Among them were the poets Vladimir Mayakovsky and Alexander Blok, and Meyerhold.

Meyerhold became head of the Theater Department of the People's Commissariat of Education, one of the aides of Anatoli Lunacharsky, the first People's Commissar of Education. Tall, lean, in a Red Army greatcoat, he was the leading spirit at theatrical debates and meetings. He pushed the idea of a "theatrical October"—the crucial need to revolutionize the stage. He sought to build a theater "in tune with the times." he wanted to "blaze with the spirit of his time." The birth of the new and the death of the old world inspired his creative work as it inspired a whole epoch.

It was no accident that Meyerhold's first production in Soviet times was Mayakovsky's *Mystery-Bouffe*. This, to quote Lunacharsky, "communist performance" was staged by Meyerhold jointly with Mayakovsky for the first anniversary of the October Revolution. After its debut in Petrograd the play was produced in Moscow by the RSFSR-1 Theater, founded by Meyerhold. It was translated into German and performed for the delegates to the Comintern Congress.

In the play with which the theater opened in 1920, *The Dawns* by Emile Verhaeren, Meyerhold scrapped all the conventional theatrical forms. He did away with the footlights, the border between the stage and the auditorium, drew the audiences of workers and Red Army men into the action. During the performance the latest dispatches announcing the victories of the Red Army in the Civil War were read and welcomed with cries of "Hurrah!" and applause. When the coffin with the body of the hero was carried onto the stage, the spectators took off their helmets and caps, and, standing all together, people on the stage and in the auditorium sang the "Internationale."

Meyerhold wanted to bring the theater closer to life, to influence the theatergoer. He wanted a theater that would help build the new society.

Meyerhold was bound to Mayakovsky by the close friendship of artists who shared the same ideas. The productions of *The Bedbug* and *The Bathhouse* may not have been perfect from our present-day point of view, but they affirmed the heroism of the epoch, satirically exposed its opponents. Both for Mayakovsky and for Meyerhold the theater was a "magnifying glass" to detect and expose the philistines, bureaucrats, drunkards and idlers in all their unsightliness and abomination.

Vsevolod Meyerhold in a photograph taken in 1922-1923.

Scene from *The Commander, 2.* The setting of the play is the Civil War, a theme that permitted Meyerhold to experiment with unorthodox techniques and include the audience in the action.

Meyerhold and Ernest Frantisek Burian, Czechoslovak composer and dramatist, in a cartoon by Adolf Hoffmeister, Prague, 1936.

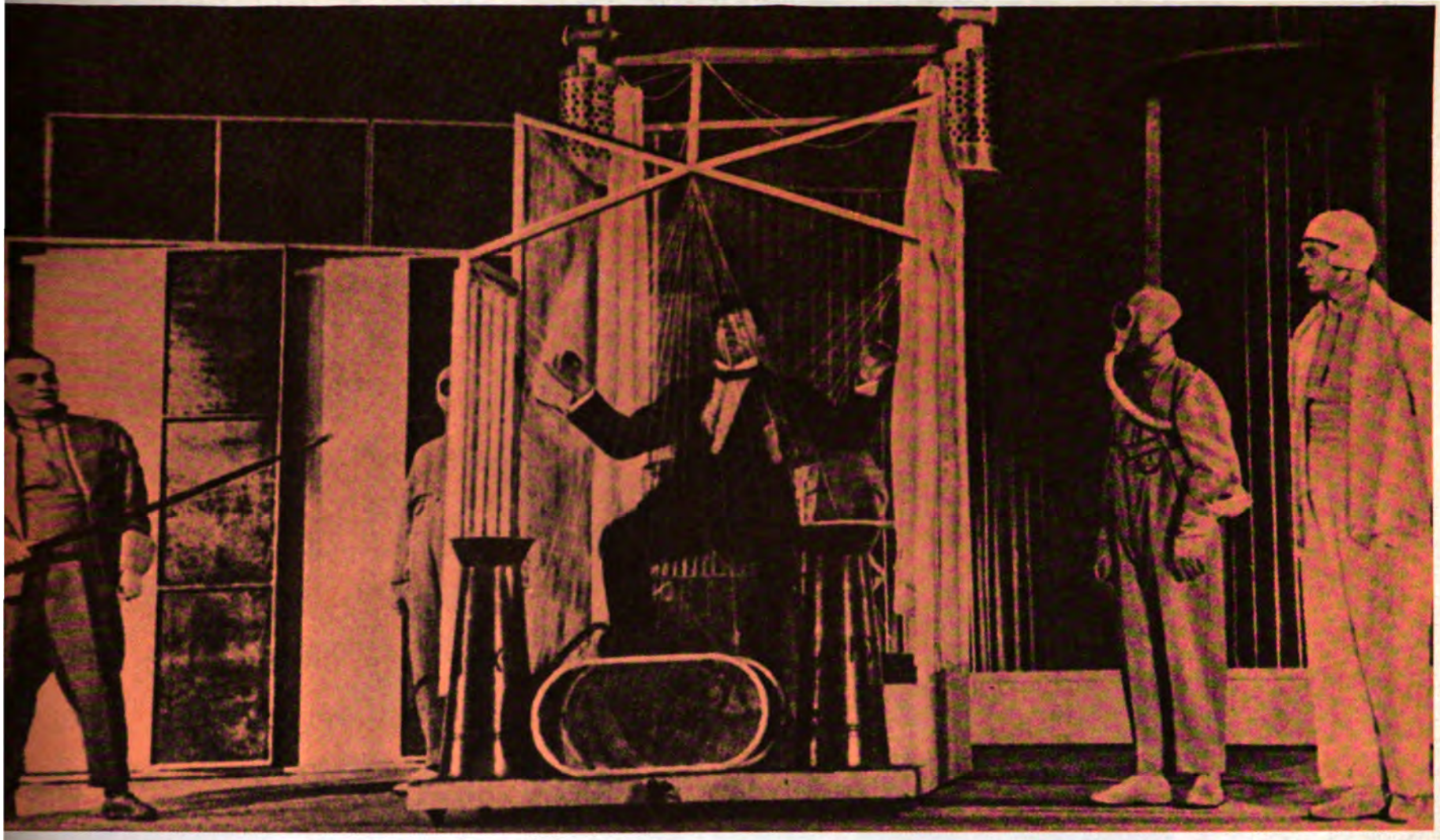
The same function was served by GOSTIM the theater, named for Meyerhold—the theater of the revolutionary placard, of the social mask. Its actors did not so much depict emotions as propagandize. They created not simply an image, but the contemporary attitude toward this image. Meyerhold saw the play only as the scenario of the performance, he abridged freely, introduced new characters, split the play into scenes and edited it like a film. Posters informed the spectators that it was perfectly all right for them to walk in and out of the hall during the performance, that there was no objection to their speaking, whistling, applauding whenever the spirit moved them. Everything had to be subordinated to the main political task of "influence," as Meyerhold was fond of saying.

Enough acting styles, dramatic principles and forms of expression were elaborated in his laboratory of dramaturgy to keep other theaters busy for years. But this does not mean that in our day we should accept without discrimination the whole creative legacy of this director-innovator. Meyerhold himself cautioned against the superficial imitation, the blind acceptance of his theatrical ideas in a 1936 talk he titled "Meyerhold Against Meyerholdism."

Much of what the times called forth—obvious propaganda of the placard type, primitivism—has been left behind. But everything valuable in Meyerhold lives on and is being refined in the Soviet theater and in theaters abroad. He dedicated his life to the creation of what he called a "conditional" theater, but he warned against a "conditionality" which speaks neither to the heart nor to the mind. He wanted an art that was emotionally infectious, rich in metaphor, multifaceted. Thus I was struck by two plays directed by Yuri Zavadsky, People's Artist of the USSR, *Petersburg Dreams*, and *Crime and Punishment*, staged in 1969. Zavadsky's approach to Dostoyevsky was particularly original, in the style of "conditionality." In this play lives Meyerhold's legacy, correctly applied, enriching contemporary stage direction.

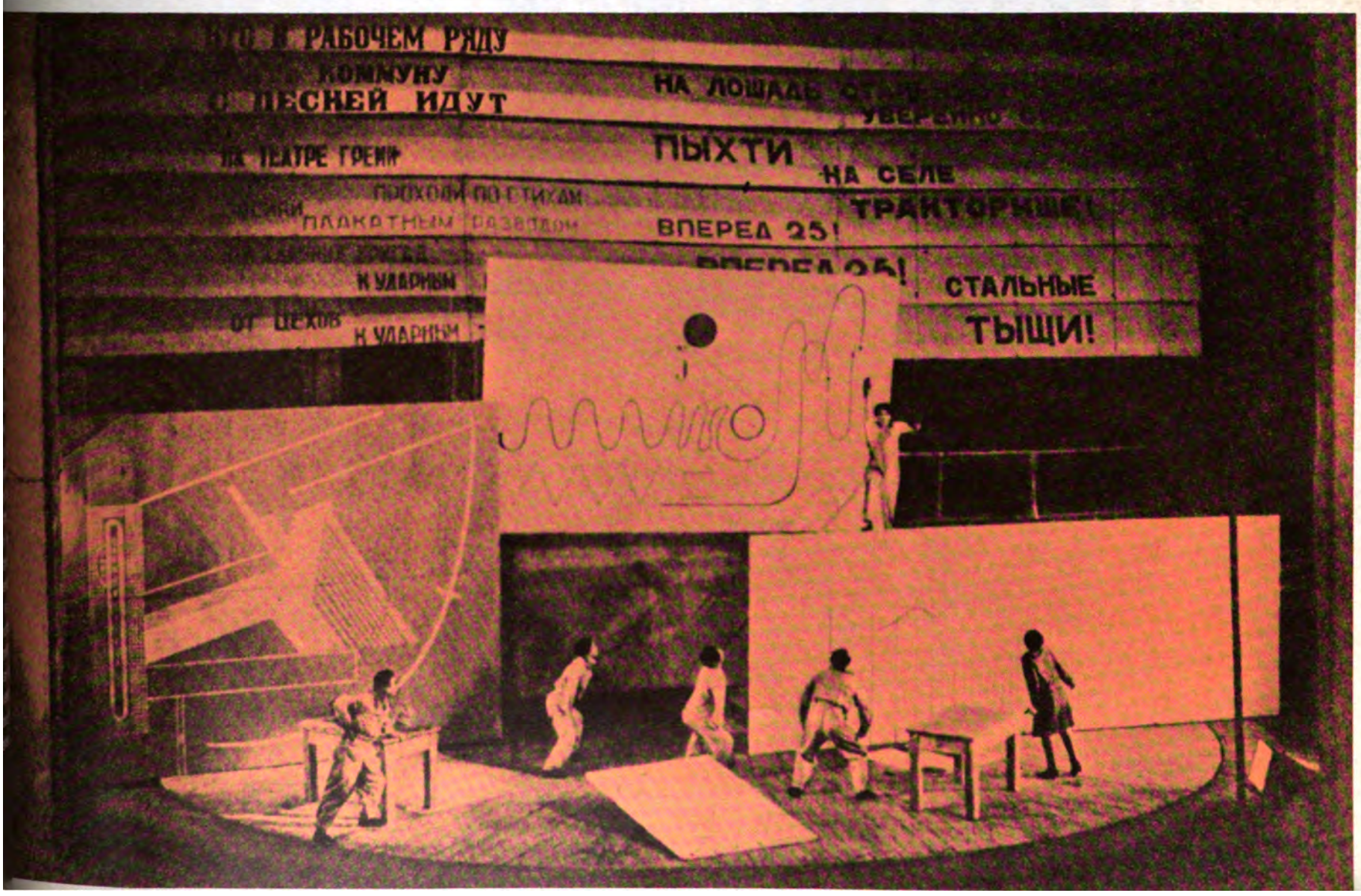
One often hears the statement that the most important thing for Meyerhold was mystery of external form. Not at all. It was he who declared: "I do not need actors who know how to move, but not how to think."

A director with a fantastically inventive mind, Meyerhold would have been gratified by the present diversity of the country's 558 theaters. Each has its own signature, its own style. In all this variety of forms, trends, methods and genres there is a unifying goal, the desire truthfully to reflect the main conflicts of our day, to carry on an honest and impassioned conversation with contemporaries about their times and about themselves.



The Bedbug, the play by the poet Vladimir Mayakovsky,
screened by Vsevolod Meyerhold with Igor Ilyinsky in the leading role.

Scene from the first act of Mayakovsky's *The Bathhouse*.
Meyerhold shared the playwright's concept of the theater as a magnifying glass.



ARTISTS SEE AMERICA

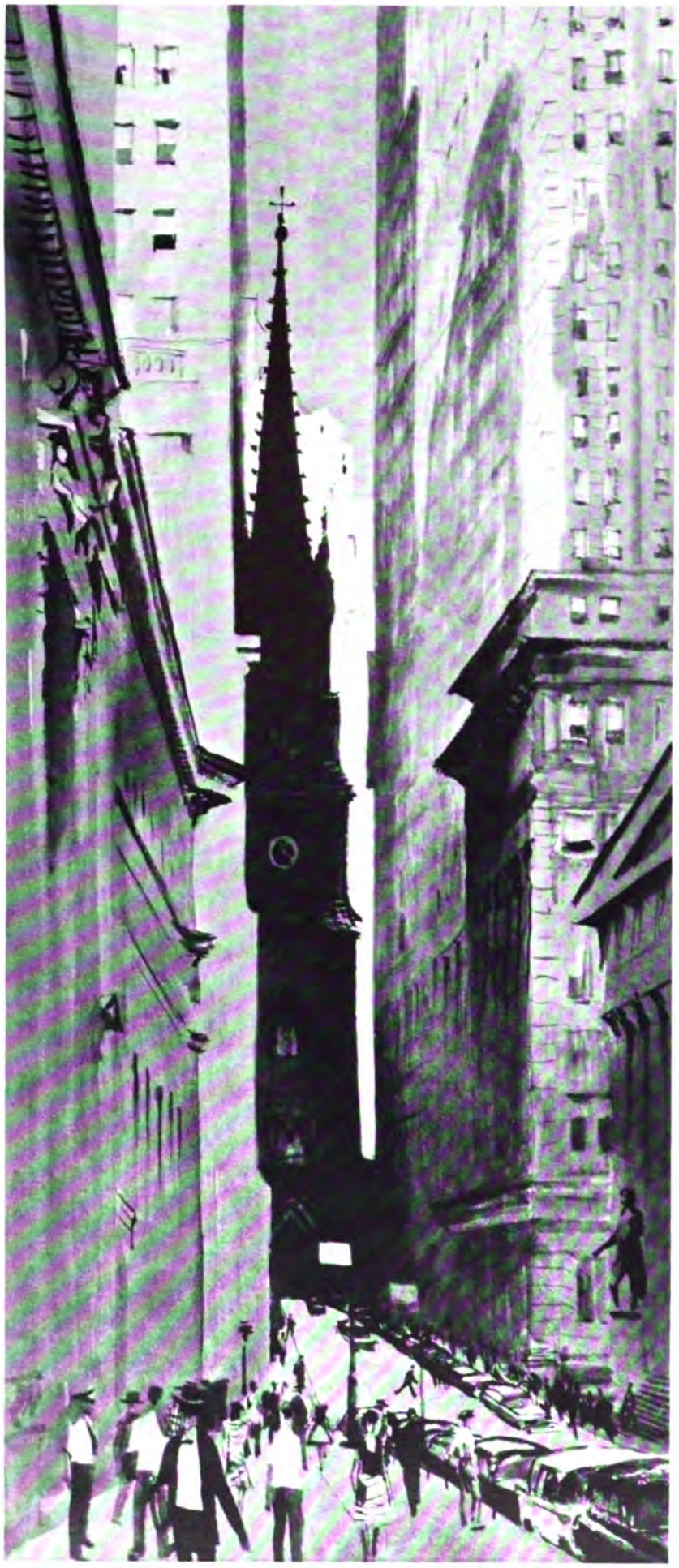
By Marina Khachaturova

A MOST ENGAGING exhibition of works by Soviet painters and graphic artists was hung recently on the walls of Moscow's House of Friendship with Peoples of Foreign Countries. "In America" presented the impressions of five masters: Orest Vereisky, Vitali Goryayev, Tair Salakhov, Georgi Toidze and Alexei Shmarinov, who had visited the United States at different times in the last 13 years.

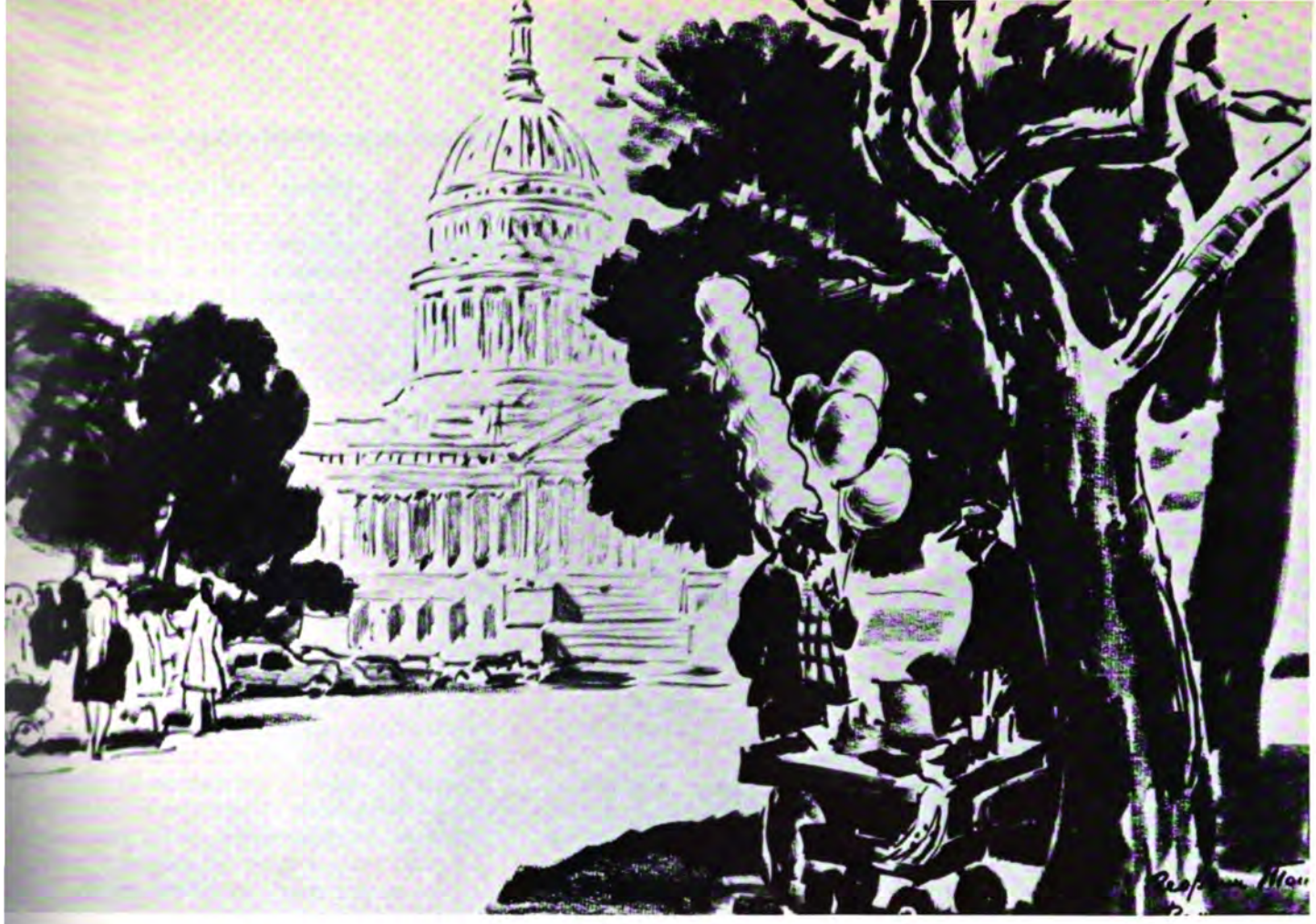
Although the works are small in size and are, in the main, sketches—because of the artists' brief stays—each is characteristic of the particular artist.

In one and the same city, for example, they chose quite different subjects. There was only one exception—none of them could resist Manhattan's silhouette, well-nigh classical. What the 72 works have in common is a well-disciplined and open approach to a previously unknown country. Their intention is to depict the world they saw, both the lasting and the transient, as truthfully as possible.

Orest Vereisky submitted the largest number of works, 21 characteristic sketches. Geographically they also embrace a wide area—New York, Washington, Chicago, Philadelphia and Kansas City. The cityscapes, as usual with Vereisky, show people: men putting up a building or painting a house, a group of people at a street corner, a young man waiting for a plane, a family in a car. It is easy to recognize Vereisky in these works.



Above:
New York
by Orest Vereisky
Top right:
New York
by Tair Salakhov
Right:
Golf Player
by Alexei Shmarinov



Above:
Toy Venders
by Georgi Toidze

Left:
In the Café
by Vitali Goryayev

Below:
Waiting
by Orest Vereisky

try with images of people, expressive in their individuality and energetic. It is a different Salakhov we see portraying New York and San Francisco.

Unlike Salakhov, half of Georgi Toidze's works are portraits. Toidze's interest in portraits can probably be explained by the fact that he is a sculptor, and portrait sculpture in Georgia, his native republic, is especially popular. One cannot speak of Toidze without mentioning his monument to Shota Rustaveli, created for the eight hundredth anniversary of the birth of Georgia's great humanist poet. As for landscapes, Toidze, a true Georgian, was attracted to sunny California. Sketches of San Francisco, Los Angeles and Hollywood predominate in his contributions to the exhibits.

The Moscow graphic artist Alexei Shmarinov brought back mostly sketches of urban skyscrapers and motor highways. Of particular interest is the fact that all the artists saw only that urban side of America; not one did a traditional landscape that would show the nature of the countryside. That is probably because we associate the United States so much with industry and ultramodern cities. Shmarinov's interest ordinarily is in nature and especially those places untouched by man. For instance, he is the author of a series entitled *Kamchatka*. Shmarinov does a lot of traveling in the Soviet Union and abroad.

This exhibition, like any other, of course had a visitors book. I would like to quote two entries made by Americans, one from Washington, the other from New Orleans.

"We were very glad to visit this exhibition about our country. Thank you very much!"

"A great exhibit! Don't forget to let us know when you send these or similar pictures for a show in the USA."

ess of observation and stinctive line of his il- ions for the stories of l Sholokhov, Alexan- adeyev and Alexander vsky.

li Goryayev's career is ng and productive as ky's. He has special- n graphic art and is s for his sketches for Twain's *The Adven- of Tom Sawyer* and eberry Finn, as well r many of his short s. Goryayev, like Verei- howed very few city- s (three out of 17). In vorite medium—India nd water color—he ed everyday scenes: ast at a restaurant, a all game, a telephone rsation, children at a taxi stand. Realism a leaning toward the sque, often predominant ryayev's work, are pres- re too.

nter Tair Salakhov, from aijan, is represented by ics, a most uncharac- c genre for him; ab- ly every one is a pure landscape, again not sual subject matter. In aintings Salakhov us- livens up the sober cape of his native coun-

SOVIET NORTH:

INDUSTRIAL DEVELOPMENT

GRIGORI AGRANAT
Doctor of Science (Geography)

NATURE IS HARSH in the Soviet Union's northern territories. This tends to rule out any large-scale farm development and thus far has limited industrial development.

The Wealth of the North

The North accounts for more than two-thirds of the country's natural gas reserves and a considerable part of its oil reserves. In Western Siberia alone projected oil reserves are estimated in tens of billions of tons and natural gas reserves in tens of trillions of tons.

The North has huge reserves of nickel, copper, tin, tungsten, mercury and other nonferrous and rare metals, as well as mica and the raw materials for aluminum. It has almost the country's entire reserves of diamonds and rich gold deposits.

Almost 80 per cent of the country's phosphates, needed for the production of fertilizer, are to be found in the North. There are huge deposits of coal and iron ore still untapped in Southern Yakutia and along the Yenisei River. Industrial timber reserves are concentrated in the European North as well as in the southern areas of the Asian North. The Pechora, Ob, Yenisei and Lena Rivers have immense power resources.

The significance of the North for the Soviet economy is very great indeed. As far back as 1970 it accounted for 13 per cent of the country's oil output, more than nine per cent of its natural gas, a considerable part of its nickel, all of its mined diamonds and about 19 per cent of its timber.

The Rate of Development

The prospects for the industrial development of the area, as envisaged by the Ninth Five-Year Plan (1971-1975), are impressive. In 1970 the oil output of Western Siberia was a little over 30 million tons, by 1975 it will be 120 to 125 million tons, and by 1980 probably 200 to 250 million tons. The Soviet North will become the country's largest fuel supplier.

The output of nickel, copper and certain nonferrous and rare metals in the Asian North, primarily in Norilsk, Yakutia and the Northeast, will be very considerably enlarged in the next few years. In the more distant future the development of aluminum raw material deposits is scheduled for Arkhangelsk Region; titanium, for the Komi Autonomous Republic; coking coal, iron ore and natural gas, for Yakutia.

The North's present rate of development can be seen from the following capital investments: In 1966-1970 they totaled 17.9 billion rubles, and in 1971-1975 (according to the draft plan) they will climb to 27.5 billion. This rate is much higher than the average for the country as a whole. Within the boundaries of the North proper, capital investments in its Asian part are increasingly larger: In 1966-1970 they amounted to 40 per cent, and in 1971-1975 the figure will be more than 62 per cent.

The Complexity of the Problems

What are the main problems in developing the Soviet North? They are financial, first and foremost. To develop uninhabited areas and settle them, particularly those in the bleak Far North, require a great deal of money. The return on funds spent to explore the territory, to construct transport facilities, power plants and settlements—what economists call the infrastructure—is not as rapid nor as profitable as on funds invested in developed and populated areas.

All this is taken into consideration by Soviet planning agencies concerned with the North. Lower norms of economic efficiency are foreseen for investments, and longer periods are allowed for a return. Soviet authorities are considering making even greater allowances.

This approach is economically justified in areas like the North, which are very rich in natural resources, many of them probably still unknown. Although there is no predicting exactly when, they are areas where we might well expect to see new industries eventually. Here, too, we have to count not

so much on today's estimates as on those of the future.

In considering, say, whether it is practicable to build a new railway, we try to take into account not only the volume of freight that will have to be transported today or in the conceivable and not too distant future. We also take into consideration the secondary effect the railway may have on the economic development of adjacent territory.

Transport: the Key Problem

The rate at which we develop and settle the North depends primarily upon transport facilities. Far-reaching plans are now being worked out for a basic transport network, railways first and foremost, which in 15 to 20 years will probably connect all the big industrial and populated centers of the North—Norilsk, Yakutsk, Magadan and others—with the country's rail network.

Since the majority of the big northern industrial centers, particularly Magadan and Norilsk, are so remote, we have had to start setting up a complex of servicing and auxiliary enterprises there—building materials plants, factories for certain spare parts, repair shops, food processing plants, and so on.

Forms of Development

In what ways and in what forms do we propose to populate the area? We are going to continue improving the old basic centers and big cities in the North and go on building new ones.

However, discussion of the methods and forms by which individual regions of the mining industries are to be populated is still going on. Which is preferable: To continue building centers in the North where people will live permanently, or to limit ourselves to so-called shift settlements? Rotating staffs of factory and office workers would come from towns and populated points for a relatively short period—one to two months. Calculations indicate that the latter way is more advantageous: There is no need then to build expensive settlements with schools, kindergartens and hospitals; and ground transport facilities can be minimal since people and freight can travel by air.

However, account-book calculations cannot take into consideration many factors which, in the final count, would make for social and economic difficulties. Living by the shift method would be very complicated. People would be periodically separated from their families and their customary way of life. Every month or two (and this is important!) they would have to adjust to new climatic conditions. It is a fact that, despite medical progress, people's acclimatization in the North and, even more, their re-acclimatization in the central regions, is still a very painful process. In the long run, it leads to lower labor productivity and more manpower fluctuation.

It may be that in some cases, where the deposits to be exploited are not very big and it is calculated that the facilities will be required for only a short period, there is some sense to the shift method. But here, too, the orientation should be toward the big centers in the North.

Still, the general principle, one most specialists subscribe to, is that the North should be populated gradually. Specifically, this principle means building a basic network of big, diversified towns that are surrounded by small, sometimes temporary, settlements dependent upon them, with mines or timber-industry enterprises.

We believe population growth will be rapid. According to Dr. Slavin, by the year 2000 there will be 12 to 14 million people living in the North; according to other estimates, which we think are less realistic, the figure will even reach 18 to 20 million.

That the idea of permanently settling the North seems to be feasible is shown by the amount of planning being done on large-scale housing construction for the northern areas. Engaged in the work are research and design institutes of the State Building Committee of the USSR Council of Ministers and other departments. Special projects are being worked out for those regions, and specific architectural and construction solutions are being sought for size, layout and other details that will make life easier in the harsh climate. In northern cities like Norilsk or Magadan, living, social and cultural conditions differ little from those of towns in temperate latitudes.

Made in the North

How to adapt machines, equipment and materials to northern natural conditions is a very serious problem. We know that standard technical equipment operates poorly at very low temperatures. Parts of trucks or excavators made of standard steels break at 40 degrees below zero, rubber loses its flexibility and lubricants congeal. Engines do not start at low temperatures; the usual starting mechanisms do not work.

Using standard technical equipment in the North means lower efficiency, frequent breakage, accidents and, in the final analysis, economic loss. That is why a Science and Engineering Council has been set up to work on special (or, as we call it, regional) technical equipment. Several research and design institutes are experimenting with frost-resistant steel, rubber and lubricants. Many experimental models of trucks, tractors, excavators and road-building machines have been produced especially for work in the North. They not only use frost-resistant materials, but all joints and systems are designed to withstand such things as snowdrifts, sharp changes in temperature and long exposure to cold. A number of machines are already in serial production.

Special plants are being built that will turn out technical equipment for the North. The development of such equipment has not only a specific aspect, which might be called physical, but also an economic aspect. Since there is a shortage of labor in the North and since it is very expensive to move people there and to house them, a higher level of mechanization and automation is of much greater significance than in a developed area. While, say, a new machine or an improved technological system releases one man both in the North and in temperate latitudes, the use of this machine or system in the North is comparatively more beneficial economically. Hence, the need for the highest degree of mechanization that will make for the highest labor productivity.

The specific conditions of the North and the experience gathered thus far show that special government agencies need to be set up to coordinate the entire process of development of the North. The Soviet Union had such agencies as the Committee on the North and the Main Department of the Northern Sea Route decades ago. Now we have such agencies, for instance, as the Interdepartmental Commission on the Problems of the North (within the framework of the State Planning Committee). However, our specialists believe that the over-all administration of the northern regions ought to be strengthened.

Industries and Nature

Nature in the North needs more protection than in the central regions. For instance, a track left by a heavy caterpillar cross-country vehicle in the forests near Moscow disappears in a week or two; in the tundra it remains for months. If two or three vehicles pass along this track, it becomes a bog, and the soil and the vegetation are almost completely ruined. It takes 25 years to restore moss and lichen.

Due to their poor biological productivity and the low temperatures, the waters of the northern rivers and lakes are less able to purify themselves than those in medium latitudes. Similarly, the air over northern cities becomes polluted more rapidly, since hard frosts and frequent temperature inversions (the temperature taken from the surface of the earth upward does not get lower, as is usually the case, but rises) are conducive to stagnation and the settling of fumes and polluting particles.

Conservation in the North is particularly complicated by permafrost. Roads, pipelines and buildings unbalance the thermal regimen of the layer of frozen soil. The thaws create bogs and even gullies.

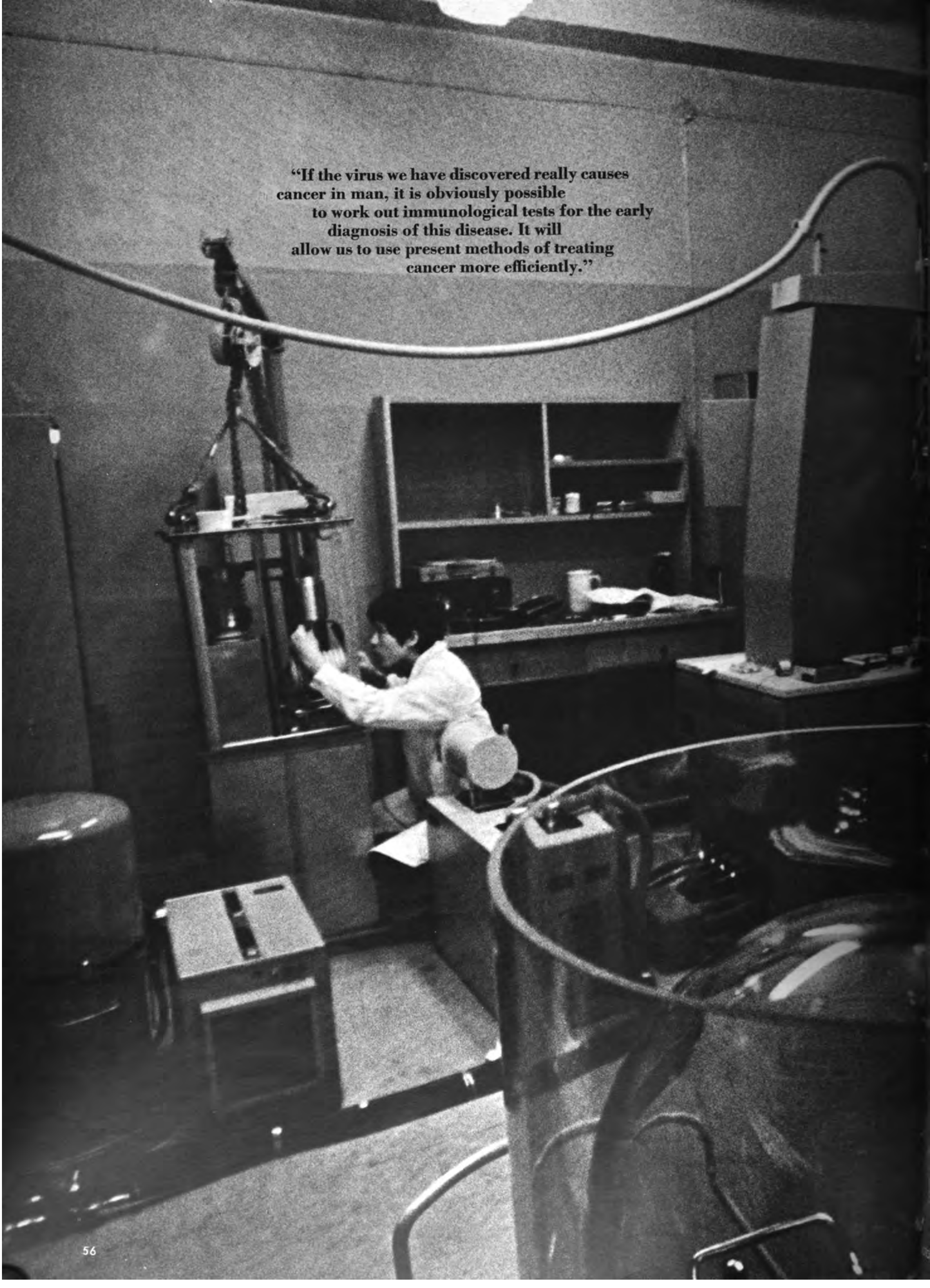
Conservation here is especially important, considering the large-scale development of oilfields and gasfields in several northern regions, as well as the construction of oil and gas pipelines, which are the most threatening air, water and soil polluters.

The North is also promising as a tourist attraction. The number of tourists taking cruises on the Ob, Yenisei and Lena rivers and trips along the shores of the White, Barents and Kara seas, as well as the shores of the Sea of Okhotsk and the Bering Sea, including Kamchatka, keeps growing.

The development of tourism in the underdeveloped regions of the North will take great effort and large-scale preparation, particularly if tourism involves a territory a long way from the sea and other transport facilities are required. New roads are to be built, as well as hotels, campsites and stores. Traveling in the North will probably take different forms, perhaps using small cross-country vehicles and helicopters. Tourism could become an important factor in the balanced and diversified development of the North.

* * *

As we see it, these are the most important problems in developing the North. They are specific and differ considerably from those which crop up in developing regions in the temperate latitudes. In other words, the development of the North requires a special economic, technological, administrative and ecological policy. It means that scientific and technical cooperation of the biggest northern countries is particularly necessary and timely.


"If the virus we have discovered really causes
cancer in man, it is obviously possible
to work out immunological tests for the early
diagnosis of this disease. It will
allow us to use present methods of treating
cancer more efficiently."

CANCER: A NEW RESEARCH STAGE

By Yulia Shishina

CANCER, the killer that takes three million lives a year, is a major problem of our time. One part of the problem is its medical, practical side; the other, its biological side. The origin of cancer is still unknown.

Persistent research to determine its cause, development, detection, prevention and treatment is being carried on in the Soviet Union, the United States and other countries. Tremendous scientific forces involving thousands of researchers and doctors working in dozens of institutes have been mobilized in the Soviet Union to study the problems of oncology. Among them are the Experimental and Clinical Oncology Institute and the Experimental Pathology and Therapy Institute, both of the USSR Academy of Medical Sciences, as well as the oncology institutes in Leningrad, Kiev, Riga and other cities. The largest of the scientific complexes is now being organized in the Soviet Union to deal with the medical problems of oncology.

But no matter how great society's effort to combat the disease, the problems of prevention, diagnosis and treatment can be effectively solved only after the causes of malignant tumors are discovered.

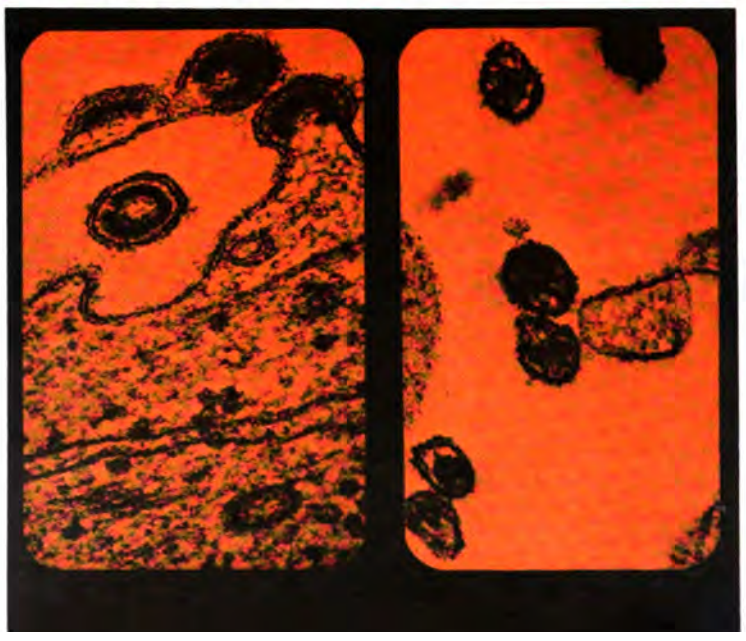
While there are numerous theories about the origin of cancer, in the past few years more and more scientists have come to accept the explanation of the virus nature of cancer in man. This is more or less what they say: The virus origin of cancer and leukemia in animals can be considered proved since about 150 pathogens of these diseases have been discovered. Taking into account the fact that, as far as we know, similar viruses cause similar diseases in animals and in man, it would be logical to suppose that cancer viruses are no exception.

This idea was supported by several successful studies. For example, Academician Boris Lapin of the USSR Academy of Medical Sciences showed that when the blood taken from human patients suffering from leukemia was injected into monkeys, they developed the disease. Otar Andzhaparidze, corresponding member of the USSR Academy of Medical Sciences, and a team of his colleagues at the Virus Preparations Institute of the USSR Ministry of Health isolated a virus from the blood of people suffering from leukemia that turned the nor-

Professor Albert Bykovsky in his laboratory. He is studying the structure of pathogenic viruses.

Photographs by Vladimir Bogatyrev

Professor Bykovsky and his assistants. They were the first to find human oncogenic viruses.



These viruses are the suspected cause of human cancer. Isolated in tissue cultures of humans, they produce cancer in animals.

mal cells of tissues cancerous. Valentin Solovyov, member of the USSR Academy of Medical Sciences, discovered a virus resembling the animal leukemia pathogen in the transplanted strain of human leukemia cells. But while the animal cancer viruses were discovered directly in their tissues—at the scene of the crime, so to speak—and the scientists could see them with their own eyes, similar viruses were not discovered in human tissue. Scientists in many laboratories kept searching for them.

Here is the history of one such effort.

ONCOGENIC VIRUSES

Albert Bykovsky, Doctor of Science (Medicine), has been as closely tied to his electron microscope as a press photographer to his camera since 1959 when he began to hunt for the smallest of the living creatures known. First he hunted for viruses, the pathogens of infectious diseases.

In 1965 he was awarded a doctor's degree, skipping the candidate's degree. To give readers some idea of the difficulty of his work, let me say that the smallest cell magnified a million times is the size of a 10-story house, but with this same magnification a virus is the size of an orange or a cherry. And he was looking for viruses in the cells.

Thanks to Bykovsky's first studies, virologists learned how infectious viruses penetrated the cells, developed (ontogenesis) and reached the stage of their destructive activity.

Since then he has probed the depths of the cell with the hidden viruses, entering the microcosm through the eyeplece of the electron miscroscope. As a result of his investigations he has been able to establish the regularity of intercellular development in about 50 pathogenic viruses and produce a unique gallery of photographs to identify them. He has also published the *Atlas of the Ontogenesis of Human and Animal Viruses,* prepared in collaboration with his teacher Professor Arshaluys Avakyan.

For Bykovsky these first discoveries were milestones on the way to a goal he has been reaching for since his student years—the search for the cancer virus.

In our century man may have traveled far from the Earth, but he has not yet solved many of the unknowns of his own planet, the cause of cancer, for example.

Scientists have been searching for cancer pathogens for a long time. In 1910 the eminent Russian scientist Ilya Mechnikov said that the combination of several factors was responsible for the development of malignant tumors and that one of these factors came from outside, while the others were present in the organism. "In the meantime we have to accept the fact that the cancer microbe belongs to the category of Infections that cannot be discovered even with the best microscopes we have," Mechnikov said.

The virus theory of the origin of cancer was based on the presumption that cancerous processes are kindred to infectious diseases. Scientists believed and yet did not believe that cancer viruses existed. They could not see them, that is why the virus theory was only one of many, among them the theory of fetal rudiments that "lost their way" in the body, irritation, biological abnormality and chemical factors. They had no proof of the virus theory. Academician Lev Zilber of the USSR Academy of Medical Sciences has developed and argued this theory most consistently in the scientific literature since 1945. He said that the malignant regeneration of the cell was the result of the influence of cancer viruses and that the genetic apparatus of the virus built itself into the genetic apparatus of the cell, turning a normal cell cancerous.

Bykovsky became acquainted with Zilber's ideas when he was a student. He hoped that he would some day be able to work with him, a hope that has since been realized. From his early years of study he has been a convinced champion of the virological theory of the origin of cancer. But he did not start hunting for cancer viruses until he had mastered the process of studying viruses inside the cell, where they live and develop. Outside the cell the viruses are as dead as stone. In his search for cancer viruses, as yet not seen by anybody, he had several unexpected experiences.

In 1959, the laboratory headed by Professor Arshaluys Avakyan (the Gamaleya Epidemiology and Microbiology Institute of the USSR Academy of Medical Sciences) experimented with infecting human tissue cultures with infectious viruses. Among other strains they infected a He La strain prepared from a woman whose initials were H.L.

Bykovsky discovered in these cells some unusual tiny particles, but they did not hold his attention. At that time virologists were not familiar with the oncogenic RNA-containing viruses (and it was established later that these had been the viruses). The negatives of the photographs of these particles were sent to the negatives collection and remained there for more than 10 years.

Bykovsky met the onco-RNA-containing viruses for the second time in 1967, when there was an outbreak of a formerly unknown hemorrhagic fever in Tajikistan and a group of virologists were sent there to study it. The injection of the sick people's blood into a culture of human tissue resulted in the development of a kind of multiple tumor in several days. This tumor could be transferred to other cultures.

Studying the tumorous cells under the electron miscroscope, Bykovsky saw the familiar particles. By that time it had been proved that the animal viruses causing malignant growth of the cells could be DNA-containing or RNA-containing (onco-RNA-viruses). The latter are classified into three types—A, B and C–depending on their nucleus structure.

The particles discovered in the tumor tissue cells looked like B-type animal onco-RNA-viruses, but once again the scientist paid no attention to them.

In 1970 Bykovsky, who headed the Morphology (Structure) of the Ontogenic Viruses Laboratory then the only one of its kind in the Soviet Union, jointly with Konstantin Ilyin, a researcher,met the onco-RNA-viruses face to face for the third time at the Gamaleya Epidemiology and Microbiology Institute. This time in the HeP-2 strain of cells taken from a man suffering from larynx cancer, in the old cultures studied many times and by many researchers where nobody hoped to discover anything new. Only this time when he bumped into his old acquaintances, Bykovsky started looking for regularities in this phenomenon.

Until then scientists tried to find cancer pathogens in the fresh cultures of cancer cells. It had never occurred to them to look for these pathogens in the tumors that sometimes existed for 10 years outside the organism. But then, this course of events was in keeping with Lev Zilber's virological theory.

A and B types of onco-RNA-viruses were discovered in the HeP-2 cells which formerly had been found only in the cancer cells of animals. What did it mean? Did they get there by mistake, or were these the tenants of human cells or the pathogens of tumors?

In 1972 Albert Bykovsky, Konstantin Ilyin and Victor Zhdanov succeeded in isolating the virus, concentrating and purifying it. They established that it belonged to the category of onco-RNA-viruses. Then similar viruses were discovered in other old cultures of human cancer cells—cervical and brain cancers (by Galina Miller, Iosif Irlin, and Albert Bykovsky). After a while the viruses became visible in photographs.

What were they? This question was argued daily at the laboratory.

What if these viruses were the pathogens of cancer they had been searching for so long? What if the virus develops in the cell under the influence of age, difficult conditions of the cell's existence and other harmful influences, as Zilber predicted?

It was necessary to pass the viruses through several stages of identification. At the Virology Institute named for Dmitri Ivanovsky, the father of virology, and headed by Academician Victor Zhdanov of the USSR Academy of Medical Sciences, where the study of viruses is organized along lines of molecular biology, these viruses were purified, their biochemistry was studied, and biophysical parameters—structure, compactness, RNA content and the molecular weight of the RNA—were established. These viruses differed in the arrangement of proteins from the animal onco-RNA-viruses, though there was some likeness to the virus causing mammary gland cancer in monkeys. To check the results, they decided in the laboratory to present three strains of the supposed human cancer pathogens for impartial international study. The viruses had to pass through the severest tests for comparison with all the virus strains known to contemporary science that cause tumors in animals. (These viruses are kept at the special museums of the research institutes.)

Three strains of the 10 found by Bykovsky and his team were passed on together with other viruses to the American virologist delegation that visited Moscow in November 1972. By 1973 the first confirmations of the Soviet virologists' main conclusions and results were obtained in the United States.

Then Konstantin Ilyin made a study jointly with American researchers of the Soviet virus received from the HeP-2 cells that established the following:

1. This virus differs from all the known animal viruses, except the pathogen of the mammary gland cancer in monkeys, with which it has a number of common qualities.
2. The specific antigens (proteins) of this virus are contained in the replanted cells and directly in the tissues of the tumor of human mammary gland.
3. Soviet researchers Konstantin Ilyin, Albert Bykovsky and Victor Zhdanov isolated a special, formerly unknown subgroup of the oncogenic RNA-containing viruses from the cancerous cells, which they say are related to some forms of human cancer.

They called this group "carcinoviruses."

The results of this work were unanimously recognized as scientifically valid after the joint Soviet-American symposium held in Moscow in 1974.

I asked Bykovsky what he thought about the prospects for diagnosis, prevention and treatment of cancer.

His reply: "If the virus we have discovered really causes cancer in man, it is obviously possible to work out immunological tests for the early diagnosis of this disease. It will allow us to use present methods of treating cancer more efficiently. For some time now scientists have been searching for anti-cancer vaccines and other immunological preparations that specifically affect the virus and cancerous cells."

KARPOV OR KORCHNOI?

By Boris Spassky
Former World Champion

All chess lovers will be following with keen interest the final match between Anatoli Karpov and Victor Korchnoi, both of Leningrad. These two of the strongest Soviet grandmasters, having successfully negotiated the first two stages of the traditional challengers competition, now have to decide who will fight for the chess crown in 1975.
We have asked former world champion Boris Spassky to introduce the challengers to SOVIET LIFE readers.

THE FINAL MATCH of the challengers for the world chess crown promises to be both tense and dramatic. Meeting over the board are a talented young man whose name is associated with the future of chess, on one side, and an extra-class grandmaster of the older generation, on the other.

Anatoli Karpov turned 23 quite recently. I first met him nine years ago at a training session of a youth team of the Russian Federation in Vladimir, 110 miles from Moscow. The session was conducted by Grandmaster Igor Bondarevsky; I was his assistant. At the close of the two-week session Bondarevsky and I gave an alternate simultaneous exhibition. The interesting game with Karpov ended in a draw. Anatoli was then the youngest on the team, but he clearly surpassed his teammates in inventiveness and speed. Even then I was struck with the way he started the game and played it through and with his assurance and seriousness, unusual for a boy his age.

In subsequent years Karpov's talent developed even more. His manner of play was always based on a sober assessment of the position, and after the Alekhine Memorial (Moscow, 1971), where the young chess player tied experienced Leonid Shtein for first place, he made a long stride forward. He was bolder, inclined to take more risks, and became an excellent tactician. These virtues, added to his finished technique, steel nerves and will to win, made the young player a grandmaster with wonderful prospects.

Here is a game Anatoli Karpov played in the present challengers meet.

SICILIAN DEFENSE
Sixth Game of the Match
Moscow, 1974

White A. Karpov	Black L. Polugayevsky
1. P-K4	P-QB4
2. Kt-KB3	P-Q3
3. P-Q4	PxP
4. KtxP	Kt-KB3
5. Kt-QB3	P-QR3
6. B-K2	

Karpov's chief weapon in the Najdorf System.

6. ...	P-K4
7. Kt-Kt3	B-K2
8. O-O	B-K3
9. P-B4	Q-B2
10. P-QR4	QKt-Q2
11. K-R1	

Grandmaster Yefim Geller's idea. This means that White is in no hurry to develop his black-square Bishop, hoping to place it directly on Kt5, given the opportunity.

11. ...	O-O
12. B-K3	

This move is more precise than 12. P-R5, as I played it in the second game of my match with Robert Byrne (San Juan, 1974). In reply to 12. P-R5 the American grandmaster could have played 12. ... P-QKt4 13. PxKtP QxP with good play for Black.

12. ... PxP

Giving up the center is a serious concession to White, after which his pieces become noticeably more active.

13. RxP

You find this position in all the games of the match in which Karpov played White. It is not especially involved, but it is difficult to play. Each of the sides has an isolated Pawn: White on K4 and Black on Q3. Besides, Black has the K4-square that is a favorite with the "Sicilians." So, it might seem that everything is in fine shape. But not quite. As compensation for that point, White exercises control over the Q5, Q4 and KB5 points, while his minor pieces are quite mobile. Also keep in mind that the advance P-R5 permits White to block the opponent's Q-side.

13. ... Kt-K4.

This is stronger, I would say, than 13.

14. P-R5!

This not only cramps Black's Q-side but also establishes firm control over the Q5-square, since Black's Rook cannot occupy the Q1-square due to the move 15. B-Kt6.

14. ...	Kt(B)-Q2
15. R-KB1	B-B3

White: K.KR1; Q.Q1; R.QR1 and KB1; B.K2 and K3; Kt. QKt3 and QB3;
Pawns: QR5, QKt2, QB2, K4, KKt2, KR2 (14);
Black: K.KKt1; Q.QB2; R.QR1 and KB1; B.K3 and KB3; Kt.Q2 and K4;
Pawns: QR3, QKt2, Q3, KB2, KKt2, KR2 (14)

16. Kt-Q5!

A purely positional sacrifice of two Pawns based on the fact that now White will occupy strong positions in the center, while it will be hard for Black to defend his extra Pawn.

16. ...	BxKt
17. QxBP	

Polugayevsky accepts the challenge.

18. Kt-Q4!	QxKtP
19. QR-Kt1	Q-B6
20. Kt-B5	

That is the position White had in mind in sacrificing two Pawns.

20. ...	Q-B7
21. QR-K1	Kt-B4

Polugayevsky defends himself cleverly. In case of 22. ... Q-B3 the mere 23. KtxQP preserves White's powerful initiative in view of the weakness of Black's QKt-Pawn.

22. KtxQP	Kt(B)-Q6
23. BxKt	KtxB
24. R-Q1	Kt-Kt5
25. QxP	QR-Kt1
26. Q-R7	Q-B3(?)

Both the opponents waged the struggle with great concentration and ingenuity. But man is not a machine, and there is no ruling out mistakes. Thus, in this situation Black can defend himself successfully by 26. ... Q-K7. The intent of this move is to hamper the cooperation of White's forces.

27. B-B4(!)	R-R1
28. Q-B2	QR-Q1
29. Q-Kt3	Q-B6
30. R-B3	Q-B7
31. R(Q)-KB1	

White's pieces hold formidable positions so that it is extremely difficult for Black to defend himself.

31. ...	B-Q5
32. B-R6	Kt-B3
33. Kt-B5	Q-Kt7

On 33. ... B-K4, the winning move 34. BxP.

34. B-B1(!)	Q-Kt4
35. Kt-R6ch	K-R1
36. KtxPch	RxKt

If 36. ... K-R1, then 37. Kt-R6ch.

37. RxR	B-B3
38. Q-B2	K-Kt1
39. RxB(!)	PxR
40. QxP	

Black resigns.

A fine creative achievement for the young grandmaster.

Victor Korchnoi is 20 years older than his rival. His strength is most evident in counterattack. Korchnoi has a flexible playing style, colossal energy and great capacity for work during a game. Returning from a major international tournament, he once said: "I used up enough nervous energy to light up a small hotel."

Korchnoi also has enviable persistence, tenacity in defense and ferocity in attack. Chess for him is first and foremost an arena for search and struggle. I believe that in solving problems that arise, he is less inclined to trust his intuition than concrete calculation. Korchnoi's ability to calculate variations far ahead and with precision also helps him in the end game.

It is noteworthy that Korchnoi has a fine understanding of the psychology of chess. Though it is true that in style he is more the tournament warrior than the match battler. He gets so absorbed in his ideas, in original schemes, that he does not always bother about the prosaics of chess. This is his vulnerable spot.

The creative style of his play is well illustrated by the following game, which is not well known to the general chess public.

GRÜNFELD DEFENSE
Twenty-eighth USSR Championship
Riga, 1970

White I. Platonov	Black V. Korchnoi
1. P-Q4	Kt-KB3
2. P-QB4	P-KKt3
3. Kt-QB3	P-Q4

The Grünfeld Defense has long held a prominent place in Korchnoi's opening repertory.

4. B-B4	B-Kt2
5. P-K3	O-O
6. Q-Kt3	PxP
7. B(1)xP	Kt-B3
8. Kt-B3	Kt-QR4
9. Q-Kt4	KtxB
10. QxKt	P-B3
11. B-K5	

The positions occupied by White's pieces look attractive, but Black begins to harass his opponent seriously with the very next move.

11. ...	B-Kt5
12. Kt-Q2	B-K3
13. Q-K2	R-B1
14. P-K4	

White: K-K1; Q-K2; R.QR1 and R1; B.K5; Kt.QB3 and Q2;
Pawns: QR2, QKt2, Q4, K4, KB2, KKt2, KR2 (14);
Black: K.KKt1; Q.Q1; R.QB1 and B1; B.K3 and KKt2; Kt.KB3;
Pawns: QR2, QKt2, QB3, K2, KB2, KKt3, KR2 (14)

14. ... B-R3(!)

It is fascinating to watch Korchnoi's spring uncoil and leave only the ruins of White's pretty position.

15. Kt-B3	P-QKt4(!)
16. Q-B2	B-Kt5
17. O-O	Kt-R4
18. Kt-K2	Q-Q2
19. Q-Q3	

You get the impression that White cannot even guess from where his opponent's next blow will come.

19. ...	P-QB4(!)
20. QR-Q1	P-B5
21. Q-B3	P-B4(!)

Korchnoi doesn't give his rival a moment's respite: He wages an offensive along the entire front.

22. PxP	RxP
23. Kt-Kt3	R-KB2
24. KtxKt	BxKt(R)
25. P-Q5	QR-B1
26. Q-Q4	RxKt
27. PxR	Q-R6!

No salvation against the threat 28. ... BxP. White resigns.

THE ADVENTURES OCTO

1. At the bottom of the sea, all surrounded by weeds, stood an unusual house. It was built of large shells. That is where Mother Octopus and her little ones lived.

2. In the morning Mother Octopus was busy with housework. She had a lot to do. But she had a very good helper, her elder son, Octopus Junior.

3. After breakfast Junior and his [illegible] schedule a
Sea Horse would go off to school. [illegible]out the sam
was not far from his house. [illegible] but the lesso
[illegible] taught the

7. Octopus Junior got on Flying Fish's back and put all his eight tentacles around him. Flying Fish shot out of the water, glided across the waves and then took off.

8. Junior was scared. He tried to hold on to Flying Fish's fin but slipped off into the water. Still he did not give up. He shaped himself like a parachute and began to sink.

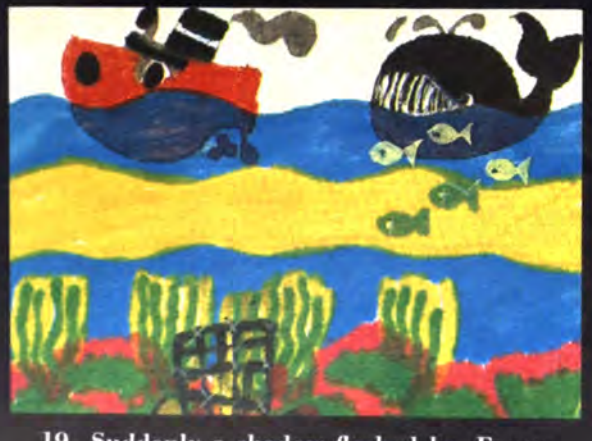
9. Junior found himself in a strange [illegible] of a sudden
surrounded by strange fish. The fish [illegible]ther: They sa
also surprised at his sudden appearan[illegible]panied by Pil
[illegible] or they would

13. Junior told the other fish how he got away from Shark. "I have a bag full of ink. I ejected the ink and dropped down to the bottom."

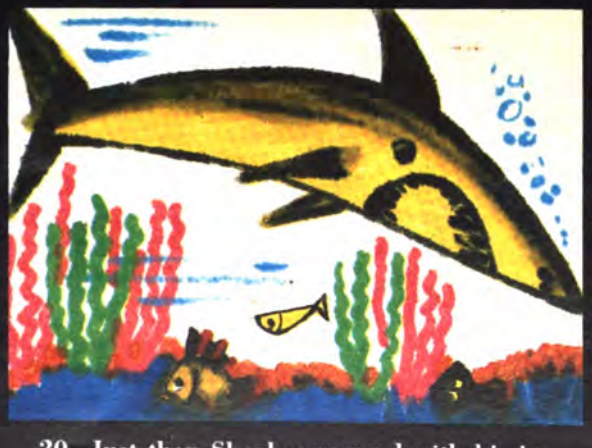
14. Next day Shark swam up to the school where Junior was studying. Pilot Fish was at his side as usual. They had a wicked twinkle in their eyes.

15. The treacherous Shark burst into [illegible]
schoolhouse, frightened the pupils [illegible]
swam off. Before leaving, he promised
come back.

[illegible], the old teac
[illegible] to get rid o
[illegible] up a plan: The
[illegible] poor eyesight,



19. Suddenly a shadow flashed by. Everybody pricked up his ears and peered out intently. But it wasn't Shark. It was kind-hearted Granddad Whale.



20. Just then Shark appeared with his inseparable Pilot Fish. They were ready for a fight and in a terrible hurry. But things took a bad turn for them.

21. Pilot Fish noticed Sea Horse am[illegible]
the stones. When he swam nearer fo[illegible]
better look. Electric Ray dashed out [illegible]
stunned Pilot Fish.

[illegible]d was now left wi
[illegible] become very n
[illegible]ely on his poor ey
[illegible]to see Junior and J

Drawings and text by Leonid Sergeyev

schedule at the underwater school
out the same as at schools on dry
at the lessons were different. The
taught the little ones sea wisdom.

5. After classes Junior and Sea Horse arranged swimming races and played all sorts of games. Once they saw a fish caught in a net and decided to call Sawfish.

6. Sawfish came right away and freed Flying Fish. As a reward, Flying Fish invited Octopus Junior to take a ride on his back.

l of a sudden the fish scattered helelter: They saw Shark approaching, panied by Pilot Fish. Junior had to or they would kill him.

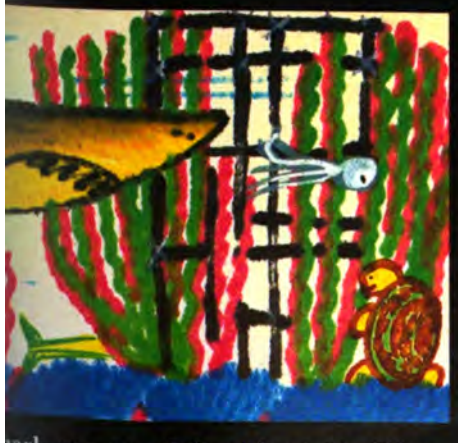
11. On seeing Junior, Shark opened his jaws and dashed toward him. But it did him no good at all. Junior shot out a big black spot of ink, the octopus's weapon.

12. Shark got very angry at that. He raged, darted to and fro, threatened to make short work of that nasty imp, as he called him.

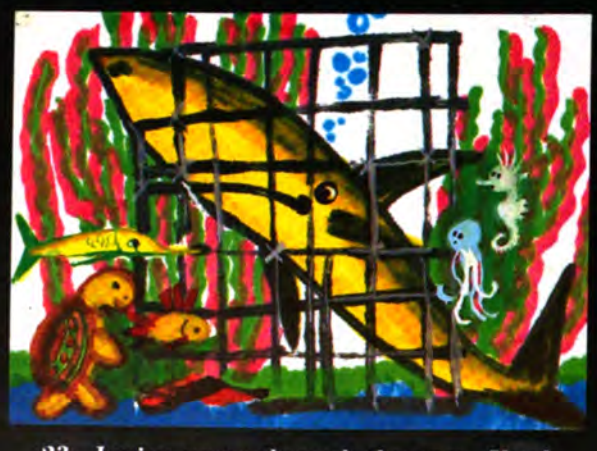
urtle, the old teacher, tried to figure
ow to get rid of Shark, and she
t up a plan: They must lure Shark,
ad poor eyesight, into a big cage.

17. Everyone helped make the cage. And Junior said he would act as bait, for Shark was sure to rush after him the moment he saw him.

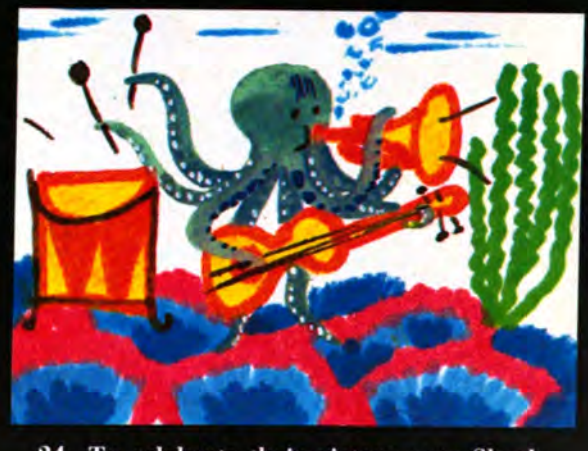
18. At last the cage was ready. It was firm and strong. They set it in the stones and covered it over with weeds so no one would see it.



ark was now left without his Pilot
He become very nervous for he
't rely on his poor eyesight. But he
ged to see Junior and went after him.



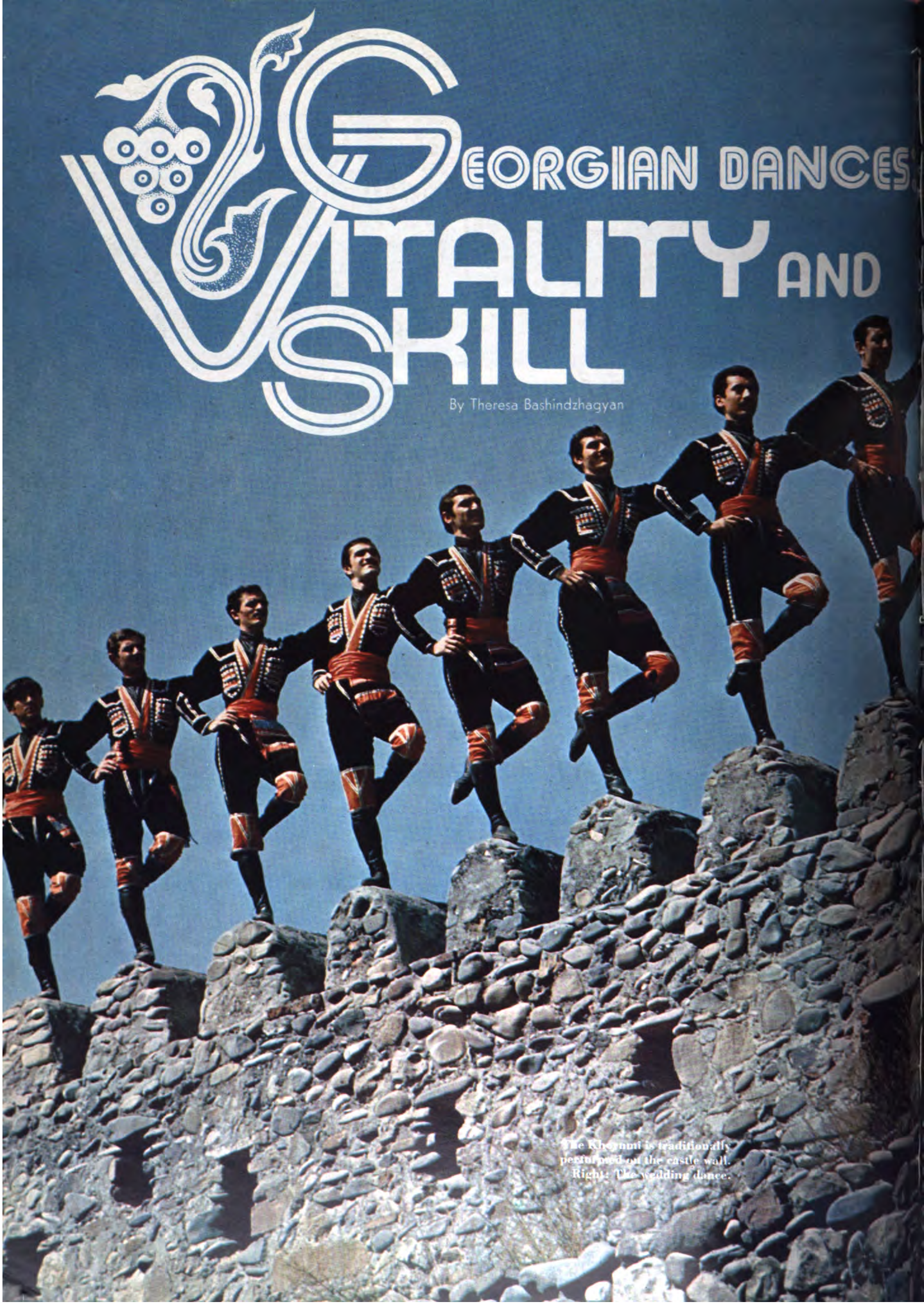
23. Junior swam through the cage. Shark rushed after him and got stuck. The fish shut the cage quickly and hung a lock on it. Now no one was afraid of Shark!



24. To celebrate their victory over Shark the Bandit, the sea folk gave a party. Octopus Junior played several musical instruments at once, and everybody had a fun.

Georgian Dances: Vitality and Skill

By Theresa Bashindzhagyan



The Khevsuri is traditionally performed on the castle wall.
Right: The wedding dance.

This dance group,
formed two decades ago,
conveys the flavor
of Georgia to its
audiences in the Soviet
Union and abroad.

SONG AND D
part of the G
the reason such
on professional
this is the virtu
State Song and

Georgian chora
been famed for
singers of the G
convey all its u
elements and a
a modern, reju

The repertoire of the Georgian company includes both the old folk dances and contemporary original creations.

Characteristic of the Georgian dances are their contrasts of mood and tempo. Top: Elza Kakhmiashvili, soloist of the

hedzhibri dance is as old as
aucasus Mountains. Dagger,
and boots are invariable parts
Georgian national costume.

NEXT ISSUE

According to statistics, the average city inhabitant has three and a half hours of free time a day—really free, not spent going to and from work or doing chores around the house. As the standard of living goes up, so do people's requirements and demands for interesting and diversified leisure activities. The problem is twofold: to extend leisure time by facilitating domestic chores and to provide the wherewithal and inspiration for developing people's creativity so that they can use the time thus gained in meaningful and fulfilling pursuits. How Soviet society is solving this problem is the theme of the November issue.

Twenty years ago the world's first atomic power station, in the city of Obninsk near Moscow, started generating electricity. The capacity of the Obninsk plant was only 5,000 kilowatts, but during the next two decades the more than 100 installations built all over the world could produce 30 million kilowatts. The large new atomic plants in Central Russia, the Urals, the Far North and the Caspian Sea area are economical and radiation-safe. New types of atomic reactors are being designed and built in other parts of the country as well. Pyotr Neporozhny, USSR Minister of Power and Electrification, discusses the latest developments in the field in his article "Electricity from the Atom."

One of the largest projects of our time—building the Baikal-Amur railroad—has begun in the dense forests of Eastern Siberia and the Soviet Far East. The 2,000-mile-long line will make accessible undeveloped areas rich in natural resources. This means more industrial and modern urban communities for the country. Like big projects throughout the Soviet Union, the Baikal-Amur is being built by young volunteers from all the republics. Ivan Yurchenko and Yuri Sadovnikov, correspondents for the newspaper *Sovetskaya Rossiya*, arrived at the site with the first builders. Their illustrated article tells what they saw there.

Stability of retail prices is a characteristic feature of Soviet economy. How price levels are maintained or systematically lowered for the necessities of life—food, clothing, housing, utilities, transportation—is told in an article written by Vladimir Sitnin, Chairman of the State Committee for Prices under the USSR Council of Ministers, in the November issue.

One hundred and forty large firms and banks from 32 Western countries participated in the International Conference on the Development of International Economic, Industrial, Scientific and Technological Cooperation that took place in Moscow recently. Soviet officials and American businessmen agree that the conference helped strengthen cooperation between countries with different social systems. In an interview Dzhermen Gvishiani, cochairman of the conference, and Alexei Manzhulo, Deputy Minister of Foreign Trade, discuss Soviet-American trade today.

Electroanalgesia has proved its value in obstetrics and surgery as a far safer painkiller than any known anesthetic. Now its therapeutic use is being developed, and an apparatus for administering it is in production. An article by science commentator Matvei Khromchenko on this subject.

COMING SOON

Fiftieth Anniversary of the Central Asian Republics

EXPO-74 ON STAMPS

By Yuri Murashkin

To commemorate an important international event, the opening of EXPO-74 in Spokane, Washington, the USSR Ministry of Communications issued a series of stamps and a souvenir sheet designed by artist Nikolai Litvinov. Each stamp reflects the general idea of the series—the responsibility of humans for their environment. The over-all slogan is "Everything for Man and His Future." Leading off the series is a souvenir sheet picturing a baby with its hands stretched to the sun. The inscription reads: "Protection of the Environment from Pollution. World Exhibition 1974. Spokane USA." Symbolic images depict the air, earth and water. The 65 x 90 mm. sheet is printed by offset, the denomination is 50 kopecks.

The stamps of the series are three-color intaglio. The leading color shows up strongly against the two more restrained accompanying colors. Each stamp depicts some aspect of the environment: the atmosphere, the hydrosphere, the earth deep underground, flora and fauna. The denominations are 4, 6, 10, 16 and 20 kopecks, the size is 28 x 40 mm.

The stamps and the sheet went on sale April 24,1974.

SOVIET LIFE

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EDITOR'S NOTES

MEASURE OF WEALTH

ON NOVEMBER 7 AND 8 each year the people of the Soviet Union celebrate their national holiday—the anniversary of the Great October Socialist Revolution of 1917. This is the fifty-seventh anniversary of Soviet power.

The October Revolution took economic and political power away from the country's capitalists and landowners and gave it to the people. For the first time in history a state was formed based on the people's ownership of the means of production—the land, its mineral wealth, factories, railways.

The ultimate aim of this change was to create social conditions which would give everyone the opportunity for rounded and harmonious personal development.

This is a large, complex and profoundly humanist goal. Never before has it been tackled by a single state, but the October Revolution and the new communist society made it achievable.

Soviet power inherited a sad legacy from the past. Industry, backward as it was, had been ruined in World War I and the Civil War. Agriculture was primitive. Three out of every four people were illiterate. The situation was aggravated by the lengthy economic blockade of the young Soviet republic by the capitalist world. Then came the nazi invasion. In that war the Soviet Union lost over twenty million people. The material losses were incalculable.

In the face of all this, it took a Herculean effort for the Soviet people to even approach the great social task they had set themselves.

The transformations they made provide all 250 million Soviet citizens an economic and social environment in which they can satisfy their needs, realize their aspirations and develop their potentials and abilities.

One of the most important values of this environment is free time. Karl Marx had good reason to declare that in the future, under communism, not working time but leisure time would be a measure of wealth. For only their leisure time gives people the opportunity for personal development and self-expression.

This issue carries materials on the place and role of free time in Soviet life today. A whole complex of social conditions and cultural facilities are required if that free time is to be used efficiently for self-education, intellectual growth and personality development: an abundance of books and records at low prices, broadly accessible libraries, museums, sports stadiums, tourist centers and the like. And all these are available almost everywhere in the Soviet Union.

But a person must also learn how to make proper use of free time. That is where the stimulus of society comes into play. Socialist society, with its multiple opportunities for an active life, provides this stimulus. Only a knowledgeable, educated person who has something to share with others can take an effective part in society's affairs. This is something large numbers of average Soviet people of all generations are aware of.

The Soviet educational system is geared to teach people how to make the most productive use of their free time. Individuals acquire a much broader range of knowledge and information than they actually need for their trade or profession. The humanities occupy a prominent place in all types of educational institutions, including technical schools. This broadens the horizon of individuals, brings out their latent potentials and aspirations.

The Soviet future promises a continued increase in free time as the prerequisite for the physical and spiritual perfection of the individual.

SYMBOLS OF THE SOVIET STATE

THE ARMS AN FLAG OF THE SOVIET STATE

The arms of the Union of Soviet Socia Republics. A sickle and hammer against globe. Above them is a five-pointed red bordered in gold. The globe is illumin from below by the rays of the sun and encircled by ears of grain with a red wound around them. The slogan "Wo of all countries, unite!" is inscribed on band in the languages of the 15 constitu republics forming the USSR.

The state flag of the Union of Soviet cialist Republics. A rectangle of red c The ratio of length to width is 2:1. the upper corner of the cloth near the are a sickle and hammer depicted in g They are arranged in the same way a the arms. Above them the contour of a pointed star is bordered with gold. The is always flown over the Moscow Kre above the cupola of the building ho the Presidium of the USSR Supreme So It can be clearly seen from Red Squar

The flag is flown throughout the So Union on March 8 (International Wom Day), April 22 (Lenin's birthday), May 1 2 (international holiday of labor), Nov ber 7 and 8 (anniversary of the Oct 1917 Socialist Revolution) and Decemb (USSR Constitution Day).

- - -

The arms and flag symbolize the esse elements of the political and social s established by the Great October Soci Revolution.

The sickle and hammer stand for s things: that state power is vested in workers and peasants, in all working ple; that the political foundation of S power is the alliance of the working c and the peasantry; that the aspiration the Soviet people and state have th source in peaceful constructive labor.

The five-pointed red star reflects internationalist, socialist solidarity of Soviet working people with the wor people on all continents, in all countries.

The slogan "Workers of all countr unite!" is the familiar closing phrase the *Manifesto of the Communist Party* w ten by Karl Marx and Friedrich Engels first published in London in 1848. Th words have since then been the comm slogan of the world working-class mo ment. They express our loyalty to the p ciple of proletarian internationalism. T Soviet state, with more than a hundred tions and nationalities living in a close family, has become their living embodim

The red flag as a symbol of the wo people's struggle for freedom was flown by the workers of Paris in the Revolution. Subsequently, it became symbol of the working-class movem all countries, including Russia. In 191 triumphant socialist revolution in our try adopted it as the state flag.

In addition to the arms and flag of USSR as symbols of the single federa all 15 constituent and 20 autonomo publics have their own arms and fla an expression of their national sov within the framework of the federal state. The arms and flags of the re use much the same symbols as the U arms and flag, with variations that their own art traditions, landscape product or the like.

November 1974, No. 11 (218)

SOVIET LIFE

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SOVIET PEOPLE

II EDITOR'S NOTES
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LETTERS TO THE EDITOR

I truly enjoy SOVIET LIFE and use it in my classroom to show that we are humans trying in our own way to coexist on this planet, regardless of whether we are Soviet people or Americans. I do believe in the message your publication consistently stresses which is humanistic and realistic.

Professor Arthur Barsky
Winona, Minnesota

I subscribe to, and enjoy immensely your magazine, both as a source of education and of entertainment. More people should go to the Soviet Union, as my wife and I have done as tourists, and see for themselves this great emerging civilization.

Alexander Pinney
Armonk, New York

Your magazine is very interesting, very useful, and very stimulating for improvement in one's society and for cooperative relations on a realistic and concrete basis.

Lina Litinskaya-Weinbaum
Oakland, California

You are publishing the best magazine in America for the general public. Your articles are an inspiration and bring out the creative side of man's nature and the possibility of accelerating human progress by conscious effort. It is fine that two great countries are beginning to understand each other better, even if they differ in political philosophy. I feel that it is of great benefit to the USA and the USSR.

Michail Melnik
Chicopee, Massachusetts

In the summer of 1970 I spent seven weeks in the Soviet Union attending a Russian language course at the Polytechnic Institute of Leningrad. My trip to the Soviet Union brought me to Kiev, Moscow and to my beloved city of Leningrad.

I am extremely delighted with your country and your most gracious people. SOVIET LIFE is now part of my life.

Ernest E. Searles
Las Vegas, Nevada

I enjoy your articles on scientific achievements and exploration. Really enjoyed your July issue "Millions of Tourists." I was a tourist in the USSR in August 1970—via Alaska Airlines for three weeks. The article brought back fond memories.

Anna Baillie
San Francisco, California

SOVIET LIFE is a very valuable part of my monthly reading. A year's reading has taught me much about the many nationalities and languages that make up the Soviet Union.

For the first time in my life I am beginning to know something about the country's people. The only way I could learn more is through a trip to Russia, and my appetite is being strongly stimulated by your excellent journalism. One single issue is worth the nominal yearly subscription fee.

Thank you for all the information. As a teacher I live by it.

Steven J. Shaw
Columbia, South Carolina

ПАРТИЯ СКАЗАЛА -
КОМСОМОЛ ОТВЕТИЛ...ЕСТЬ!

Seventeenth Komsomol Congress

THE NEW TASKS FACING YOUTH

One of the groups of young people leaving Moscow for the Baikal-Amur construction site after the Komsomol Congress. The banners they are carrying read: "[illegible] Komsomol Shock Project" and

SEVENTEENTH KOMSOMOL CONGRESS: THE NEW TASKS FACING YOUTH

GATHERED in Moscow this spring for the Seventeenth Komsomol Congress (Young Communist League) were 4,717 delegates, young people of 61 nationalities. Long before the highest body of the organization started its work, local YCL meetings were held throughout the country in preparation for the event. Some five million young people spoke at these meetings, and the important issues and problems they raised were acted on at the congress.

For example, the demand for broadening the rights of YCL organizations resulted in an amendment to the Rules of the Komsomol recording the decision of the congress that local Komsomol organizations, together with representatives of the trade union and management, are to look after the interests of young people, their working conditions, bonuses and other incentives and have a say in allocating funds for cultural work and sports facilities.

In fact, the Komsomol has always handled these matters, but now it is to be given even broader powers.

The Komsomol, with a membership of 34 million young women and men, plays a most important role in all areas of the economy, science, education and culture. Its goals coincide with those of the entire Soviet society.

For example, with the economic development of Siberia and the Soviet Far East a point of concentration, the construction of the Baikal-Amur railroad is of primary importance. Recognizing this, the YCL has pledged to sponsor the building of this 2,000-mile railroad that cuts through virgin land and forest. The railroad has been declared an All-Union Komsomol Shock Project. The Seventeenth Komsomol Congress issued the first vouchers to volunteers, who set out for Siberia and the Far East straight from the Kremlin in Moscow.

The congress also resolved that the Komsomol was to participate in another important undertaking—land reclamation and farm construction in the nonchernozem zone of the Russian Federation (the central part). It is a vast region with a population of tens of millions.

Intensive farming will raise the production potential of the region very considerably. Every summer 20,000 students from Soviet cities will come to help the land improvement experts and the builders in the nonchernozem zone.

The congress stressed the fact that today the country was getting the most educated generation of workers in its history. About 85 per cent of the young workers (up to the age of 30) have a higher, an incomplete higher, a secondary or an incomplete secondary education. That is the law of our time—a time of scientific and technological revolution. But every year the economy's education and professional training demands become higher. The congress pointed out that the Komsomol must without delay start preparing fresh generations of workers whose qualifications and scope of general knowledge will meet future needs. The YCL has therefore decided to take over the sponsorship of vocational training schools where young girls and boys learn a trade and (in many of them) acquire a complete secondary education as well. Thousands of Komsomols—engineers, workers and educators—have joined the teaching staffs of vocational training schools to help the youngsters become real masters of their trade.

The congress underscored the fact that the school today, especially the village school, is in need of help from the Komsomol, especially for vocational orientation and involving adolescents in socially useful labor.

Much was said about student youth. The most important items discussed were the need for more independent research by students and the application of their knowledge even before they graduate.

NO MAJOR PROBLEM IS HANDLED WITHOUT THE PARTICIPATION OF YOUTH

Excerpts from Leonid I. Brezhnev's Speech at the Seventeenth Komsomol Congress

We Communists are proud of our young people. Not thousands, and not even millions, but tens of millions of young men and women in our country connect their fate with the Komsomol [Young Communist League—Ed.]. For many millions of Soviet people the Komsomol has become an inseparable part of their biography, while for our motherland it has become the embodiment of her eternal youth.

For a long time now the Komsomol has firmly occupied a worthy position in the sociopolitical system of Soviet society. Its role is determined by the very nature, the revolutionary essence of socialism and our aspiration for the future.

The Komsomol has always been and remains the party's militant reserve and reliable assistant. This is no abstract formula, but real life, real practical activity. Remarkable is the fact that today two-thirds of the party's replenishment, more than ever before, is supplied by the Komsomol. In the three years following the Twenty-fourth CPSU [Communist Party of the Soviet Union—Ed.] Congress about one million Komsomols were admitted to the party ranks. Young Communists continue to work in the Komsomol, constituting the party nucleus of Komsomol organizations.

The vital connection between the party and the Komsomol is also expressed in the fact that tens of thousands of youth leaders have been elected to party steering organs—from the bureaus and committees of the primary organizations to the CPSU Central Committee.

And take a look at the composition of the Soviets, the organs of our state power. Young people under 30 constitute one-fifth of the deputies to the USSR Supreme Soviet, and the share of young people in local Soviets is even greater—nearly one-third. Young people work actively in the trade unions and other mass organizations of working people. The best Komsomols are promoted to responsible sections of party, economic and cultural construction.

Without exaggerating, we can say that no major problem—whether concerning the affairs of the Soviet Union, a region, district, or labor collective—is handled without the participation of youth. In our country the Komsomol, all young men and women, enjoy unlimited opportunities to express their creative force and initiative.

It has always been a tradition with Communists to place their trust in young people, take support from their inherent enthusiasm and noble aspiration to work for the common good, and at the same time to help young people find correct orientation in life and to arm them with the knowledge and experience of older generations. In the future the party will continue to reinforce these traditions, develop youth activity and draw young people into participation in managing the affairs of socialist society on an even broader scale.

We are living in an era of developed socialism, an era of the construction of the material and technological basis for communist society. An active process of forming the best human qualities, qualities of a member of communist society, is progressing along with major social and economic transformations. We possess all the conditions for this.

Our communist morality inherits by right and develops the humanist norms of ethics elaborated by mankind. Diligence, honesty, modesty, personal dignity, comradeship and mutual respect are all inseparable features of the moral image of the Soviet man.

We must pass on the best of everything accumulated by the ethical experience of the new society to the young people, each young man and woman, and at the same time persistently eliminate everything that hinders life and work.

We often say: Our young people are following the road of their fathers. And that is correct, comrades! Confidently marching along this road, young people continue the way started by the Great October Socialist Revolution, and enrich the experience of past generations with fresh experience.

BAM

railroad 2000 miles long

By Ivan Yurchenko
Sovetskaya Rossiya Correspondent
Photographs by Yuri Sadovnikov

THE AIRPORT at Ust-Kut, a small town on the Lena River, is crowded and lively. Vehicles with passengers keep arriving. Helicopters land one after another and take off again with their loads of people and goods for destinations deep in the taiga.

These young women and men in green overalls, with stripes on their sleeves and bright badges on their chests, flying across the Lena are not local people. You can tell by the three-letter emblem sewed on their sleeves—BAM (short for Baikal-Amur Trunkline)—and by the signs they carry: Leningrad, Voronezh, Kazakhstan, Armenia, the cities and republics they come from.

Quite a few, like us, come from Moscow. We traveled on the same plane with them, changing in Irkutsk. The whole journey took about 10 hours. Had we come by train, it would have taken about a week. And, besides, Ust-Kut would be the last station, the railroad ends here. But not for long.

A Look into the Past

The country's network of railroads linking cities separated by thousands of miles works at maximum load. The central and western parts are the most densely ramified. It stands to reason since they are more thickly populated, their volume of passenger traffic is greater, mineral deposits have long since been discovered and mined there, many industrial plants have been built and transportation links between them are well developed.

There are far fewer roads east of the Urals. Still farther, in the expanses of Siberia and the Soviet Far East, in their northern part particularly, the steel roads are rare. The western part of the country is connected to the Pacific coast by a single straight trunkline—the famous Trans-Siberian Railroad. It is famous because there has never yet been a greater transportation project in the country's history. The thousands of miles of track were laid even before the Revolution, in the years when the builders had no equipment and machinery to speak of and much of the work had to be done with pick and shovel.

But this is all in the past, and the talk these days is not about the Trans-Siberian Railroad. Its route was hardly planned for current economic needs. In Soviet years geologists have done a fairly thorough job of exploring the natural resources of Siberia and the Far East and have found that the most abundant mineral deposits are not concentrated in the places where the railroad passes, but to the north of it, sometimes thousands of miles removed. Almost all the elements of Mendeleyev's periodic table are native to those outlying areas—copper, nickel and other metals, coal and such building materials as brick clays, rubblestone—just about everything. Moreover, since this is taiga country, there are also tremendous reserves of timber.

How can this wealth be put to use? The obvious first step is to build a railroad. The idea of a second railroad across Siberia and the Far East to the Pacific was proposed a long time ago.

Intensive surveying has been done since the thirties. A railroad connecting Komsomolsk-on-Amur, a major industrial center in the Soviet Far East, with the port of Sovetskaya Gavan was built in the forties.

"This construction is of tremendous importance. The Baikal-Amur railroad will cut through primeval taiga and pass through places where tremendous wealth lies, which must be put to the service of the motherland. A new large industrial area of the country will be created there and new cities and settlements built. We are firmly convinced that the Komsomols and young people will make a worthy contribution to this great construction project."

From Leonid I. Brezhnev's Speech at the Seventeenth Komsomol Congress

In recent years the Abakan—Taishet—Ust-Kut line was built in Siberia. But all these lines are only a few hundred miles long. They do not solve the problem. That is the reason for the ambitious BAM project.

A Look into the Future

About 2,000 miles of permanent track will be laid to connect the present Taishet—Ust-Kut and Komsomolsk-on-Amur—Sovetskaya Gavan lines. Where will the route pass? Branching off from the Trans-Siberian at Taishet (a long way to the east it will rejoin it by the Tynda-BAM branch road which will run north to south), it will run north of Lake Baikal, cross Eastern Siberia and terminate in the Far East, reaching the Pacific via Komsomolsk-on-Amur. The railroad will cross a territory that is unique in a variety of respects. First, because it is tremendously rich in the most diverse natural resources. Secondly, the territory is unusual for its geographical, natural and climatic conditions. Its temperature changes are dramatic, sometimes below minus 40 degrees in the winter. Despite that, it is sunny country. In Georgia, one of the warmest republics in the Soviet Union, the average duration of sunshine in a day is 5.5 hours, while in places to be crossed by BAM it is 6.6 hours. The relief is also characterized by the abrupt convolutions of mountain ranges, hills, valleys and cliffs. Flowing through them are the swift and mighty Siberian rivers.

Experts say this is the most difficult route in the history of transport construction. Not only will the track have to be laid but thousands of bridges, viaducts, tunnels and other structures built.

BAM will be a first-class road. Its design provides for centralized dispatcher service, automation of all processes, and the latest types of locomotives.

In recent years major industrial centers have sprung up north of Lake Baikal in Siberia and in the Far East. The railroad will connect enterprises of the timber, woodworking and mining industries into a single complex. It will also link Siberia and the Pacific coast. This will give new impetus for the development of economic ties with Japan and other countries.

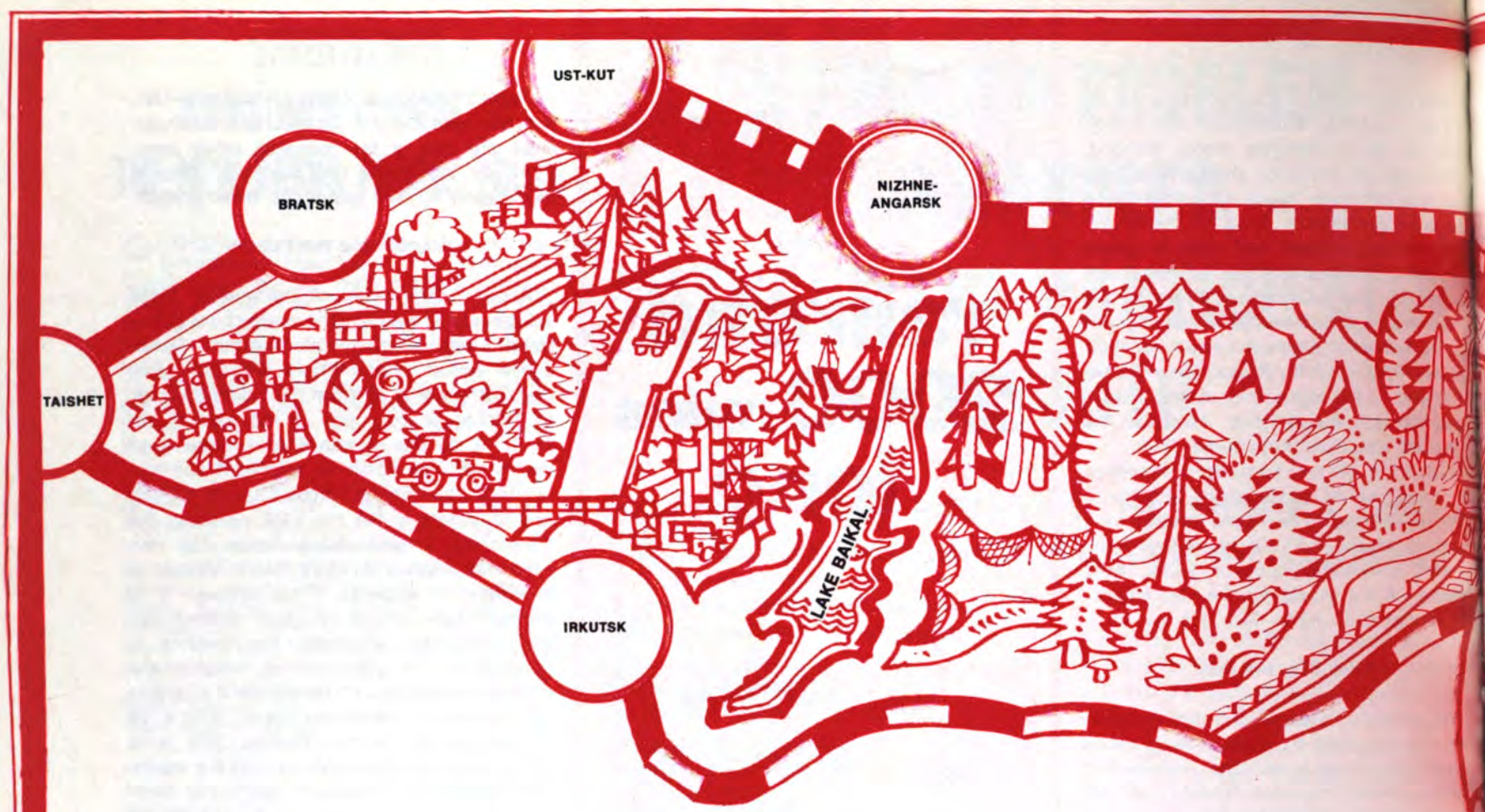
In the years to come there will be new cities along the railroad. The slumbering wilderness will come to life.

But that is for the future. What about present-day activities in the taiga?

Bridgehead

It is already traditional with us that when a big construction project on a national scale is launched or new lands are to be cultivated, young volunteers flock there from all over the country, from all the 15 union republics. This was the case with the virgin lands and the Kama Truck Plant on the Volga. The same thing is happening today at the construction sites of the Baikal-Amur Railroad where the all-Union shock Komsomol construction squad is gathering. The word "all-Union" adequately conveys its composition. It includes people of different nationalities who speak dozens of languages and dialects.

We flew with the young builders into Zvyozdnyy, the first settlement in the western

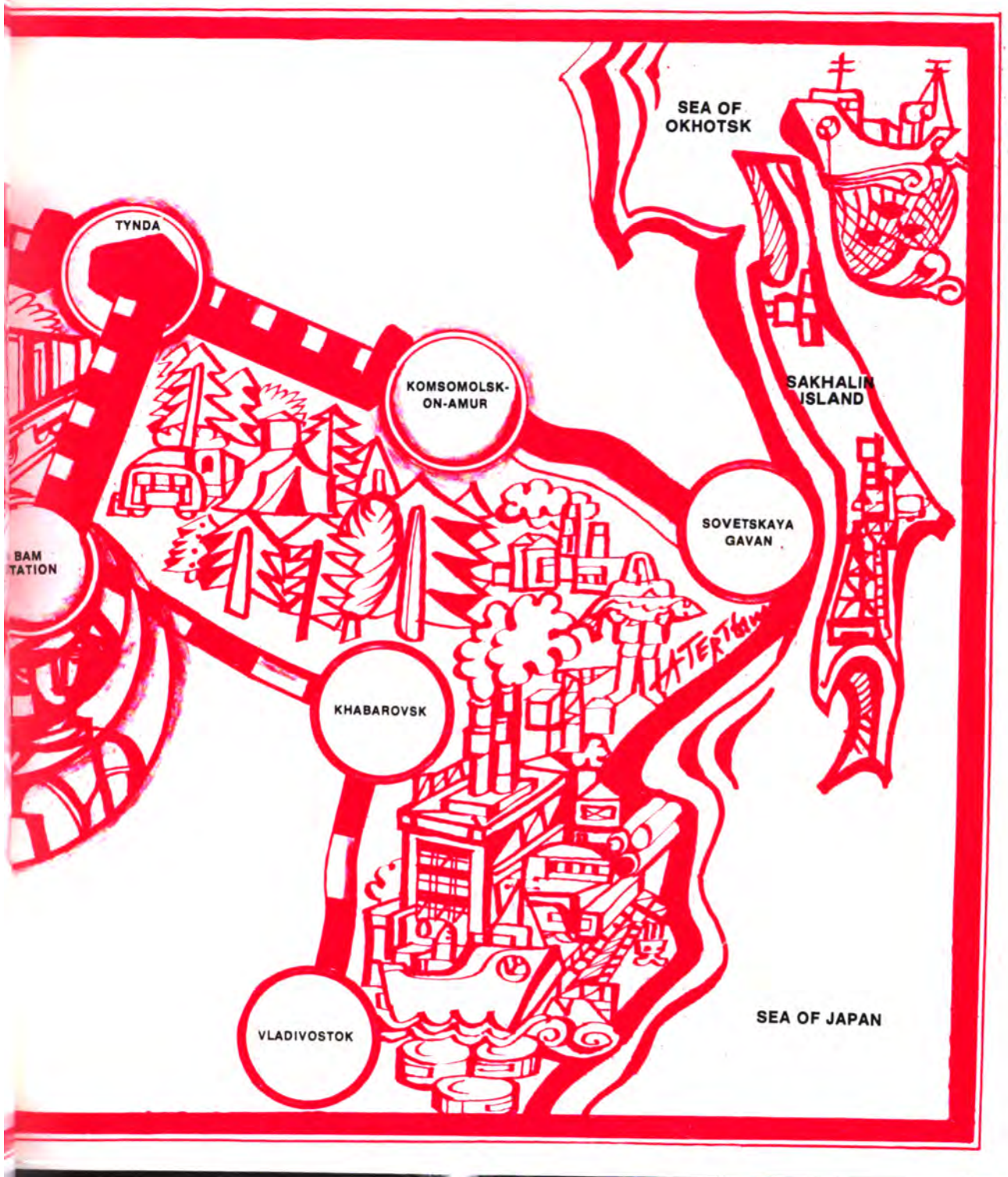


SKETCH OF THE BAM PROJECT

BAIKAL-AMUR TRUNKLINE

TRANS-SIBERIAN RAILROAD

SECTIONS IN OPERATION



section of the project. Farther east, some 40 miles from Zvyozdnyy, another settlement is being built. It will be called Magistralnyy. Then a third township will be built, and so on. Settlements will be built all along the route.

Said V. Bondarev, head of the Angara Construction Organization: "More than 500 builders have already arrived. By the end of the year our section will have about 10,000 workers."

The helicopter was approaching the landing site between the hills, and Zvyozdnyy could be seen below.

It was an impenetrable out-of-the-way place only yesterday. And even now a dense thicket of fir, spruce and pine surrounds it. But on the bank of the small river Niya I could see structures of freshly planed wood, prefabricated cottages and long lines of tents. A power plant, a dining room and a bakery were in operation. A motion picture theater was showing films. There was a livestock farm nearby.

"Our first priority," said Bondarev, "is to create normal living conditions for newcomers."

Planner Gennadi Kan spread the development plan for Zvyozdnyy on a table that smelled of resin and agreed:

The Baikal-Amur Railroad will extend the area of exploration. Many new way stations, settlements and cities will spring up along its route. The effect on industry will bring many social changes to these lands.

ew scenes.
ew work.
ew dreams.

"We want it to be a settlement with all the amenities, despite the fact that it is a temporary settlement. We will have a school ready for the beginning of the academic year."

We do not want to underestimate the hardships of the Siberian railroad builders. They are working in rigorous places and having their difficulties. But the times have changed. In the old days pioneers came to the taiga expecting life to be primitive and relying only on their youthful strength and stamina. Today they find living conditions quite normal.

Zvyozdnyy is a tiny inhabited island in the endless taiga. But when the helicopter took us east along the route of the future railroad, we had a chance to see more and more such islands. You might call them bridgeheads for the beginning of large-scale operations. Equipment is being brought here, and experienced transport builders are arriving along with the young people.

Many hundreds of miles to the east similar bridgeheads are being built near the Tynda station, another construction site of BAM. The rails are being laid in several places along the route in eastern and western directions simultaneously.

Newcomers and Old-timers

Who are these people coming to the taiga today?

As a party of volunteers was on its way to the construction site, bricklayer Sonya Nikiforova from Yoshkar-Ola, capital of the Mari ASSR (the Volga area) turned 18 and had a birthday party. It was as enjoyable an occasion as it would have been at home. Lilia Shpakova from Latvia is a little older. She has just graduated from a building school. Alexander Ovcharov, who comes from Voronezh, is the same age as Lilia but he is still taking college correspondence courses.

There are qualified specialists among these newcomers, and there are young men and women who have no trade. Both are beginning a new life among new people, people whom they can copy and from whom they can learn.

Victor Lakomov, head of a shock Komsomol group, has been building railroads for 10 years now. He also worked abroad building railroads in Latin America.

Pyotr Sakhno, head of a building assembly train, is a veteran Siberian transport builder. He was among the first to come to Zvyozdnyy.

The first to come to the taiga, however, were not builders, but surveyors. Tynda's newcomers have made friends with old-timer Alexander Pobozhiy, a man with a very interesting background. For 40 years now he has been working as a railroad surveyor. He trod unbeaten paths in Central Asia, the Urals and Siberia. His work has taken him from the Baltic to the Pacific. Just about the time the young volunteers were on their way to the construction site, his book *Roads Through the Taiga* was published in Moscow.

Different people come to help build BAM. Different generations meet here at the bridgehead of tomorrow's construction. But there is one motivation they have in common —the desire to make their contribution to the country's growth.

Top to bottom: This bird's-eye view will provide an idea of a typical Siberian construction site. Team leaders get a briefing. This is rough country and you prepare for all contingencies. New settlements in the taiga begin with improvised housing like this. But the tents will not be there long. First on the list of priorities is permanent housing, and with the amenities. Then come schools, hospitals, movies.

THEY ARE GOING TO T

THE FIRST GROUP of BAM builders—600 young men and women—have arrived in that remote taiga region. Who are they? What moved these young people to leave their homes and go to the taiga, where they knew hard work was awaiting them?

On the second day of the train journey a wall newspaper was posted. It contained answers to the question: "Why Are You Going?" They were all different of course, since they came from young people with different backgrounds, temperaments and aspirations, but they also had much in common:

"I want to be a part of this great undertaking." "I want to feel the satisfaction of being able to work on a famous project." "If I don't take the chance to see the world and to show what I can do at the age of 21, then when will I be able to?" "The toughest job in unexplored lands, in the taiga, interests me more than the usual humdrum job in my small town."

A few days after the first train with volunteers left for the BAM project and after the press, radio and TV reports, the YCL Central Committee was flooded with letters and telegrams—more than 3,000—from people who wanted to sign up for the next contingent of builders. This is what some of them said:

"I want to build the new railroad," wrote Nikolai Barykov from Novokuznetsk. "I am an installation worker and have a secondary education. For 19 years I have been working at Siberian construction sites. My wife

The new railroad inches its way across the taiga. Machines do the pick-and-shovel work these days.

Forest campfire, guitar and a quiet song. Another hard day's work finished, and they've laid another stretch of track across a continent.

PROJECT OF THE AGE

teaches school—physics and mathematics. I am confident of my strength and competence and feel I can be useful on the project."

"I will take any job. Hardships don't frighten me, I am ready to live in a tent. I have worked on the construction of many sections of railroad lines. My family: wife and a daughter in the sixth grade. Nikolai Filippov, Orsk."

"I read about the construction beginning on the railroad from Baikal to the Amur in the newspapers and made up my mind to get in on this important project. I am an excavator. Please tell me how I can join the builders. Ivan Yakovenko, Moscow."

And here is a comment from someone who went out with the first group of builders, Gennadi Sorokovikov, deputy head of the BAM construction site authority:

"Serious trials await all of us—uninhabited taiga tracts, swarms of midges, no roads. The young people know that. They are, nevertheless, confident of success and are prepared to overcome the difficulties. The volunteers have two commitments: to the people and to themselves."

Across the nation young people, wanting to try their strength and to be of use to their country, are making application to join the builders of BAM, the project of the age. Their letters—insistent, diffident, emotional—are pouring in at ministries, departments and editorial offices of youth newspapers. And more and more groups of volunteers are setting out for BAM.

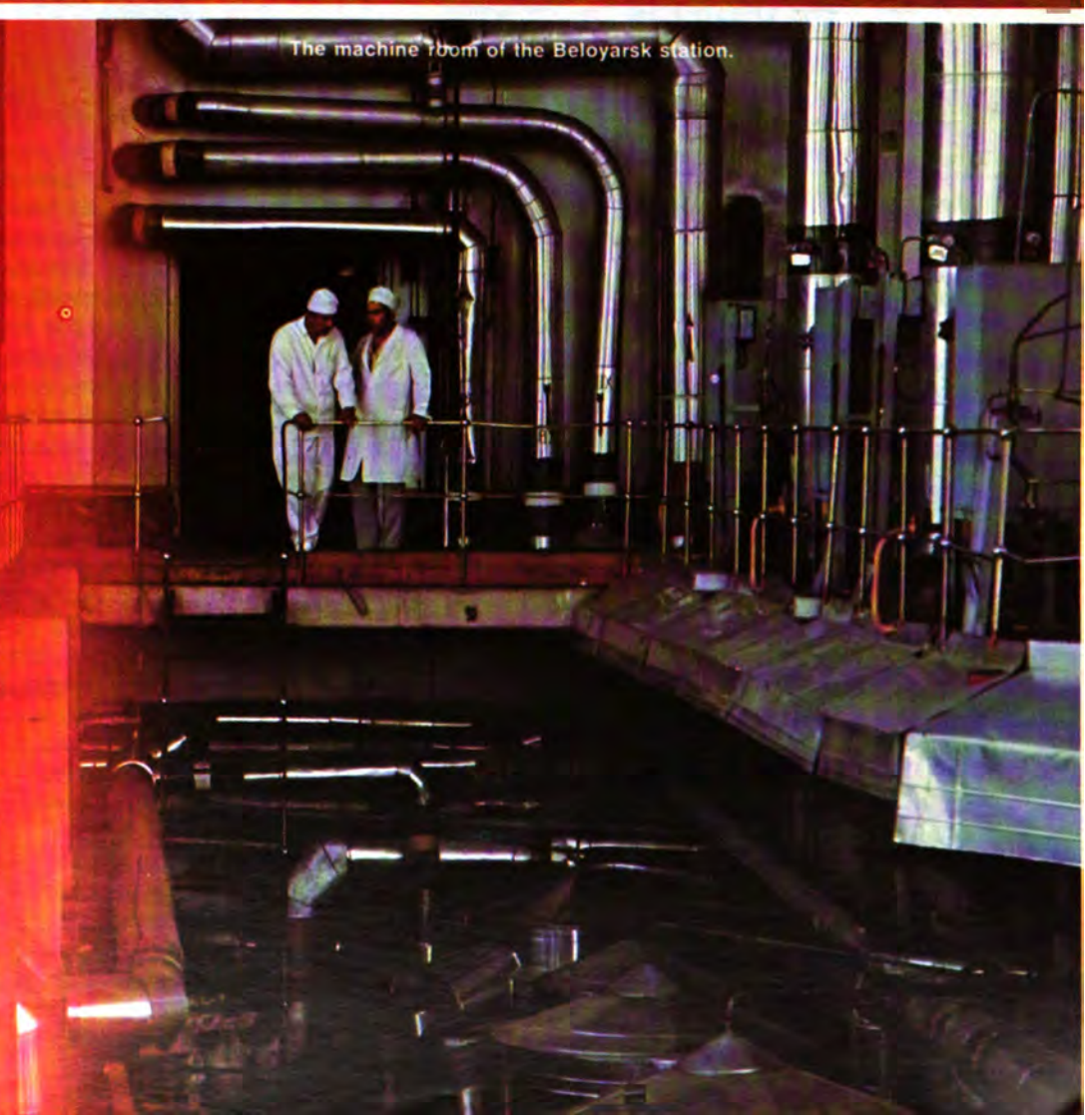
Photographs by Gennadi Koposov

The light structures of the Kola atomic
blend harmoniously with the northern

ATOMIC ENERGY OR FOSSIL FUEL?

In the reactor section of the Kola station.

Each succeeding year the world consumes more electric power. But its resources of fossil fuels are limited. Researchers in all industrialized countries are working on new energy possibilities. When the world's first atomic power station began to generate electricity in 1954 near Moscow, it inaugurated a new stage in power engineering. Atomic reactors have more than proved their potential. A perspective of thermonuclear reactors Soviet engineers will be designing by the end



The machine room of the Beloyarsk station.

ELECTRICITY FROM THE ATOM

An interview with Pyotr Neporozhny, USSR Minister of Power and Electrification.

Pyotr Neporozhny, Doctor of Science, was born in 1910. He started his career as a driller on the Dnieper station and then worked on projects in Central Asia. He got his technical training in Leningrad. Neporozhny is one of the country's leading authorities on power engineering.

Obninsk. The control panel of the world's first station to generate electricity from the atom.

Q: About 20 years ago, for the first time in history, the inhabitants of the Soviet town of Obninsk boiled their water with the energy of the atom, and 10 years ago the first units of the Novo-Voronezh and the Beloyarsk atomic power stations began operating. The Obninsk atomic power station had a capacity of only 5,000 kilowatts; now more than 100 atomic power stations are in operation throughout the world, and they have a total capacity of over 30 million kilowatts. How do you explain such rapid growth?

A: Necessity and the developmental peculiarities of today's power engineering explain it. To begin with, what is happening is a concentration of production. Large cities are growing and huge industrial areas are developing. More often than not they are far removed from sources of fossil fuel. Besides, the world's fossil fuel resources are limited. So industry's dependence on electric power keeps growing.

Take our country. Power-consuming industries and large cities are mainly located in the European part of the country, while fossil fuel resources are mostly in the eastern part. Siberia and the Far East are also developing rapidly. Large cities, industrial plants and scientific centers, which consume a lot of power, are being built there. And yet for the next 10 or 15 years the concentration of power-consuming industries will remain in the European part of the country.

The cost of energy today is part of the cost price of any item manufactured. So our task, the task of those working in the power industry, is not only to produce a great deal of electric power, but to produce cheap, economically profitable power.

And you must add social considerations, such as the increase in urban population and the one-shift operation of industrial plants, to the economic ones.

All these features of the current development of power engineering put the construction of atomic power stations on the agenda. These stations consume very little fuel. For example, to generate one million kilowatt-hours, the Novo-Voronezh atomic power station consumes about 400 grams of uranium, the equivalent of some 1,000 tons of coal. This means that there is no need to transport fuel.

Atomic power stations are economical because of their high-capacity power units, but a more important consideration is that they do not depend on sources of raw materials and relieve mankind of the fear of being left without fuel altogether.

Atomic power stations throughout the world have come a long way in the past 20 years. It would have taken conventional power stations about 100 years to get that far.

Q: Whether atomic power stations are dangerous or not has been discussed by the press in many countries. It is axiomatic that a new technology must be as safe as the one it is replacing, or even safer. What are the advantages of atomic power stations over thermal stations?

A: My reply will be one more argument in favor of the rapid growth of atomic power stations. I have already said that their construction is dictated by economic and social reasons. I would like to deal with the ecological reason now.

The fact is that in spite of anything we power engineering people can do, thermal power stations discharge many noxious wastes into the atmosphere, including different kinds of ash and sulfurous gas. This is a tremendous world problem. Industrial cities are being covered with coal dust that turns houses black and is harmful to people. Scientists are trying to minimize the amount of these noxious substances. Trapping devices have been installed in many factories, but ash and gases continue to get into the atmosphere.

It is a different matter with atomic power stations, which are extremely modern and clean generators of electric power.

The Kola station, for example, blends harmoniously with the scenery. On the Kola Peninsula everything seems to have been made specially for this station: The landscape harmonizes with its light structures; Lake Imandra provides it with water of the same composition as that often made artificially for atomic power stations; the cold climate is especially suitable for such stations. Lush coniferous forests stretch on all sides for many miles. There is no dust or smell of burning.

The scientists and designers who create atomic stations think first of all of radiation safety. To begin with, all the principles were checked at the experimental Obninsk atomic power station. Both scientists and operators did the many studies required for the design and construction of the Kurchatov Nuclear Power Station in Beloyarsk. A large number of experiments were done in the construction and operation of the first unit of the Novo-Voronezh station as well. And it was only after it became quite clear that the nuclear stations were reliable that they started routine operation.

Reliable equipment has been developed for storing atomic wastes, and a separate branch of industry has been set up for the recovery of wastes. And now we have figures to prove that the radiation from the atomic power stations is not only lower than from thermal powered stations (do not forget that coal is also radioactive) but even less than that emitted by all the objects around us—houses, cars and even people.

Q: How do atomic power stations rank in the country's power engineering industry?
A: In 1974 the country will generate 975 billion kilowatt-hours of electricity. By the end of 1975 power production will reach one trillion kilowatt-hours. The greater part of the power will be produced by thermal power stations, followed by hydroelectric power stations. For the time being the contribution of atomic stations is fairly modest—they are in third place. But the share of power they produce will be increasing from year to year, and the ratio will inevitably change.

Q: What new atomic power stations started operating recently and what atomic stations are in the offing?
A: Last year the Kola atomic power station began functioning. A new power reactor with a capacity of 440,000 kilowatts started operation at the Novo-Voronezh atomic power station. Performance testing of the first atomic reactor with a capacity of one million kilowatts began last December at the Leningrad station. The Kursk and the Smolensk stations are under construction as are stations in the Caucasus.

The main trend in atomic power engineering throughout the world is the use of water-moderated, water-cooled reactors of the type employed at the Novo-Voronezh station. However, the Soviet Union continues to take the lead in the development of other types of reactors. The so-called multichannel reactor is in operation at the Leningrad station. It was developed in the Soviet Union, and again we were the first to construct this type of station. The Leningrad atomic station will have a capacity of two million kilowatts.

The first stage is characterized by the construction of atomic power stations with thermal-neutron reactors; in the second stage stations will be constructed with fast-neutron reactors. Reactors of this type are more promising since they produce additional nuclear fuel during operation, in other words they are self-sustaining. Igor Kurchatov explained this very well at the beginning of the development of nuclear power engineering. "It is as if you have burned coal in a furnace and along with ashes you rake out still more coal." These reactors will accumulate nuclear fuel, not only for themselves, but for other stations as well. They will have practically no fuel shortage.

In this field the Soviet Union is in the lead again. Production tests are in full swing at the Shevchenko nuclear power station on the Mangyshlak Peninsula. This station has a fast-neutron reactor with a capacity of 350,000 kilowatts, the world's biggest.

Thus, our power engineering specialists are seeking to produce cheaper electricity and work in different directions. Even now one kilowatt-hour of electric power produced by the atomic power stations in the European part of the country is cheaper than that produced at large thermal power stations, and in the very near future it will cost half as much.

Q: The freshening unit at the Shevchenko station supplies that area with water. How economical is the construction of such dual-purpose installations?
A: Atomic power stations use only 25 to 40 per cent of the heat from atomic reactors to generate electric power, the rest is used up in heat or is often discharged into rivers and lakes as hot water. The water-freshening unit uses this heat to produce fresh water from sea or salt water. This is a very good engineering solution, especially since fresh water is more precious than gold where there is none or little available.

Q: You have spoken mostly of the importance of building atomic power stations in the European part of the country. What about Siberia and the Far East?
A: In that part of the country conventional power engineering, so to speak, is being developed, that is, thermal and especially hydroelectric power stations. However, experience in the construction of atomic stations has been accumulated there as well. The northernmost station is under construction in the settlement of Bilibino, Magadan Region, in the permafrost area. Its first turbine generator produced electricity for industrial purposes early this year. This station will supply power mainly to the local gold-mining industry.

The experience gained in the construction and operation of the Kola station has proved useful. The severe conditions on the Kola Peninsula are typical of many northern areas in our country, as well as of Siberia and the Far East. In those areas there are many industrial centers whose electric power requirements keep growing. Often it is not profitable to construct high-voltage transmission lines in the difficult taiga and tundra country. Even in the very near future it will be more economical to build atomic stations. It has been estimated that the cost of one kilowatt-hour of electric power produced by an atomic power station will be one-fourth that of one kilowatt-hour produced by an electric power station using diesel fuel, because it takes so much time and effort to transport fuel in the North.

Q: The book *Physicists Joking,* published by the Mir Publishing House, has a humorous article by Otto Frisch, a Cambridge University physicist. He writes that in the future, when the reserves of uranium and thorium have been exhausted on the Earth and on the Moon, scientists will again "discover" coal and raise the question of developing nonnuclear energy. Obviously this is just a joke, but are we now thinking of replacing all power sources with atomic energy?
A: Of course not. The object of atomic power engineering now is not to replace conventional power engineering. To some extent the new always replaces the old. I think that hydroelectric power stations, too, have many potentialities. The problem is to create a reasonable combination of hydroelectric and atomic power stations, especially in our country, which has so many powerful rivers. But atomic power stations are accelerators of progress. They give rise to new branches of industry and encourage conventional power engineering to search in new directions.

Q: At the First International Conference on the Peaceful Uses of Atomic Energy held in Geneva the Soviet delegates reported on the operation of the first atomic power station in Obninsk. That was just a year after it was put into operation. The Soviet Union shared its experience with other countries and placed at the disposal of the delegates to the conference technical characteristics and a description of the principles of operation of the atomic reactor. What is happening now on the joint construction of nuclear power stations?
A: In mid-December of last year I attended the opening ceremony of the Nord Atomic Power Station in the German Democratic Republic. This is the second atomic power station in the GDR built to Soviet design. Soviet plants supplied the equipment for this station, and Soviet specialists supervised its construction.

This station is especially important for the GDR. The country needs electric power, but it has few natural resources for its production.

Atomic stations have been put into operation or are under construction in other socialist countries, for instance Bulgaria, Hungary and Czechoslovakia. To implement the program of socialist integration, machine-building plants in the member states of the Council for Mutual Economic Assistance have started production of equipment for atomic power stations. Until now such equipment has been supplied by the Soviet Union. So you see, our experience is being used outside the Soviet Union as well.

Courtesy of the magazine *Ogonyok*

ATOMIC POWER STATIONS

Few people remember now the tremendous effort it took to solve the many new problems that cropped up in building the world's first atomic power station and to develop the instruments, materials and equipment for it. At the time nobody had the technical know-how and skills to design atomic power equipment.

Many problems worked on during the construction of the Obninsk plant are still up in the air.

For example, we did not know how radiation would affect the properties of steel. Components in the reactor core were made of the best grades of special steel, but they soon lost many of their valuable characteristics. For one thing, they became brittle.

We tracked down the reasons and found that the metal undergoes serious structural changes when subjected to radiation and high temperatures. And so we had this new property, "radiation resistance of metal," to contend with. Working with metallurgists and metallurgical engineers, we found new materials that stood up better in the atomic reactor. This is only one example. We had to keep researching all the way through because we lacked experience and did not know what we could expect from many of the phenomena we came across. You can imagine how pleased we were when the station started generating electricity.

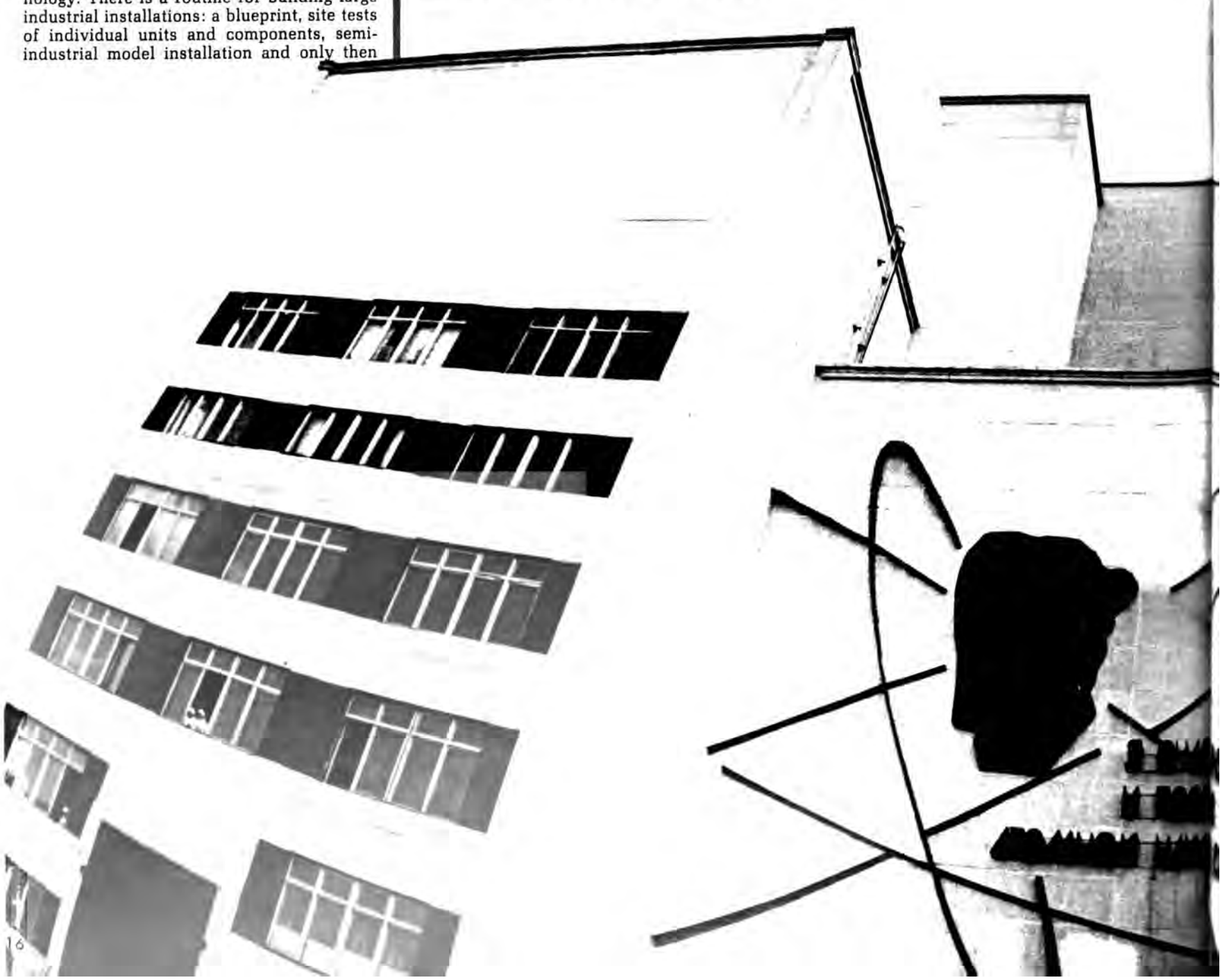
The year 1954, when the first atomic power plant began operating, will probably go down in the history of technology alongside the years when the first steamship, the first steam engine, the first automobile and the first airplane were produced.

One of the incidental but very important effects of the construction of the first atomic power station was that it trained the designers of future power plants. The work of reactor designer has no parallel in technology. There is a routine for building large industrial installations: a blueprint, site tests of individual units and components, semi-industrial model installation and only then comes the industrial project. A different approach has to be taken by the builder of atomic installations. Many elements of a future reactor cannot be studied at the site under natural working conditions. It is practically impossible to model in the laboratory a nuclear reaction taking place in a reactor of industrial size. Furthermore, as the comparison of the reactors at Obninsk and Beloyarsk, built to an identical design, has shown, the change in the size of the installation modifies the processes, not only quantitatively but qualitatively. Thus, the designer often has to go straight from the drawing board to the industrial installation. It calls for an extraordinary combination of knowledge, skill and intuition to create a single picture of the future atomic installation from a mass of data and indirect indicators.

Today we have a whole galaxy of specialists with such qualities. They have refined their skills operating the Novo-Voronezh, Beloyarsk and other Soviet atomic power stations.

Academician Nikolai Dollezhal
Chief Designer of the atomic reactor of the first atomic power station, Hero of Socialist Labor, recipient of the Lenin Prize and the State Prize

The Beloyarsk atomic power station started generating electricity only 10 years ago. And it was only 20 years ago that the houses in the town of Obninsk, for the first time in history, were lit with the energy of the atom. One of the incidental but important by-products of construction of these first atomic stations was that they schooled later designers.



AS SEEN BY THEIR DESIGNER

The Novo-Voronezh and Beloyarsk nuclear power stations ushered in the age of large-scale power generation in the Soviet Union. This does not mean, obviously, that all the problems have been solved and that we can just go ahead adding more capacities. There are any number of engineering and economic questions still to be answered.

A problem of primary importance is nuclear fuel. The future of atomic energy depends on the quality of the fuel and the methods of combustion. Initially, only uranium-235 was used in atomic reactors. But it is present in natural uranium in small amounts—about 0.7 per cent. The remainder is uranium-238, which does not split under the effect of thermal neutrons and consequently cannot be used as a fuel by reactors built for such neutrons (that is to say, the reactors in all present-day atomic power stations).

There are huge quantities of uranium-238 available in the world. What to do with it is the problem. The prospects are good. Fast-breeder reactors use plutonium-239 and can use uranium-238 which, until recently, was useless in nuclear power production. Such a reactor is charged with plutonium-239 and the "unusable" uranium-238, which is converted into plutonium-239 during nuclear reaction (plutonium-239 does not occur in nature). Moreover, if we load one kilogram of plutonium and a given quantity of uranium-238 into the reactor, after a certain period of chain reaction time we get 1.5 kilograms of plutonium (this growth comes from the conversion of uranium). Thus, we can not only produce thermal energy generated by fast-neutron reactors but also effect a kind of "expanded reproduction" of fuel at the expense of the widespread uranium-238.

No less important is another problem, the utilization of the energy of fuel in the reactor. We know that no atomic fuel burns up completely. The so-called critical mass required to support the chain reaction is occasionally many times greater than the quantity of fuel that is split in the course of the reaction. Therefore, specialists around the world are trying to increase the burn-up fraction. They hope thus to ensure a continuous movement of fuel inside a working reactor from the zone of weak burning to the zone of more intense burning, charging fresh fuel into the empty space.

It is not a simple solution, but I think very promising.

It should be said that the technical problems of nuclear energy are not limited to atomic questions. There are sizable engineering industry problems. Thus, the manufacture and assembly of one-million-kilowatt reactor vessels present a host of engineering and transport problems.

The problems are there, but the game is more than worth the candle. The capacity of the first power plant was 5,000 kilowatts, and today a single unit of the Leningrad nuclear power plant has a capacity of one million kilowatts. This growth has been achieved in a mere 20 years.

Atomic energy can help solve the problem of technical progress, make it possible to build an energy source in any part of the world, of any capacity, which, for all practical purposes, will be independent of natural conditions.

people and events

Odetta's Tour

Odetta, the well-known black folk singer, made a great hit with Soviet audiences during her month of guest appearances in the Soviet Union. Among the appreciative reviews of her concerts carried by the Soviet press was one in the popular daily *Izvestia,* whose Melor Sturua, a former special correspondent in the USA, had first heard Odetta in America.

"I am not a professional music critic," Sturua says, "but an enthusiastic listener. Certainly her voice is an instrument of unlimited range, rare depth and clarity of tone. What is most striking, however, is that it goes straight to the heart. To appreciate that quality, one doesn't have to be a professional critic."

Elliot Richardson in the USSR

Elliot Richardson, former U.S. attorney general, and his family spent two weeks in the Soviet Union. He was invited by the Institute of U.S. Studies of the USSR Academy of Sciences, where he delivered a lecture.

In Moscow Richardson met with Mikhail Solomentsev, Chairman of the Council of Ministers of the Russian Federation. He also had talks with the Ministers of Health, Justice, and Higher and Specialized Secondary Education, the Chairman of the Supreme Court of the USSR, executives of the Ministry of Foreign Affairs and prominent scientists.

In an interview with a SOVIET LIFE correspondent Richardson said that the family was highly impressed with what they saw on their visit and that everywhere they went—Moscow, Leningrad, Tbilisi, Tashkent and Samarkand—they found the Soviet people warm and friendly. He noted our country's great progress in industry and education, particularly evident in the Central Asian republics.

Richardson views the future of American-Soviet relations with optimism. He pointed out that in his talks with both Soviet officials and ordinary citizens, the most frequently mentioned subject was the need for peaceful cooperation between our countries.

Elliot Richardson in Moscow with (left) Mikhail Solomentsev, Chairman of the Council of Ministers of the Russian Federation, and (center) Georgi Arbatov, Director of the Institute of U.S. Studies.

Tamara Kolesnikova accepted the Gold Lilac Branch award on behalf of her late father. Left to right: Roger Neetz, agricultural attaché, of the U.S. Embassy; David Nalle, Counselor for Press and Cultural Affairs, Mrs. Nalle.

Selectionist Awarded the Gold Lilac Branch

The spacious conference hall of Moscow's Friendship House proved to be too small to seat all those who came to a memorial meeting for Leonid Kolesnikov, a leading Soviet selectionist who was honored in 1973 at the International Lilac Society show in Boston. He was given the Gold Lilac Branch (the Directors' Award), the first prize to carry a winner's name in the society's history.

Among those attending the meeting were Leonid Leonov, the Soviet writer, famous ballet stars Galina Ulanova, Yekaterina Maximova and Vladimir Vasilyev, and many distinguished Soviet scientists. Headquarters of the International Lilac Society are in the USA so that guests of honor at Friendship House included David Nalle, Counselor for Press and Cultural Affairs of the U.S. Embassy, and Roger Neetz, agricultural attaché.

Many varieties of Kolesnikov's lilacs were displayed throughout the conference hall. An automobile mechanic by profession, he was an amateur selectionist interested in the hybridization of flowers. He created over 300 varieties of beautiful lilac now grown not only in the Soviet Union but in the United States, Canada and many European countries. His lilacs won any number of medals and honorary certificates at flower shows.

At the gathering in Friendship House the society's award was accepted by Tamara Kolesnikova, the late selectionist's daughter. It was presented by Andrei Gromov, vice president of the society and Kolesnikov's pupil, at the request of Robert Clark, president of the International Lilac Society.

The audience was shown a color documentary film *The Lilac Garden,* which described the unique collection of lilacs created by Kolesnikov during the long years of his work and which he had presented to the state.

Mr. Nalle said it had been a wonderful idea to arrange a meeting of lovers of beautiful flowers. Kolesnikov, he added, had made an important contribution to the relations between our two countries since flowers have always been regarded as a symbol of friendship.

Western Businessmen Gather in Moscow

SUBJECT OF DISCUSSION—ECONOMIC DÉTENTE

One hundred and forty of the major companies and banks of 32 capitalist countries were represented at the International Conference on Economic, Industrial, Scientific and Technological Cooperation held in Moscow June 23 to 28.

A Novosti Press Agency correspondent interviewed Dzhermen Gvishiani, cochairman of the conference and vice chairman of the State Committee for Science and Technology of the USSR Council of Ministers, and Alexei Manzhulo, Deputy Minister of Foreign Trade of the USSR.

Both Gvishiani and Manzhulo appraised the conference as an important step in strengthening the business relations of countries with different social systems.

Gvishiani: When we discuss business contacts between the socialist and capitalist countries, we should keep in mind that along with their economic benefits, they help to build a system of inter-state relations based on the principles of peaceful coexistence and equal cooperation.

Manzhulo: Lately, business people in the advanced capitalist countries have had the opportunity to make the closer acquaintance of both Soviet industrial products and Soviet research. For example, the American firm that bought 700 Belarus tractors from the Soviet Union. The machine, subjected to most rigorous field tests in Nebraska, showed, as reported in *The New York Times,* that it has all qualities Americans like: It is cheap, it doesn't use much gas, its exhaust is minimal and it has four-wheel drive. The high quality of Soviet tractors is something of a sensation. A country that 45 or 50 years ago spent its very scarce foreign currency to buy American Fordsons is now itself selling tractors to the United States.

Correspondent: The United States has still not canceled its discriminatory customs tariffs on Soviet industrial goods, and yet a number of American firms make the additional expenditure to buy them. How do you explain that?

Manzhulo: It's a practical business decision. The American Beneficial Company decided to buy 100 hydrofoil boats from us. Customs duties make up 30 per cent of the cost of the deal. If these boats were imported from a Common Market country, the company would have paid only two per cent, 15 times less. And yet it decided to buy Soviet boats, believing that the advantages would compensate for the discriminatory high customs tariffs.

These tariffs are a serious obstacle to Soviet-American trade. They are unfair and economically illogical both for us and the United States. Artificially restricting purchases of Soviet commodities automatically reduces the possibility of U.S. export to the USSR. Trade cannot be unilateral.

Americans could buy many kinds of industrial commodities from us. Consumers in the United States are especially interested in Soviet bicycles, motorcycles and the tractors I have already mentioned. General Motors has just signed a contract to buy a million dollars' worth of electronic computer components from us. Recently we sold American companies a million dollars' worth of cameras and clocks and watches running to two million dollars.

I could add to this list metal-cutting machine tools, cotton textiles and many other items, but all this is only the beginning. Neither the variety of industrial commodities which I have mentioned nor the volume of that business begins to exhaust the export possibilities of the USSR and the import requirements of the United States.

In the last three years, the Soviet Union has built nearly 12,000 new types of machines, equipment and instruments. Many of them are better than foreign makes, and some of them are brand-new products, for instance, KhPRT-12-25 ribbed-pipe rolling mills, FPAKM continuous-action filter presses, and other items.

The Soviet Union has participated, and will continue to, in international economic, scientific and technical cooperation on principles of equality and mutual benefit.

Correspondent: Certain people in the capitalist countries argue that the Soviet Union cannot get along without the economic and technical aid of the advanced Western nations, that we are so eager to get that aid that we will put up with all sorts of conditions, including interference in our internal affairs.

Gvishiani: That argument I would call "a caveman's illusion," to borrow a phrase from the British philosopher Francis Bacon. International cooperation is a must for any state that does not want to fall behind the times. In this respect, the USSR is no exception. But interest in cooperation and dependence on foreign technological know-how and techniques are two different things. The Soviet Union —and I want to make this very plain—depends less than any other country on capitalist partners. We are better provided with natural resources than all the others and have a mighty industry, which today accounts for one-fifth of world industrial output, a well-developed agriculture and legions of engineers and scientists. We can, if we have to, develop independently and, relying on our scientific and

Dzhermen Gvishiani, vice chairman of the USSR State Committee for Science and Technology (right) and J. Paul Austin, chairman of the board of Coca-Cola.

Below: The cochairmen of the conference were E. Hornsby Wasson, chairman of the board of the Stanford Research Institute (right) and Gvishiani (left foreground).

Above: Conference delegates visit the big Likhachov Auto Plant in the Soviet capital.

Left: Another group touring a collective farm in the countryside near Moscow.

technical potential, tackle problems in any modern field of production.

Incidentally, this is something all experts abroad understand. The caveman's illusion is used as an argument usually by people who have never had any direct connection with either science, technology or business.

Correspondent: Foreign businessmen sometimes complain about the slowness of Soviet organizations with which they deal. Are these complaints fair?

Gvishiani: We don't want to exaggerate the efficiency of our offices and their staffs. There are times when they are not nearly as efficient as they should be. But the main reason lies elsewhere. The long years of cold war, which we did not start, disrupted the mechanism of East-West cooperation. It actually has to be rebuilt from scratch. This is a long and complicated process calling for patience, mutual trust and good will. These qualities are not always demonstrated in full measure by our partners.

Correspondent: Trade ties and industrial and economic cooperation are closely bound up with world scientific and technological progress. Is cooperation growing in this area?

Gvishiani: There are several developments. We have already mentioned one of them, that serious-minded businessmen everywhere have long realized that the USSR is an equal partner of the most advanced states, that it does not seek unilateral advantages, that it is ready not only to borrow know-how and experience but also to make its considerable contribution to world scientific and technological progress.

The socialist system of economic planning creates a firm foundation for stable, long-term cooperation. The new five-year economic plan which we have begun to draft, along with the general perspective of economic development for 1976-1990, will make it possible to work out long-term perspectives for our foreign economic ties as well.

Long-term cooperation on a treaty basis is a characteristic feature of the times. The experience of many years of business relations between the Soviet Union and a number of Western countries demonstrates that the best results are achieved when there is a close relation between scientific-technical and economic cooperation. This close connection is inevitable when the two kinds of cooperation are long term.

At the present time the State Committee for Science and Technology of the USSR Council of Ministers has agreements for cooperation with nearly 150 industrial scientific organizations in the capitalist states. In many cases these ties involve definite economic projects. Trade contacts with companies in turn lead to scientific and technical cooperation between the partners.

Another development is global in nature. Today's scale of research, the vast amount of money spent on it, the unprecedented rate of advance of science and its applications and the positive and negative effects of the impact on social development raise the question of international cooperation in a new way. It is no longer enough for it to take shape spontaneously, to merely register disunited efforts and finally to integrate in a single world system. What is necessary is an extensive process of international cooperation consciously aimed at accelerated and purposeful progress of science and technology in the interest of all mankind. Of course certain scientific problems are global by their very nature: the use of nuclear energy, the exploration of outer space and the wealth of the ocean, environmental protection, the provision of mankind with food and energy and the fight against disease.

The third development is that cooperation in the field of science is exerting an ever greater influence on relations between states and is contributing to the building up of an atmosphere of trust and understanding among nations, to a strengthening of security. As for the difficulties ecountered on this road, we approach them as obstacles which have to be overcome, not as justification for inertia.

Deputy Chairman of the USSR Council of Ministers Vladimir Kirillin. Far right: E. Hornsby Wasson.

Below: Represented at the conference at Moscow's Rossiya Hotel were 140 major companies and banks in more than 30 countries.

USSR AND THE WEST: CONSTRUCTIVE DIALOGUE

Interview with John D. Harper, chairman and chief executive officer, Aluminum Company of America, Pittsburgh.

Mr. Harper, what prospects do you see in Soviet-U.S. economic cooperation, and what opportunities does it open up for your company?

I think there are some tremendous opportunities for both sides. It's going to make more discussions, more getting to know each other, for your people to know what we have and what you can have. But I think the potential is tremendous for economic and technical cooperation, that is, we have a lot of technology which your people can use, you have technology that we can use, you have raw materials, we have raw materials and things that we can put together.

We have had several discussions with various Soviet officials regarding cooperation, mainly technical cooperation, licensing, know-how. We have also had some very preliminary discussions about cooperation on building a plant, on our supplying possibly raw materials for a plant. I think specific developments of ours could be used in the Soviet Union, and these are devices which are advanced in technology or are more economical, or take pollution problems or things of that sort.

Do you have any problems in doing business with the centralized and planned economy of the Soviet Union?

I just happen to believe in a market economy myself. You have a somewhat different system. But the fact that our systems are different should not have anything in particular to do with interfering with our trading together where it is for the good of both. I think it is in our interest and in the Soviet Union's interest that we trade with each other. Therefore, I think we ought to work out whatever the problems are between the market system and the central system to make the trade work. This can be done, I see no great obstacle.

Interview with E. Hornsby Wasson, acting cochairman of the International Conference on Economic, Industrial, Scientific and Technological Cooperation, held in Moscow June 23 to 28.

Mr. Wasson, how would you assess the current state of business relations of Western firms and organizations with the Soviet Union?

We have come a long way. I was here just two years ago, though on a somewhat different kind of mission (a Chamber of Commerce mission), and I would say that a lot of progress has been made. But there are still many problems to be solved. We are laying them on the table, and when you get to that point, you begin to make progress. Some of these problems, however, could not be solved at the meeting we just had. They must be resolved on the government to government level. Many of our people saw various ministers of your government and had private discussions about the mutual problems. That is the heart of the conference.

What, in your opinion, could be done to further expand business relations between the USSR and the USA?

Well, such meetings as this are very helpful. I think they ought to continue. That's one thing. I think both of us have to take a careful look at our rules and regulations and tariffs, which are so important to trade.

There are a number of businessmen who are doing business with you and have been for a long time.

Too often in the past we talked about the problem of doing business with the Soviet Union and never asked you about the problems of doing business with us. And we are doing both now.

Just a short time ago trade between the United States and the Soviet Union was of very small volume. It has increased considerably just over the last five years. If we could be successful in persuading our Congress—and we are working on this—to amend our position to where the Soviet Union is afforded the most-favored-nation treatment, that will eliminate many of the tariff barriers that make it difficult for the USSR to sell its products to the United States. The matter is before Congress today.

What do you think of the results of the conference?

I think good. Many of the people from my side were here for the first time, and, I think, they are very much impressed by what they saw and heard. There were a good many people here representing very large corporations, talking concretely about various projects. I had a meeting with the head of your agricultural group on the possibility of building a potato-processing plant here to dehydrate potatoes. This is only one example.

What are your impressions of Moscow and Soviet people?

We were here just two years ago. I noticed more traffic on the streets. Mrs. Wasson noticed that the women dressed in brighter colors. We were very much impressed with the change over just two years. You are here all the time, perhaps you don't notice these things. You have a lot of things going for you. You have one system, and we have another system, there is a place for both, in my opinion. There is a common ground on which we can do business.

Interview with A. W. Clausen, president, Bank of America National Trust and Saving Association. The bank has opened a permanent office in Moscow.

Mr. Clausen, what importance do you attach to this conference?

I think it is a rather historic conference in the sense that leading industrialists and businessmen of more than 30 countries all over the world were present here in Moscow. It showed that the Western world wants to have economic détente with the Soviet Union and that we would come here to arrange for conferences and discussions with your ministries and your government to find ways in which we could mutually approach the subject of trade. I would expect the conference to have developed the whole array of human acquaintances and relationships.

What is your attitude to the relaxation of international tension?

Well, I think that détente is a fine word. Détente can lead to so many things, it can lead to investments, it can lead to trade, to cultural exchanges. And out of détente, or, I would say, with détente, we have a better hope for peace.

Speaking for my own country, the United States and the USSR for many decades have looked down the gun barrels at each other, in a manner of speaking, on confrontation. We tried that, and no country is strong enough to subsist on its own strength, no individual is strong enough to subsist on his own strength. We need human relations, we need something else to tie to, and countries need the same thing. And so economic détente can be good for the peoples of the Soviet Union, it is good for the peoples of the United States, it is good for the peoples in the world.

What do you think are the remaining obstacles on the road to better Soviet-U.S. relations?

There are a number of obstacles, none of which are characterized as insurmountable. But let me speak of a few obstacles on the United States side, the most-favored-nation treatment, and the situation is an obstacle, there is no question about that. Our Congress has not yet finished its deliberations on that subject, we were hopeful that we would be able to get that.

I think it is unfortunate that we characterized that phrase as the most-favored-nation clause in our trade arrangements because for the U.S. citizen and the U.S. Congressmen that conjures up the idea that it is a special treatment, it is an advantage, a subsidy, it is out of the taxpayers' pocket, when really most-favored-nation means equal treatment, equal treatment arrangements. Now, equal treatment arrangement, equal trade arrangement extended by the United States to the USSR, would conjure up something of equality, and therefore it is a less emotive phrase, and it would have a better chance to succeed. The business community, the USSR-USA Joint Trade and Economic Council, is working very hard to see whether we can be influential in having most-favored-nation treatment extended to the Soviet Union.

Another obstacle, related, although indirectly, to most-favored-nation questions, is the extension of credits because I think, naturally, that credit is pretty important. And so there must be permissiveness by the financial institutions of the United States, either government or private, and I represent the private financial institutions. And they are able to extend the credit to help facilitate the financing of trade.

On the Soviet side the obstacles are primarily in the Western world's learning the system, learning the ministries and how to interface with the ministries and how to reach conclusions and tie things up so that we can cause the trade arrangement to sail, the purchase, whatever it is, the investment, the exchange of technology in order to reach those arrangements.

The Soviets are tough negotiators, the Americans are also tough negotiators, and we find that once we have reached an arrangement—and it might take a lot of patience on both our sides to do that—once it is reached, our experience in Bank of America, which has been doing business with the Soviet Union for more than two decades, shows that the execution of arrangement and contract has been impeccable.

Some Western press organs are arguing that the granting of credits to the Soviet Union is a privilege. What do you think?

It really is not. The receiving of credit is not a privilege, but the granting of credit should be done on a world market basis.

The extension of credits to the USSR will not be a privilege, but it will be like any other borrowing, and that is the way it should be. Our own role in extending credit to the Soviet Union has been growing, we have been a syndicator for the chemical fertilizer plant, which is the largest privately arranged financing syndicate, worth 180 million dollars.

Do you expect a further increase in Soviet-U.S. trade?

I would predict that from this small acorn that we have currently a huge oak tree will grow.

The expansion of international trade in the future is going to continue at a very rapid pace because the world and the small family of nations in this world are becoming increasingly interdependent, and I would underline dependent. The USA is dependent on other countries to supply needed goods, natural resources and commodities and products. So, I think, we will become increasingly dependent upon each other for commodities, resources and products which you can manufacture and vice versa

OUR TIME FOR LEISURE

. . . The measure of affluence will be free time and certainly not working time.

Karl Marx

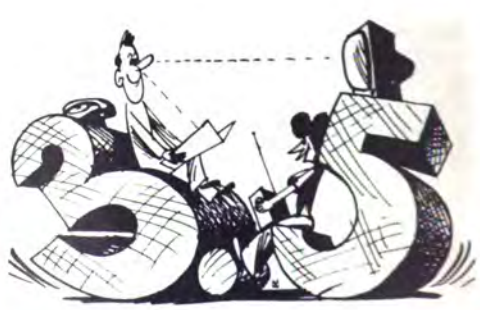
By Len Karpinsky
Sociologist
Drawing by Mikhail Shestopal

7-8 hours a day on the job

1-1.5 hours to get to work and back

3-4 hours for household chores, shopping

8-9 hours for sleeping, meals



3.5 hours—at last—for leisure

All over Moscow you see Help Wanted signs. What is intriguing about them is that, in addition to specifying the usual information about wages and working conditions, they also list the facilities available for recreation and leisure-time activity.

"There is man alone, and all the rest is the work of his hands and his brain!" This line, spoken by the hero of a Gorky play, is more these days than a philosophic observation. Recent figures show that workers' higher qualifications and improved educational background alone account for a 27 per cent rise in the national income. This is indeed a dramatic statistical picture because it is telling us how the rational use of leisure time can affect the economy.

We are concerned in this article, however, with leisure time's effect upon the worker's growth outside the job.

Research carried out in various parts of the country gives us average figures detailing how urban workers spend their time after seven to eight hours on the job: 1 to 1.5 hours riding to and from work, plus time to wash and change before and after; 3 to 4 hours in household chores, shopping; 8 to 9 hours for sleep and meals. A total of some 19 to 22.5 hours, which leaves an average of 3.5 hours for leisure. An approximate figure, of course. Variations in the amount of free time available are naturally determined by a person's economic and social development. Comparative studies made in 13 developed countries show that the men have from 3.5 to 4.9 hours of leisure a day and the women from 2.4 to 4.3 hours.

Is it a lot of free time or a little? That depends on the individual. Some people manage to get a good deal done and still find plenty of time to relax. The ability to use time rationally, of course, depends on people's self-discipline, but on the whole their demands today are greater than their ability to "find time for everything."

Explosion of Interests Versus Available Time

Let us list the typical resources for leisure-time activity: 1. Reading books, magazines, newspapers; listening to the radio and, especially, viewing TV; 2. Going to movies, shows and concerts; 3. Exercise, walking, ice skating, swimming, Sunday sports, short trips and excursions, games; 4. Get-togethers at home, in cafés, restaurants, clubs or simply outdoors; 5. Creative interests and hobbies—community activity, amateur arts, amateur inventing, crafts; finally, 6. Self-education and vocational study.

The point we are making here is that each of these leisure interests is available to everyone, not limited to a privileged few. And going in for just two or three of them will more than fill those 3.5 hours of free time. A fact that must be faced, then, is that the rapid and general spread of culture has given rise to a contradiction difficult to resolve—more interests and opportunities, less time to pursue them.

It would seem that the technical revolution in the communications media—in television, radio, film, publishing, tape recording—should blunt the contradiction. Diffusion of information is simultaneous and to millions of people. In actuality the flood of information merely stimulates the curiosity of most of us, steers our interests into many channels and aggravates the contradiction. All of us demand not only our portion of bread, clothing and electricity, our share of home and international news, but also, just as important, the opportunity to probe, and personally involve ourselves in, today's currents of expression. In short, what we have here is both an increase in the usual material requirements and an accelerated rise in the spiritual demands that call for leisure time.

Important, also, is the new role science plays: It touches many forms of endeavor and, consequently, pushes into the consciousness of millions of people. Ancient Egyptian and Greek legends have it that the "Sciences were created by a deity hostile to human peace of mind." This belief is particularly true in relation to today's science. The flow of social life, charged, as it were, by the nervous excitement caused by scientific revelations, likewise changes. What is taking place is a constant relearning process—in occupations and their demands, in ways of life and forms of social organization, in tastes and psychological reactions, in material environment and, above all, in the human personality itself. Fast disappearing is contentment with the familiar, so typical of the past. People must have extra time constantly to renew knowledge, to readapt, to learn more, to develop. And all this within the space of three and a half hours.

The problem becomes still more complex if we bear in mind that those few hours are taken as an average figure. People over 40 spend three times as long at household chores as young people between 18 and 24. Married folk spend twice as much time on chores as single people.

And the bigger share of the household load is carried, as we all know, by the women. Even on the average the difference between the wife's load and her husband's is very large. Women's household cares are particularly time-consuming during the central, or growth, stage of the family, when there are small children to care for. The time a woman spends working during this period is no less than 16 hours. Since she has acquired an education, a certain social status and financial independence, it is not easy to put these accomplishments in the closet, even for a time. The combination of job and housekeeping role therefore becomes a problem.

What is the conclusion? Free time is real and viable, depending on the spread of service facilities.

Timesavers

The organization of public services in all their forms has become the subject of social concern. In 1973 the state allotted more than 220 million rubles to public catering. The figure comes to more than a billion rubles if we add other financial sources. Construction of big stores, community services and public catering facilities, all with the last word in equipment, results in mass timesavers.

But the spread of public catering and related services only partly solves the problem of providing more leisure time. A good deal more is involved, often, for example, the architectural reorganization of whole cities and villages. In the past many towns grew up around factories. They provided little more than living quarters for the workers.

In the experimental houses of a few residential blocks in the southwestern district of Moscow, every story has its dining room and snack bars. The central dining room of the public catering complex delivers their lunches, suppers, partly cooked foods and delicatessen. The complex, housed on the first floor of each building, has, in addition, a dining room seating 250, a kitchen and a lounge room for general use. Another block, where 45,000 people live, is so designed that the distance from any house to the central House Kitchen and the At-Your-Service Agency is no farther than 300 feet away. The grocery, dry cleaning shop and laundry are 400 yards from the houses, and the palace of culture and department store are no more than three-quarters of a mile from the most distant apartment houses of the block. The determining principle here again is saving time.

The same consideration is a controlling factor in the general plan for developing cities and other population centers: in architectural layout, engineering and technical servicing; transit routes, the number of public conveyances, traffic speed, distribution of the stops; placement of stores and public service establishments along the main intercity thoroughfares—from workplace to home; delivery routes from store to purchaser.

So we are dealing with that aspect of the problem: increasing leisure time by simplifying household chores.

Bringing Culture to the Masses

We are seeing important changes. More freedom from the daily grind and more time and opportunity for free and independent choice of pastime are be-

ginning to affect people's actions, influence their behavior. One obvious example is the influx of rural youth to the cities in search not only of a city profession but of richer forms of recreation.

Figures showing that people in the developed countries have more or less the same amounts of free time do not signify that the forms of recreation in countries with different social systems are identical. As a matter of fact, the more objective Western sociologists are sharply critical of what passes as civilized entertainment in today's bourgeois society. People make their homes illusory fortresses, where the choice of recreation is completely theirs, they think. But commercial entertainment is all pervasive, it cannot be kept out. Television, radio and the other purveyors of consumer culture are omnipresent. It becomes that much more difficult for individuals to be creatively active, to discover their own gifts and capacities.

Bringing culture to the masses is the socialist opposite of "mass culture," of culture "for the masses."

Bringing culture to the masses means giving direction to the people along the highroad to culture; mass culture means diverting the majority away from that highroad. Bringing culture to the masses means developing their potentials for creativity; mass culture means reducing them to the status of spectators, consumers of shows. Bringing culture to the masses fosters social equality; mass culture reinforces inequality. Bringing culture to the masses enhances humanity's understanding of interrelations of people as transformers and social changers; mass culture is designed to keep people in the role of acquisitor.

In summary, bringing culture to the masses is essential for social development; mass culture leads to social regression.

The Communist Party and the Soviet Government have for many years labored to bring culture to the people. Here are some relevant figures, as of the end of 1972, when the fiftieth anniversary of the formation of the Union of Soviet Socialist Republics was being commemorated.

When the current, the ninth, five-year plan was inaugurated, 65.3 per cent of the country's working population had a higher or secondary (complete or incomplete) education. In 1972 some 80.2 million people were pursuing some kind of formal study, a very significant figure indeed in terms of personality enrichment. In the 50-odd years since the Revolution the number of general education schools increased from 89 to 184,000, and the number of higher and specialized secondary schools from 1,180 to 5,071. Prerevolutionary Russia had only 12 universities, and in most of the present union republics there were none at all. Now there are 52 in the USSR, and they are to be found in every one of the republics. Per 10,000 of the population Moldavia has 124 university students, Turkmenia 131, Tajikistan 149, Kazakhstan 152, Byelorussia 154, Kirghizia 161, Azerbaijan 192 and Armenia 214.

Everyday Statistics

I began with these statistics on formal schooling for obvious reasons. Education is perhaps the most substantive cultural index. Its influence on character formation is enormous; it gives us the tools to digest, use and spread the cultural and spiritual values amassed over the ages.

No less impressive are the contributions of other cultural tools. In Soviet times upwards of 2.4 million books have been published in 145 languages, including 89 languages of the peoples of the USSR, in a total printing of 38.3 billion copies. Forty of the country's nationalities had no written languages before the advent of socialism; alphabets were created for them. The USSR now publishes more than 8,000 newspapers and about 6,000 magazines and other periodicals.

We have 1,144 museums; some 360,000 libraries, with a total collection of more than 3 billion books and periodicals; 553 drama and musical comedy theaters, with offerings in 42 languages; 39 major film studios; more than 157,000 film projectors, about 133,000 of them in villages; 133,000 clubs. Every year theaters and concert halls are attended by 245 million people, museums by around 100 million, the movies by 4.6 billion. Fifteen million amateurs vie with professional actors on the stage. Workers discuss stories and poems in the pages of newspapers and magazines, in libraries and at clubs.

These are now routine statistics. But their meaning is truly historical. What we have here is a fundamental breakthrough in the old division of labor, when artistic talent was supposed to be the exclusive property of select individuals and withheld from the masses. The high level of culture the Soviet people are reaching for is not limited to one or even 10 per cent of the people but is there for the vast majority.

According to sociologists, what characterizes people guilty of antisocial actions is not so much their low occupational qualifications as their poor cultural backgrounds. Thus, 75 out of 100 persons guilty of antisocial activity have less than an eight-year education, and 20 out of 100 have not even finished primary school. Only half of them do any reading, preferring to play cards and drink their time away.

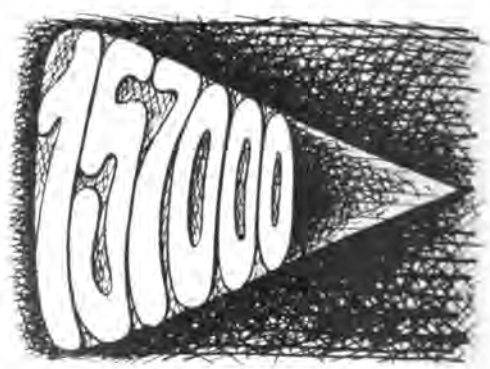
We must see to it, obviously, that everyone is helped to develop a rich

1,144 museums

360,000 libraries open to everyone

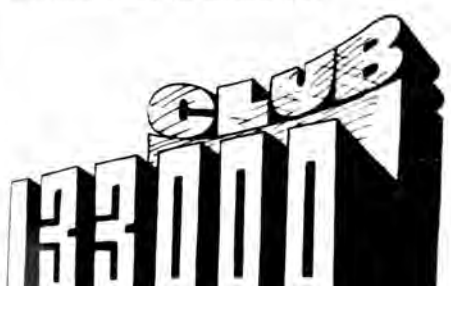
553 theaters with shows in 49 languages

39 big film studios



157,000 film projectors

133,000 clubs for all interests



inner life and to have the opportunity to enjoy good living conditions. Most Soviet families have far better housing now. Besides, higher family income and mechanical household aids provide more free time. That is a gratifying change. On the other hand, the demand for more varied forms of collective recreation, for more independent choices, is greater. Elementary demands in the way of improved living can be satisfied with a few aids and services. Demands of the spirit cannot be met with standardized doses of cultural benefits.

No matter how gratifying leisure time spent alone at home may be, it lacks the stimulus of human contact.

Organizing Recreation Groups

The content of one's recreation is one thing, the form it takes is quite another matter. An interesting development in this connection is that clubs are undergoing a change—everywhere—in factories, villages and housing complexes. Clubs have often been spectator groups, but they are usually better defined as a collection of people with a common interest in which they actively participate.

The shift to a five-day workweek, with its extended weekend, some years ago not only increased the amount of free time but provided opportunities for expanding a recreation program beyond a club's immediate area of activity—in content, geographically, time-wise. The Kuznetsk Iron and Steel Mill Palace of Culture in Western Siberia, for example, enlarged the activity programs of its study and hobby groups and put on shows and festivals in the two city squares, known as Theatrical Square and Victory Square. More excursions and tourist trips were added, and a suburban recreation zone was opened. Some 10,000 of the mill personnel and their families now take part in weekend activities. The Lensoviet Club in Leningrad, another example, has 74 amateur groups in the various arts and a variety of technical groups. It has 34 lecture series and has 18 groups in sundry fields of special interest.

These recreation groups are formed on the job as well as in the neighborhood. Sociologists of the Urals found, as might be expected, that closely knit production teams in a number of industrial plants spent a good deal of their free time together—going to movies, theaters, concerts, museums, forums and literary gatherings. Each of these teams went as a group to 2.2 collective cultural activities a month. This figure compared with the 1.8 statistic of teams not as closely knit.

Here are (1) the main groups which influence people's recreational and cultural preferences and (2) the extent of their influence.

Groups	Choice of Literature	Films
1. Mass media	39.6	45.4
2. Fellow workers	30.7	35.8
3. Fellow students (study groups)	6.8	6.7
4. Friends living in same house	12.5	16.7
5. Neighbors	6.8	8.3
6. Parents, relatives, members of family	14.1	14.2
7. Close friends	41.7	59.2
8. Others	14.1	10.4

Apparently close friends (No. 7) and workmates (No. 2)—the mass media understandably carry great weight—have the greatest influence on cultural choices. Members of the closer-knit working teams exchange information on new books, films and shows. It is interesting also to note that the team leader is often the generally accepted cultural leader whose advice is regularly sought.

Scientific-Technical Progress and Culture

Shaping the rounded personality is the object of Soviet education. Philosophers, sociologists, industry executives, teachers and writers gathered at the editorial office of a magazine to exchange opinions on the subject.

Sociologist: Quizzes of schoolchildren have elicited an alarming number of "I don't knows." Some are completely ignorant of the great Russian and foreign painters and their work, the same with composers. They have never been to the theater or to a picture gallery and have no appreciation of opera or symphonic music. They grow to adulthood believing that a man who can repair a radio set or car deserves more public esteem than one who knows Pushkin's poems and Tchaikovsky's music.

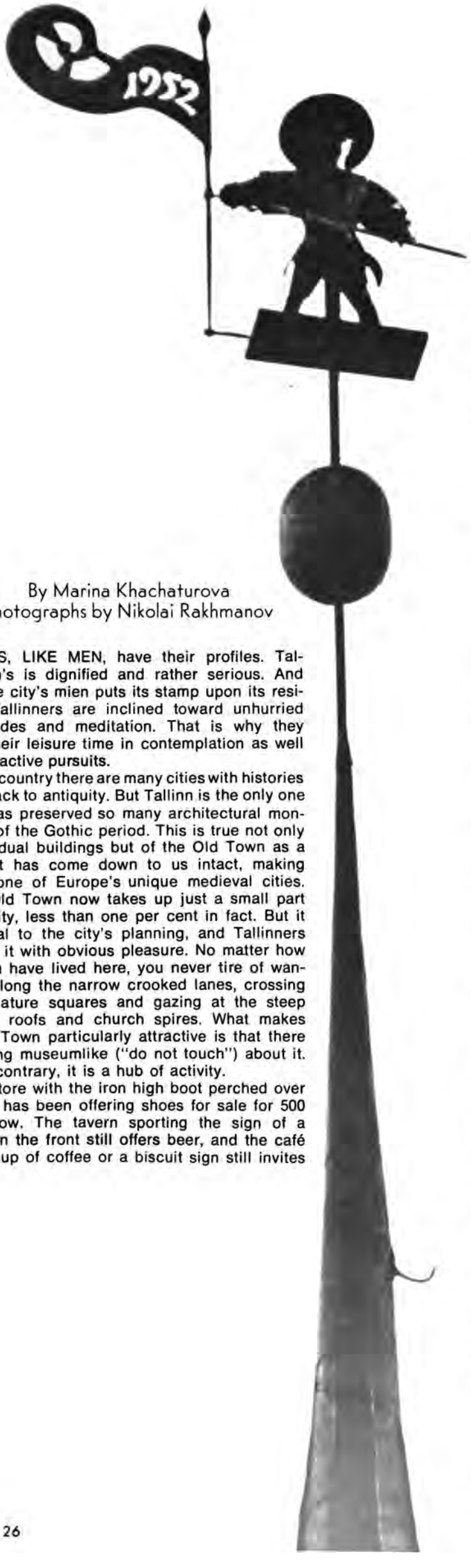
Very few of these young people will defend their attitude with any real conviction. They are simply children of the times. Ours is the age of the atom, of radio, television, cybernetics and, most notably, man's flight into outer space. There was a time when the keys to the mysteries of the universe were in the pockets of the philosophers, historians and artists—the men and women in the humanities. Now these mysteries are being unraveled by physicists, chemists, mathematicians, biologists. The scientific-technical revolution has brought us many new things, many hobbies and interests. It is also responsible for many delusions.

Writer: That is only one aspect of the matter, the objective aspect. But the realization of "something" is always "somebody's" realization. Many still cling to the old idea that a man's value is measured by the things he owns. As they see it, the age of science and engineering is merely an age of new things. It is even easier in today's world to worship things for these things have become so much more amazing and clever. What I am getting at is that this worship of things acquired—with which the philistine traditionally tries to impress his guest—can be increased by the worship of things created. This preoccupation with things is hard to expose since it appears to be the manifestation of pride in accomplishment. In reality it is, I repeat, what it looks like, a worship of things, and it debases the human personality. As though the person is worthless and only basks in reflected glory.

Chief Engineer: My opinion is that scientific-technical progress and culture are allies. I once went abroad with a worker, the senior operator of Rolling Mill 2000 at the Novo-Lipetsk Iron and Steel Mill. This worker was constantly embarrassed because he was taken for an engineer. But he himself gave that impression. At the factories our delegation visited, he kept pestering his hosts with such questions as, "What device is that on the control board?" "What kind of transmission is this?" The fact that he was taken for an engineer was hardly surprising. The new worker thinks in engineering terms. His job demands engineering technical knowledge and analytical ability. This man has an excellent cultural background. He is interested in painting, keeps up to date on books and enjoys the theater.

Teacher: There is certainly interaction of personality, scientific-technical progress and cultural development. That interaction makes special demands on the content of education and instructional techniques. The new methods already in general use in Soviet schools presuppose the pupils' active interest, their creative participation. They absorb knowledge by constant independent discovery. In the higher schools the so-called problem method of teaching is tied in even more organically with independent research.

Philosopher: What we have been leading up to is the problem of destroying the remnants of the old division of labor. For centuries the people's creative endeavors were so limited as to be petrified. They were deprived of the principal means of expression—printed books, building techniques, laboratories, complex musical instruments, the drawing board and the artist's brush. Now they have them—and much more. The people are creating culture, not only producing material means, and thereby providing professionals with extra leisure time to create in, not only inspiring professionals with stories and characters, supplying them with poetic and musical languages, as was the case before, but also making contributions of their own in their own good—and free—time. This is culture democratized.



By Marina Khachaturova
Photographs by Nikolai Rakhmanov

CITIES, LIKE MEN, have their profiles. Tallinn's is dignified and rather serious. And since the city's mien puts its stamp upon its residents, Tallinners are inclined toward unhurried promenades and meditation. That is why they spend their leisure time in contemplation as well as more active pursuits.

In our country there are many cities with histories dating back to antiquity. But Tallinn is the only one which has preserved so many architectural monuments of the Gothic period. This is true not only of individual buildings but of the Old Town as a whole. It has come down to us intact, making Tallinn one of Europe's unique medieval cities.

The Old Town now takes up just a small part of the city, less than one per cent in fact. But it is central to the city's planning, and Tallinners frequent it with obvious pleasure. No matter how long you have lived here, you never tire of wandering along the narrow crooked lanes, crossing the miniature squares and gazing at the steep red-tiled roofs and church spires. What makes the Old Town particularly attractive is that there is nothing museumlike ("do not touch") about it. On the contrary, it is a hub of activity.

The store with the iron high boot perched over its door has been offering shoes for sale for 500 years now. The tavern sporting the sign of a barrel on the front still offers beer, and the café with a cup of coffee or a biscuit sign still invites you in for a light lunch. The medieval guild symbols are as much a fixture of the city as the silhouetted Tallinn weathercocks, among which the most famous—Old Toomas—tops the spire of the City Hall. Here you can dine in the Old Toomas Restaurant or in the Gnome Café, which accommodates no more than eight, or drop into the Mundi Bar with the bearskins on the walls and lit by the flickering light of candles. Your tour of Tallinn is unique because this medieval town seethes with life as much as it ever did. This combination of the antique and the modern is Tallinn's special charm.

Like Leningrad, Helsinki or Stockholm, Tallinn is one of the few cities where there are white nights during the summer solstice (in May and June), and at such times the ancient city seems eternal.

In our day people yearn for more greenery, and in Tallinn this desire is gratified by a green belt that encircles the entire Old Town. The areas where there were earthen fortifications have been turned into lovely parks, and Reindeer Park, a joy to grownups and children alike, has species of trees rare for so northern a town. Tourists like to climb the steps of the *Kiek in de Kök* gun tower, whose broad windows offer a fine view of the city and Tallinn Bay. Local people visit the tower very often. It houses a branch of the City Museum where photo exhibits, chamber music concerts and shows are held. Some 150,000 people visit the tower every year.

The sea gives the city a special quality and also determines the nature of much of the recreation. Tallinn's suburb—Pirita—is a local seaside resort and favorite playground for Tallinners on holidays. On sunny days they go there by bus, car, bicycle or motorcycle—whole families, groups or couples. Pirita has a beach, enclosed in pines, of fine, almost white sand, and there's a yachting club. Even when it's too cold to bathe in the Baltic Sea, you can play ball, stroll among the pines or climb the narrow stairs up the walls of the ancient St. Brigitta Monastery. Sadly, nothing but the walls remain; the ruins inside are overgrown with grass. From the top you can see the blue water, the silhouettes of Tallinn's Gothic buildings to the left and the pine grove and Pirita River behind.

Not far from here, in Kadriorg, there are peaceful walks in the lovely park surrounding Catherine Palace, which Peter I built. The palace is now Estonia's art museum.

Near Kadriorg is the vast Song Field. Here more than 30,000 singers stand on a specially constructed stage during the traditional song festivals. This stage lies at the foot of a hill which forms a natural amphitheater accommodating 250,000 spectators.

Both the Kadriorg park and the Song Field border the wide strip of seafront stretching for several miles and joining the city to the beach, the Pirita River and an enormous forest park of pines, oaks and chestnuts, shady paths, groves and ponds.

Most of the young Tallinners love sports. In Russia soccer is the favorite game, but for Tallinners it's basketball. In Moscow's courtyards boys kick their balls into improvised goals, in Tallinn they shoot the balls into baskets. It is easy to see why several Estonian basketball players have become USSR champions.

George Bernard Shaw said that traditions were the fruit of the obsolete. If that is a rule, Estonian song tradition is the exception to prove it. Nowhere in the Soviet Union is mass choral singing

Continued on page 46

Old Tallinn.

New Tallinn.

RECREATION— THE CITY COUNCIL'S JOB

Mayor Ivar Kallion of Tallinn is interviewed by a SOVIET LIFE correspondent.

Ivar Kallion is 43 years old. A graduate of the Tallinn Polytechnic Institute, he worked his way up from electrical engineer to plant director, then was elected mayor of the Estonian capital three years ago and reelected for a second term last year.

Q: Tallinners this year celebrate the thirtieth anniversary of their liberation from fascist occupation. Tallinn, I know, was one of the Soviet Baltic cities that suffered enormous damage during the war.

A: Our city was liberated in September 1944. Whole districts lay in ruins. More than 6,000 buildings were completely destroyed, and a great many were badly damaged and burned. About half of the housing was demolished. You can imagine how much effort and money were required to rebuild! We went far beyond reconstruction. As a matter of fact, the equivalent of three 1945 Tallinns were built over these 30 years.

Q: In 1971 the Estonian government adopted a master development plan for Tallinn stretching over the next 25 to 30 years. What is projected in terms of recreation facilities?

A: Large-scale construction of new districts and new recreation areas will be concentrated mainly along the seacoast, east of the center of the city. Our architects will have the opportunity to take advantage of the natural landscape, the sea and the pine forests.

The plan calls for cultural centers and sports complexes. For example, an auditorium with a seating capacity of 7,000 is scheduled for the center of the city, right on the shore; construction will begin in 1977. We have a special agency for long-term social planning. Its recommendations include additional suburban rest and recreation centers, hunting lodges and a large complex of park attractions, a

kind of Luna Park on the seashore. We are also planning indoor swimming pools and gymnasiums.

Q: I hear that every Tallinner goes in for sports. Is that really so?

A: Not every Tallinner but a great many of them. For instance, the city has a population of more than 400,000, and 79,000 are members of sports societies. We try to get everyone interested in sports, not just those who have the makings of champions.

Did you know that Tallinn has an ancient sports tradition? The first competitions we have a record of—equestrian contests—were held here in 1440. Weightlifting became very popular toward the end of the nineteenth century and has since become almost a national pastime so Tallinn is famous for an unusual number of very strong men. Weightlifting is still popular, but auto racing is even more so. Our race track is one of the best in the country.

Tallinn is also one of the country's important chess cities. An international tournament is to be held here next year. I'm the chairman of the organizational committee.

Another very popular sport is sailing, which is understandable for a seaside city. Basketball runs it a close second. Our women in recent years have been going in for calisthenics in a big way. We have more than 2,500 woman gymnasts—no small figure for a city under half a million.

Q: I understand that Tallinn seconds Moscow's candidacy for the 1980 summer Olympic Games and is inviting the Olympic regatta.

A: Right. Our bay is almost perfect for regattas because of the dependable winds, its insulation from the Baltic Sea, its depth, currents and configuration. Another important feature is that our yachting center, Pirita, is practically a Tallinn suburb so that participants in the Olympics will have close at hand the city's museums, theaters and other entertainment.

As it stands the present seacoast center cannot handle major competitions. So the City Executive Committee and the Union of Architects held a contest for the best Olympic yachting center in Pirita. Twenty interesting projects were submitted, and the two that won first and second prizes meet all the necessary requirements. The plans are now being worked on, and the complex, which is to be ready by 1979, is already taking shape. Everything around the center will be rebuilt. The road along the seacoast is being widened by 150 feet, and another bridge will be built across the Pirita River. We are going to modernize the beach, too, and a new hotel and more social, cultural and commercial facilities are on the schedule.

I want to make the point that all these rest and recreation projects will be built regardless of the International Olympic Committee's decision.

Q: How about other cultural interests of Tallinners, choral singing, for instance? I think it would be no exaggeration to say that every Tallinner sings in some chorus. Am I right?

A: You are. The Estonian tradition of choral singing goes back to time immemorial. Tallinners would never forgive their City Soviet if it considered choruses and choirs to be of secondary importance. A lot of time, labor and money go into training singers. New choruses and groups spring up every year. There isn't a park without its choruses and folk song and dance ensembles. Open-air concerts in the summer draw audiences in the thousands. We have a Shortest Night Festival in Tallinn every June 23. As many as 80,000 participate. Singing is one of the highlights. Every five years an All-Republic Song Festival is held on the Song Field's huge stage, and more than 30,000 singers are invited. The field is also where the Children's Song Festival is put on; 26,000 youngsters participate.

Q: Every City Soviet has its agencies and standing committees whose job is organizing rest and recreation facilities for everyone. What commissions of this kind does the Tallinn City Soviet have?

A: They're similar to what the District Soviets have—ours are called the Commission for Physical Culture and Sports, the Council for Mass Recreation, the Commission for Youth and the Commission for Culture.

Tallinn is on the Baltic Sea, and that gives the city a special quality. Its suburb Pirita is a seaside resort and a favorite playground for Tallinners. It has a sailing club and a beach of fine, almost white sand surrounded by pine trees. The swimming is not the warmest in the world, but bracing. Once you get in, it's fine.

SEE YOU AT THE PALACE

By Vladimir Velman

THERE IS good reason for Tallinn's Jan Tompa Palace of Culture to be named after the first chairman of the Estonian Central Council of Trade Unions. The palace's sponsor is the present council itself. And its site on Salma Street has significance —the city's industrial plants are concentrated in the area.

The palace has an auditorium seating 800, a dance floor, a lecture hall, exhibition halls, rooms equipped for all the different clubs and a library with over 150,000 books.

During the day it is comparatively quiet on Salma Street. But from six in the evening till late at night, it is a lively and a very crowded place. Every day a thousand people spend some of their free time in one

Photograph by Yuri Vendelin

ıe palace's 40 groups and
s: chess, dance, choral,
ic, dramatic, art, dress-
ing, photography, to name
ew. All activities are, of
rse, without charge.

sn't this a rather expen-
commitment for the
a?" I ask Friedrich Suura,
ited Worker of Culture of
Estonian Republic and di-
or of the palace.

t is, in money terms," the
ctor replies. "Our palace
s in only 85,000 rubles a
, most of it from admission fees to concerts and films. But that hardly pays for the bare essentials. We get an annual state subsidy through the Trade Union Council—150,000 rubles."

At the palace you meet people of all ages and professions: factory workers, engineers, pensioners, students, schoolchildren. The membership of the Kalev mixed choir is typical. It includes Arthur Aasajarv, a house painter; Aita Roost, a doctor; Herbert Barbola, a pensioner; Victor Kabonen, a schoolboy; engineer Willu Pahk and teacher Yulla Reino.

Something unique in instrumental performers is the girls' drum corps. But the appreciation of Estonians for the group has to give way to their even stronger passion for choral singing. There are any number of choral companies at the palace. The Boys Choir is a regular participant in republic song festivals. When a boy's voice begins to change, he is invited to join the palace's teenage brass band. It's an honor; the band is one of the best in Estonia. At the close of the school year, the young singers and musicians leave for the country for two weeks, and there they rehearse and perform for the local people. Camp accommodations are free.

The palace's performing companies make frequent tours of the Soviet Union and even foreign countries. They give some 200 concerts a year.

THE INTERNATIONAL CLUB

Tallinn's four schools of higher education all have a variety of extracurricular clubs. Third-year economics majors Roode Liias, Eda Urbel and Tiine Kongas are three of the 10,000 day, evening and correspondence students at the Polytechnic Institute. They are active in the school's International Club.

Roode Liias
President

Our International Club had a fifth birthday not long ago. We have 32 members and 25 candidate members.

We are in touch with other schools of higher education throughout the Soviet Union and abroad. We play host to delegations from these schools, arrange lectures and seminars for them and make return visits.

Perhaps our interest in the International Club has to do with the fact that Eda, Tiine and I all graduated from the same special school in Tallinn that uses English as the language of instruction for many of its courses. So it is quite natural that we should want to improve our English and want to keep informed on international matters. As we see it, our club helps to promote understanding among nations.

Eda Urbel
Vice President and Treasurer

Student delegations from other countries are invited to our institute through the Estonian branch of Sputnik, the Bureau of International Tourism for young people. We show them around our institute and our town and arrange meetings with students and young factory and office workers from Tallinn. We try to put them in touch with people they might find interesting.

The visitors book of our club will give you some idea of the extent of our ties geographically—Hungary, Czechoslovakia, Poland, Austria, the USA.

I correspond with many of our guests, one of them is Ben Fairfax, from Illinois.

We give each group souvenirs to remind them of their visit. The trade union committee of the institute covers our expenses, which are my responsibility since I'm the club's treasurer.

Tiine Kongas
Cultural Secretary

It takes planning to give our visitors a picture of the institute and Tallinn. One of the things we do is arrange lectures, which I organize. I make sure that the program is informative. Guides are needed not only when delegations come here. Most of the members of the club spend their summer vacations working on student construction sites, where there are also visitors from abroad. It has already become a tradition for students from the Budapest Technical University, the Prague Higher Economics University and the Silesia Polytechnic Institute to work summers in Estonia.

For all the institute students the International Club arranges meetings with government officials, cultural workers, journalists who have visited different countries. Aare Purga, Minister of Higher and Specialized Secondary Education of the Estonian SSR, gave us an account of students in the USA. Television commentator Simon Ioffe talked about young people and their problems in the Federal Republic of Germany. Lembit Elre, senior scientific assistant at the Institute of Economics of the Academy of Sciences of the Estonian SSR, described the youth movement in the Netherlands.

Our club not only organizes meetings at the institute itself but also at vocational schools and workers clubs. A great many young people come to these meetings, and we appreciate their thanks; it means that our club is doing what it set out to do, namely, to help people get to know and understand one another.

Photograph by Yuri Vendelin

TALLINN: STATISTICS TELL THE STORY

The five-day workweek and eight-hour workday leave the 400,000 residents of Tallinn, the capital of Estonia, plenty of time for recreation. Jan Vendla, deputy chief of the Tallinn City Statistical Board, tells us how that time is spent.

STATISTICS, they say, tell the tale. That may be true, but the figures usually need some fleshing out. Consider the city of Tallinn and its cultural facilities, for example.

The story of Tallinn and matters cultural began changing in 1940, shortly after Estonia became a Soviet republic.

The theaters, museums and other cultural institutions were nationalized. A State Philharmonic Society, a Central House for Folk Art, a state film company, and new libraries and clubs were founded.

At the disposal of Tallinners today are 25 trade union clubs and palaces and houses of culture. Their 441 study and hobby groups are attended by 10,400 people. In 1973, 1,324 concerts, attended by 306,800 spectators, were held in the clubs of Tallinn. Some 27,500 people heard 2,397 lectures, and 284,400 people went to 1,824 discussion groups.

Five professional theaters, accommodating 3,000 people, and four amateur theaters gave 2,257 performances attended by a total audience of 837,600.

Annually some eight million people go to the city's 13 movie theaters.

Tallinn has 13 museums. Last year 720,000 people visited them, many came for field trips and for the lecture series on art organized by art historians. The Tallinn State Museum of Art, the largest in the republic, has a collection of 17,000 paintings, drawings, sculptures and works of the applied arts. Last year 1,324 groups came to see the collection. Some 12,000 people heard 220 lectures on art.

Tallinn is the home of the State Kreitzwald Library of the Estonian Republic, the Scientific Library of the Estonian Academy of Sciences, 45 department and trade union libraries, as well as those in factories and schools. Every third resident of the capital borrows books regularly from one of the city libraries. In 1973 they read a total of 2.5 million library books.

Every fourth resident participates in one or another sport. The 312 sports clubs have a membership of 80,000. That is 15 times as many as in 1940 and three times as many as 10 years ago.

Engineers Meetinghouse

THESE DAYS engineers tend to develop lopsided personalities, their areas of specialization have come to be so narrow. Which is why interbranch contacts are so necessary and so helpful. In Estonia, at the Tallinn House of Engineers, leading specialists in different fields of the profession meet informally to exchange ideas after work.

The House of Engineers is headquarters for the Estonian Science and Technology Society, whose members work in 20 branches of trade and industry. There are 20,000 in Tallinn alone. Enterprises in the city are eager to have society members on their payroll. They are generous with their scientific and technical know-how and help workers improve their skills. That is one of the reasons many factories give annual contributions to the society of 300 to 500 rubles and more. Membership fee for individuals is 1 ruble 20 kopecks a year.

Specialists who visit the House of Engineers do more than sharpen their professional wits and test ideas. They work out projects of immediate value for the republic. For example, they have drawn up a comprehensive program for the production of mineral fertilizer, contributed to better organization of production in some of the factories and have helped mechanize and automate many branches of industry. They have suggested improvements in management and are working in the field of environmental protection, in particular tackling the problem of production wastes.

Even informal contact needs some form of organization. The House of Engineers has a 15-member working presidium and an 81-man council. Seven sections headed by leading specialists explore a range of problems, the eighth section organizes recreation—ski and fishing outings, picnics, sports contests and meetings with actors and musicians.

The two-story House of Engineers has rooms accommodating from 15 to 100 people, but more often than not the intimate café is the members' meeting place.

Officers of the International Club of Tallinn's Polytechnic Institute. From left: Eda Urbel, Tiine Kongas and Roode Liias.

Dancers from a Textile Mill

Text and Photograph by Alexander Lobov

HE REASON for my visit to the Ukrainian town of Kherson as to get acquainted with the ıvria amateur dance company. ıave seen any number of such oups perform. My considered ɔinion is that the Kherson group ands very near the top. I am ıpported by what the French apers wrote during Tavria's two ıonths of performances in Paris: fiery, passionate dances," "superior dancing skill," "real professionalism."

Twenty-five young people are ıe core of Tavria, which is the ncient name for the Crimea. here are, in addition, the standys, props and wardrobe people. Who are the twenty-five? They are eavers, technicians, laboratory ssistants and engineers at a mill hich manufactures curtain fabics, tapestry, chiffon, poplin and ther textiles. Most are under 4 and have been training at he textile workers' palace of ulture for the past five to seven ears. About half of them are hildren of workers at the mill. Some came to the dance studio hile they were still in high school.

All 25 told me that they had ıo leisure-time problems. They are very busy people, what with hree rehearsals a week, local dance concerts and frequent guest tours. Once a month they perform at their own mill after their work shifts or during the unch break. They have danced to storms of applause in Moscow, Leningrad, Kiev, Simferopol, Volgograd, Baku, as well as in cities of Bulgaria and Hungary. The whole mill staff feels a proprietary interest in Tavria.

It is interesting to know that the years spent as members of the Tavria dance company have been at the same time for all its members a period of growth in their jobs. People who started their working careers as operators have become engineers or technicians, and five are students at various schools of higher education. Everyone moved ahead despite the fact that the job demands made on them are no different from the requirements and standards other workers are subject to.

The one concession they enjoy is that the management excuses them from night shifts. When they go on concert tours, they are given additional, but unpaid, leaves of absence. Every year the company gives about 80 concerts at collective and state farms and in factories in other cities.

Besides their jobs and dancing the members of Tavria also have family responsibilities. Only five are single. There are six married couples in the group.

Kherson is a southern and very green city on the banks of the Dnieper River, with a population of 250,000. It has the look and almost the feel of a health resort, an atmosphere conducive to relaxation and play. Apparently the members of Tavria prefer a more active and creative kind of leisure

Museumgoing is one of the favorite pastimes of Muscovites. The Pushkin Museum of Fine Arts has one of the world's best collections of art of the ancient East and Western Europe. Among its most prized possessions are Egyptian papyri and sarcophagi, Greek and Etruscan terra cottas, vases and sculptures, and works by French painters of the seventeenth through the twentieth century. The museum periodically arranges exhibitions on the art of various countries and outstanding individual painters, which are always attended by many visitors.

QUERIES FROM READERS

QUESTION: When a Moscow family is assigned a new apartment, is there a choice of neighborhood?

ANSWER: The city housing administration tries, of course, to meet the requirements of the family. It is not always successful, the requests are so varied. One family is offered an apartment that is too far from the wife's place of work. The grandmother in another household can't climb steps. Two friends, neighbors in the old house for 30 years, don't want to separate. And so it goes.

A computer has been called into service to help resolve housing problems. Data on all new apartment houses and detailed information on families in need of housing (for example, composition of family, age of members, their place of work) are fed into the computer, which recommends the most suitable address for the applicant.

What new housing locations does the computer's memory store? One is the southeastern district of the capital. A number of large machine-building plants are located on the banks of the Moskva River, as well as several scientific and design institutes. So most of the people moving into the new apartment houses in the vicinity are in trades and professions related to the industry in the district.

Southeast Moscow has much more than housing developments; there are concert and exhibition halls, a public library, medical institutions, schools, shops, a park with entertainment facilities and dance halls, a café and many other things people have to have.

The residential areas are separated from the industrial plants by a throughway, along which boulevards will soon be laid out. They will reach right up to a big suburban park.

A typical Muscovite for whom the computer chose a new apartment is Yevgeni Shashlov, a fitter at an electromechanical plant. His wife works as a hotel chambermaid, his daughter is in the tenth grade. From a one-room apartment the family has moved into two rooms and a kitchen. The difference in rent is minimal.

Of the city's seven and a half million residents, over three million in the last 10 years have moved into new, bigger, well-equipped apartments.

QUESTION: Are there many believers in the USSR? What rights do they have?

ANSWER: Sociologists estimate that about 10 to 12 per cent of the people in the USSR are believers. There are no official figures. The church was separated from the state in 1918, and since that time no statistical records have been kept of the number of believers. Religion is considered to be a person's private business. No official questionnaire asks what anyone's religious belief is.

The freedom to exercise any form of worship or to be an atheist is a constitutional right of every Soviet citizen.

There are guarantees which make it impossible for religious convictions or the absence thereof to affect a person's social and private life in any way or to infringe any political, economic, civil or other rights (including the right to free education, free medical service and old age security).

The guiding principle with regard to believers is the same as the one for people of different races and nationalities: Any discrimination against people because they profess one or another religion is punishable by law. For instance, refusal of employment or admission to an educational institution because of a person's religious belief is punishable by a sentence of up to one year of corrective labor.

It should be noted, in all fairness, that such cases are very rare and do not go unpunished.

Every believer has a right to file complaints —with state agencies right up to the top— against any attempt to infringe his rights. There is a special state body, the Council for Religious Affairs, one of whose functions is the consideration of every such complaint.

Soviet law protects believers against any infringement of their legitimate rights. For instance, the freedom of observing religious rites is guaranteed: Anyone who violates that right is answerable to the law. The state also forbids any interference in such religious matters as holding prayer meetings, teaching in seminaries, publication of religious literature and the financial activities of religious associations (all expenses are met from voluntary donations).

Many of the thousands of buildings at the disposal of believers in the USSR are valuable historic and architectural monuments which are under the state's protection. Foreign tourists, for instance, have had the opportunity to visit the Troitse-Sergieva Lavra (Trinity Monastery of St. Sergius) in Zagorsk, which houses the Ecclesiastical Academy of the Russian Orthodox Church, and the St. Vladimir Cathedral in Kiev, the capital of the Ukraine. Believers pay no taxes for the use of churches, mosques, synagogues and the like. And, just like other citizens, many are active in the country's trade unions and mass organizations.

QUESTION: What do Soviet automobile designers think of the electromobile?

ANSWER: Work on an electromobile is in a new stage. So far only single cars have been built and tested, but a whole batch will be produced in 1975. However, the electrically driven car still cannot substitute for the gas-engine vehicle. The battery power capacity is too low.

But it is becoming clear that we will eventually have two types of automobiles, one for within the city, the other for outside. Some of the experts say this will happen around 1980, regardless of how advanced the electromobile's design is by then. Even its present insufficiencies do not completely bar its use. A purely urban car does not need high speeds, nor does it travel any appreciable distance. Recharging or replacing batteries in a city is no problem so that even present types of storage batteries can be made to meet current needs.

Still, experience shows that the introduction of even the simplest electromobile brings a number of problems.

No matter how modest speed and distance requirements are, the daily run of urban freight-carrying, service and passenger cars (and, hence, electromobiles) is at least 60 miles. A speed of 35 miles an hour is also needed. Buses and taxicabs have even longer runs, up to 250 miles. That means that an electromobile with a load-carrying capacity of about half a ton will require for a day's run a lead-acid storage battery weighing 1,300 to 1,500 pounds, and a bus will need one weighing two to three tons.

Then the machine itself, particularly the body, will have to be lightened. That can be done. It is also desirable to reduce traction resistance, which can be accomplished by using special tires. It may sound paradoxical, but the best tires for an electromobile would be those closest in design to the ones on racing cars. Special devices also have to be evolved to accelerate recharging or replacement of batteries.

To sum it all up, we don't yet see the electromobile as an all-purpose vehicle but one for specifically urban conditions and use. Creating a practical machine of this type involves much more than the replacement of a conventional car's power plant.

Around the Country

MOBILE HOUSES FOR THE TAIGA

Special mobile houses are being constructed for geologists, oilmen and builders working in the uninhabited expanses of Siberia. Each house has a living room, bedroom and kitchen. Special equipment includes a shower room and a closet for drying clothes.

The house is built of metal, faced inside with panels made of wood and pressed shavings, with good heat insulation in between. Hot water stored in a boiler in the hall is heated by units hidden under the floor. Electric heaters can also be used. Tests made in the Far North have shown that a normal temperature can be maintained in the house even when the frost outside reaches 58 to 76 degrees below zero. The houses are built on springs and can be moved about in places where there are no roads.

EVERYTHING ABOUT MAMMALS

The first International Congress of Thereilogists (zoologists specializing in mammals), held in Moscow in June, was attended by over a thousand scientists from 54 countries. Papers read and discussed dealt with current problems of zoogeography, the s of mammals, their structu relation to the environm well as interesting aspects mal behavior.

1,000-YEAR-OLD SCHOOL

The school in the old of Sanain in Armenia celebrating its thousandt day this year.

Grigor Magistrat, eleven tury Armenian philosopher, ar and writer, taught at Sanain school. Sayat-Nova, eenth century poet-com Marietta Shaginyan, well-k Soviet writer, and Artyon koyan, aircraft designer whom the school has named, studied at the scho visited it in their time.

LIGHT AND SOUND— ILLUSION OF PRESENCE

An unusual open-air theater will soon be operating in Yerevan, the capital of Soviet Armenia. Spectators will see neither live actors nor scenery. The "action" will take place on neighboring hills in an area covering 85,000 square feet. By means of light and sound the directors will re-create events connected with the founding and history of the ancient city of Erebuni (now Yerevan).

The theater will use radioelectronics, automation, illumination engineering and electroacoustics to create its effects. The whole system will be automatic and centrally controlled. A combination of light and sound effects, programed and prerecorded, will give the impression of characters in the flesh and the movement of changing events. The sound effects will simulate battles, the movement of cavalry and the voices of people. White and colored streams of light will heighten the dramatic action. One scene will show the ancient city in flames.

SWITCH ON THE SUN

Solar light is one of the major components of man's environment. Architects, builders and specialists in illumination engineering labor to use it efficiently in designing houses, blocks and entire cities. To make their work easier, the Moscow Institute of Construction Physics has set up a research complex to study architectural illumination engineering. Mockups of new cities will be studied under an artificial sun.

Beneath a dome some 60 feet in diameter, a "sun," consi from special tubes, will emit in various ways, turning, a researcher's command, into desert sun or the weak s Northern latitudes.

CHUKCHI POET

A new collection of verses by Kymytval, the first Chukchi poet, has been published in a large edition in the Chukchi and Russian languages. The book is called *Listening to Music*. Kymytval, daughter of a reindeer breeder, grew up in the tundra and became a teacher. She started writing poetry 10 years ago. Several of her books are concerned with the life of the peoples of the North.

MINE VENTILATION

The Sever (North) mine-ventilating installation, the largest in the world, has completed final tests. The blast blower—it supercharges mines with over 70 million cubic feet of air an hour—was designed in the city of Donetsk in the Ukraine especially for the Oktyabrsky mine of the Norilsk mining-metallurgical complex, where ores will be extrac from a depth of over half a m

RIVER BOTTOM CLEANER

The Belaya River bed (the area) is being used as a ural filter to purify water for city of Ufa. The idea origi when seams of sand and g were found at the bottom Belaya. Sand and gravel do excellent job screening wate

A deep shaft was sunk on bank of the river. Powerful draulic jacks were installed shaft. The jacks were used through the earth under the bottom with special steel The shaft was then closed concrete, and pumps were stalled to bring up pure water.

UNDRA TOWN

nye Zori (Polar Dawns) is me of the youngest com- n the Far North. It has p in the tundra where nuclear power station built. More than 10,000 ow live in Polyarnye Zori. ders' settlement has kin- ns, a school, a movie café and shops. A swim- ol, a stadium and a pal- ulture are under construc-

IGHTNING ROD FOR AIRCRAFT

Leningrad Polytechnic In- e and the Research Insti- Civil Aviation have worked system of protecting pas- senger aircraft from lightning. The system draws electric discharges from the nose to the fuselage. Then special units are activated which deflect the discharges away from the plane.

NEW INTEREST IN THE ORGAN

Tallinn, the capital of Estonia, was host to a USSR festival of organ music. Its theme was "Bach and Twentieth Century Music." For the final concert Estonian composer M. Marguste wrote the piece "The Tones of the Organ." Interest in organ music is on the upswing in the Soviet Union. More than 30 large organs have been installed in the country's concert halls.

FILM ABOUT THE NATURE OF HUMOR

Enigmas of Laughter, made by the Kiev Popular Science Film Studio, is the first attempt to depict the psychology of man's perception of humor in a popular science film. Episodes were shot out of doors at the Sorochinsk Fair in the Ukraine, at folk festivals in Uzbekistan and in the Bulgarian city of Gabrovo.

ROUND THE WORLD IN A YACHT

At a meeting of the Oceanographic and Polar Departments of the Soviet Geographic Society held in Moscow, a one-man voyage round the world in a yacht was announced. Alexander Chebanyuk of Voskresensk, a town in the Moscow Region, is making ready for the trip. Chebanyuk is 51, in excellent physical shape and a good sailor (he served on a submarine). He is an engineer by profession.

Chebanyuk is building his craft with the help of friends. It will be a two-masted ocean yacht of the Bermuda ketch type, 41 feet 4 inches long and 9 feet 10 inches wide with sails 700 square feet in area. The yacht will also be equipped with a 12-horsepower engine. The voyage, 30,000 miles long, is expected to take a year.

A FILM ABOUT AMERICAN WRITER

documentary film on Theodore Dreiser has been shot netsk, one of 20 cities in the visited by the writer in 1927. in the Donetsk Basin the famous novelist acquainted himself with the life and work of Soviet miners. The movie follows the route of the novelist, showing changes that have taken place in the district since his visit.

Reminiscences of Dreiser's contemporaries and sketches illustrating his novels round out the film.

TALL STORIES

Kindasovo is a small Karelian village on the banks of the swiftly flowing Shuya River. The natives have a reputation for tall stories. The most improbable things happen in the village. Not everyone has the good fortune to hear the stories firsthand so the Petrozavodsk publishing house Karelia has put out a large edition of the stories entitled *Kindasovo Fables*.

SHIP ON WHEELS

A trawler with a catch aboard is moving along a highway. Impossible? There really is such a vessel. It was built around a ZIL vehicle by specialists from the Institute of the Mechanization of the Fishing Industry. The *Amphibia* is designed for remote lakes and ponds. It catches a ton or two of carp, bream or zander, sails to dry land and delivers the catch directly to a receiving depot. Even on hot days the cargo will stay perfectly fresh since the fish bunker is provided with refrigeration equipment. The *Amphibia* has a crew of five. In the near future serial production of wheeled trawlers will be started.

REPORT FROM INTOURIST

Each year the influx of tourists in the Soviet Union increases by 15 to 20 per cent, Victor Boichenko, chairman of the board of Intourist, reported at a recent press conference.

In 1973 more than 2.9 million tourists from 150 countries visited the Soviet Union (2.1 million Soviet people visited 126 countries).

This year Intourist itineraries cover 100 cities and regions of the USSR.

OM WASTE DUMPS TO GREEN FIELDS

ck slag heaps are an unfor- unate but inevitable part of ndscape in miners' towns settlements. Karaganda in khstan was no exception. he number of waste dumps perceptibly diminished here past few years because of work done to level and re- ale them.

Staff workers of the Karaganda Botanical Gardens of the Kazakh Academy of Sciences select plants to be cultivated, work out agrotechniques and organize maintenance of the green plantings.

Exhibits demonstrating the achievements of the Karaganda biologists in greening industrial mining zones are on display at EXPO-74 in Spokane.

IRRIGATING COTTON PLANTS

Experiments have been started using electronic control apparatus in intersoil irrigation of cotton plantations.

Cables with sensors that record the plants' need for water are laid alongside pipes directly under the layer of plowed land. As soon as the soil moisture around the roots falls below standard, the sensors send signals to the control panel of the pump house. The pumps switch on automatically, and water runs to the field.

THE ARTIST IS REMBRANDT

Etchings by Rembrandt not known to have existed have been found in the scientific library of Tartu University in Estonia.

In a rich collection of old manuscripts the library staff found a small album on which the name Rembrandt is written in gold letters.

After long research Hermitage scholars and Estonian art experts have concluded that four of the album's 20 engravings were by the great Dutch painter.

"FOR EXCELLENT AIR SERVICE"

In a recent USSR Competition of Professional Skill of young Aeroflot workers, Lyudmila Gvozdeva, stewardess of the Central Board of International Airlines, won first prize. Among the 120 people competing were stewardesses, booking and registering clerks, and receptionists responsible for meeting and assisting passengers. Twelve winners came to the stage for their prizes and certificates.

HOW MUCH HEAT IS UNDER GROUND?

The first of two groups of a geothermal expedition has set out for the Southern Urals and the Pamirs. The expedition is studying thermal processes at the junction of the Ural and Tien Shan mountain systems.

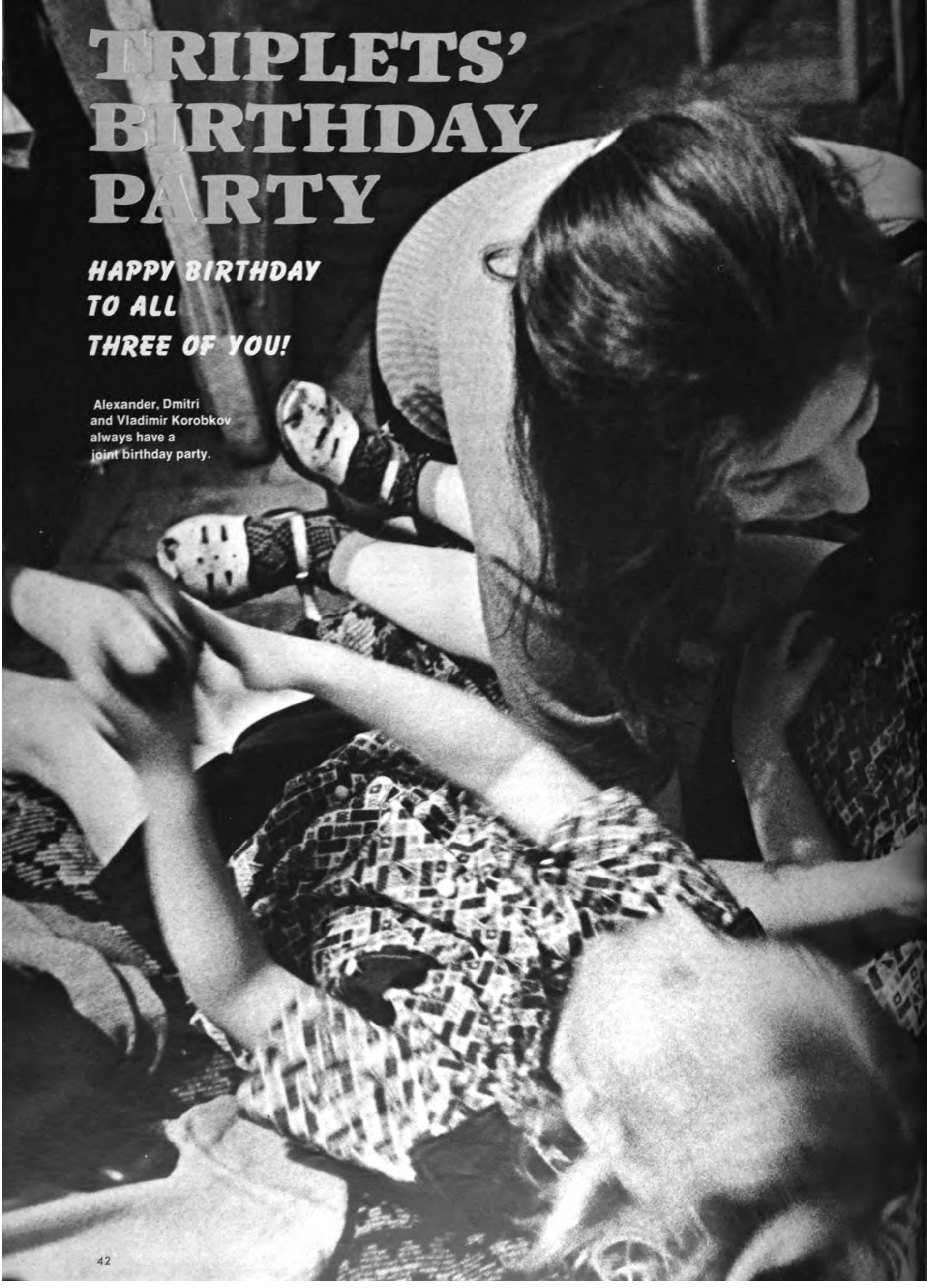
Fifteen holes have already been bored for the group of researchers who are to work in the Urals. Through these holes the geologists will measure the temperature and capacity of the heat streams flowing at a depth of some 5,000 feet. The second group, which will work in the Pamirs, will probe a hole bored in the glacier three and a half miles above sea level.

The data obtained by the expedition will be, say specialists, a valuable help in the choice of sites for the construction of geothermal stations.

TRIPLETS' BIRTHDAY PARTY

HAPPY BIRTHDAY TO ALL THREE OF YOU!

Alexander, Dmitri and Vladimir Korobkov always have a joint birthday party.



Photographs by May Nachinkin

The triplets on their way to the store for birthday party shopping. At the other end of the leash is big sister Tanya.

A song from the trio for mother, father and guests. They will be in kindergarten before their next birthday. Sister Tanya, at the piano, has just graduated from high school.

Mother and father, a doctor and engineer respectively, are busy people. They expect all the children to help with the chores, the triplets included.

The most exciting part of the birthday was viewing the movie Dad shot last summer. They were "babies" then, not the husky fellows they are now.

BIRTHDAY PARTY

THIS was an unusual birthday. It was celebrated by triplets—Alexander Dmitri and Vladimir Korobkov. Their mother (a doctor), father (an engineer) and sister (just graduated from high school) let them make their own arrangements for the party. Bringing the children to do for themselves is a tradition with the Korobkovs.

The red-letter day began with "Happy Birthdays!" from Mom, Dad, Grandma Sis and the neighbors in person, and from relatives and friends by phone.

With Sis in command, the triplets straightened up the house. Needless to say, something got misplaced, "something special" had to be found, and so the brothers launched an attack again the closets and shelves.

Next came shopping. At the supermarket the interest of the Happy Three was naturally centered on candy and cakes.

Returning home, they set the table and put the finishing touches on their family wall newspaper, *Zaichiki* (Bunny Rabbits), tendering congratulations to Mom.

Dressing was a tiresome job because it had to be done without help. You had to fish out a missing sandal, fasten straps and struggle with buttons that wouldn't go through their buttonholes. Temper got a bit ruffled, but Grandma stood by to set things right and put the culprit in corner for sixty seconds.

Everything was shipshape by the time the guests began arriving. Very grave and solemn, the heroes of the day took their seats at the festive table.

However, the most interesting part of the event was looking at the film Dad had shot the previous summer. It was fun to see yourself catching butterflies and beetles, basking in the sun and swimming. They were just "babies" then, nothing like the strapping fellows they are now.

Then Tanya, their sister, sat down at the piano, and the triplets sang songs to her accompaniment.

It was a very long birthday. But then it was really three days in one!

ARE WE STILL GOOD NEIGHBORS?

By Zoya Yankova
Sociologist

Drawing by Vera Sharkova

TYPICAL of all of today's industrially developed countries, say many Western social scientists, is a process of urbanization which makes for a "depletion of human contacts" and a "crisis of intimacy." According to Alvin Toffler, Orrin Klapp and others, the expansion of contacts is made at the expense of depth and intimacy. Relations based on the principle of mutual usefulness leave less and less room for disinterested human attachments.

A tendency has been observed lately to extend this characterization to the Soviet Union as well. The magazine *Newsweek* has said, among other things, that conditions of modern urban apartment living make Soviet people "less inclined to spend their evenings at cultural events. Instead, spare time is often devoted to savoring the amenities of home." What happens, says the article, is that the family is alienated from its immediate surroundings. Is that really so? Let us consider the facts.

We asked several tenants of a new Moscow housing development a question which would elicit their reaction to family and neighborhood problems. Their answers were revealingly similar.

"What did your neighbors ask you to do for them this past month?"

Some of the answers: (a) to keep an eye on their children; (b) to lend them some money; (c) to help them repair something in their apartment; (d) to lend them some household appliances; (e) to let them watch a TV program; (f) to lend them a book or a magazine; (g) to advise them on some purchase; (h) to discuss bringing up children; (i) to recommend ways of spending their holidays; (j) to exchange experience on housekeeping; (k) to talk about some social or political event; (l) to discuss a new book or work of art; (m) to take part in a community effort in the house, the block or the housing development.

So the list included not only requests for financial help and information but also suggestions for joint community activities in the residential area. An analysis of the data brought sociologists to some unexpected conclusions, the most important being that contacts among neighbors have lost none

of their importance. They have, rather, taken on new forms and new meaning. Financial help was more often expressed as the request "to borrow a small sum of money" (about 20 per cent of the answers), and information was sought by "getting advice on how to bring up children" (16.8 per cent), "exchanging experience on housekeeping" (15.8 per cent), "asking advice on spending the holidays" (17 per cent).

Community efforts in the house, block and housing development were very important. About 20 per cent of all those questioned regularly discussed such matters as improving the courtyard by planting trees and shrubs, taking care of the children, helping pensioners and the like. About 32 per cent regularly took part in the community efforts of their residential area, while over 50 per cent offered interesting ideas or expressed a desire for better neighborhood organization. Many parents wanted special groups arranged for children to study foreign languages and music, to learn figure skating, for the small children to be taken on walks together. A goodly number of the parents took turns bringing the children to the nursery, kindergarten or school.

The subjects of our inquiry ask their neighbors for assistance on the average of five to 10 times a month, while women with small children, pensioners and teenagers do it all the time. For these latter this relationship with their neighbors helps to satisfy to some degree their need for emotional contacts and for information. They come together for joint activity, and their relations develop from neighbor to companion to friend.

On the whole neighbors have short-term face-to-face contacts, with the exception of those neighbors who are also friends. This last group made up about 25 per cent of the people interviewed. Most of those questioned said they would like to have contact with their neighbors outside the apartment building. Consequently, there was, among other things, the wish to have a public library in the area, a children's room and similar facilities. These wishes reflected the tendency of modern city dwellers, on the one hand, to isolate themselves from the nearest microenvironment to a certain extent, to have the optimum conditions for using their free time and relaxing with their families, and, on the other hand, to change the character of their relationships with the microenvironment.

Sociological data establish a direct relationship between everyday contacts of neighbors and joint community activity: People appraise their environment in terms of the opportunities it offers them for maximum self-expression. They build their relations with neighbors around shared facilities and situations—a sports field, a lounge, a library; the care of children, forms of entertainment, of spending leisure time. The old traditional forms of neighborly relations based on sharing a kitchen in a communal apartment have grown much weaker. Along with the building, on an enormous scale, of one-family apartments, new relationships have developed, primarily out of the widening of people's interests and their increasing need for interesting contacts. In other words, they have been growing culturally.

This increase, then, in community activity outside one's place of work (such things as raising children, organizing leisure time, forming clubs, setting up coordinating councils) can take on special importance.

In Botanicheskaya Street in Moscow, for example, we find such forms of mutual assistance as a volunteer service bureau and a public library. The neighbors plant trees and shrubs in their courtyards and help each other take care of their children. Older schoolchildren help younger ones with their studies and keep an eye on little ones playing in the yard.

In Oktyabrskaya Street in Moscow a volunteer health room does medical checkups of residents.

We find very often that the residents of an apartment building buy movie cameras, motorboats and other things they use in common. Neighbors cooperate in looking after children of preschool age, organize activities for teenagers' free time, help the old and the sick.

A kindergarten and groups for small children, as well as several hobby clubs, have been organized on a volunteer basis in the Leningrad district of Moscow.

In the residential areas of the Cheryomushki district of Moscow volunteer coordinating councils do organizational and educational work.

Sociological studies have shown that people of all age groups and every profession are involved in neighborhood work where they meet the people next door. It should be noted here that the residents of apartment buildings in the Soviet Union are a mixed lot—you find both an academician and an electrician living in adjacent apartments. Of course, neighbors are not the same as friends and fellow workers. Bonds are weaker, visits less frequent among neighbors. Nevertheless, everyday relations are an important component of community contact and activity.

Our studies do not support the picture of family life in the city as reported by *Newsweek*. As our examples prove, relations among neighbors do not wither away in a developed socialist society; they become, on the contrary, an organic part of its structure. And the future promises even deeper social contacts in our day-to-day existence.

Continued from page 26

so widespread as in Tallinn. Some of its sch have choruses of men teachers and wo teachers, of men students and women stude and, in addition, a combined chorus. The Ta linn Teacher Training Institute, for instance ra all five choruses. It also has a department th trains amateur chorus leaders, club workers an stage directors for people's theaters. It is as ha to enter this department as it is a theater institu The matriculant must be able to sing, dance an play a number of instruments. On graduation fro the institute the young people, most of whom a very gifted, go to various parts of the repub and settle down, not only in towns but in villa too. That is why the level of club work is so h

Tallinn has other traditions not quite so hoa in fact not more than 10 or so years old. The A Week annually held in April is one of these. Du ing the week more than 100 art shows are he and get-togethers with the exhibiting artists. In be tween you can visit art studios, hear lecture talks and reports, and consult with the master Students of the State Art Institute take an activ part in all the doings.

The artists of Tallinn contribute a great del to esthetic education for adults. They have clos ties with such factories as the machine-buildi plant, the Marat Jersey Mills and the plywo furniture factory. At all these work places a shows are held and discussed, and lectures ar given on subjects ranging from the various a forms to the preservation of old monuments.

Tallinners have many hobbies. They colle stamps, badges, picture postcards, coins. The raise flowers, keep bees and breed pigeons. There are societies for all these interests. An there are clubs to suit every taste—for flyers auto racers, amateur film makers, hunters, fishe and yacht enthusiasts.

Also dance clubs. The dancers from Tal always win first place at the countrywide danc competitions. They are especially good at ball room dancing, elegant and dignified, like the cit itself. Ballroom dance competitions are held fo schoolchildren from the earliest grades, and th whole city follows them with great interest. Seat for these events are not easy to come by eve though they can be seen on local TV.

When it comes to figuring up the cost of recre ation activities, you can see that the Tallinner family budget is allotting more for that item a the time. And yet the sum is very modest—fa less than the subsidy each person receives from the state and trade unions. Even yachting, whic is so popular, partly because it is so accessible costs very little. The members of yacht clubs pay a token fee of only 30 kopecks a year. In Tallin the state funds for mass recreation, distributed through the trade unions, run to hundreds o thousands of rubles annually. Neither the Tal linner nor the state sees any reason to be sor ing of the money.

HIGHER WAGES AND STABLE PRICES

By Anatoli Arkhipenko
Novosti Press Agency Commentator

In the first half of 1974, as compared with the corresponding period last year, the average wage of industrial and office workers rose by 4.8 per cent and the earnings of collective farmers rose by six per cent.

Our consumer price policy is based on two simple and firm rules. First, the price is never arbitrary, it is scientifically based. Second, once the price is set, all stores must comply with it.

The prices of all commodities affecting living standards are fixed by the State Committee for Prices of the USSR Council of Ministers. The committee and the Price Formation Institute also work out the methods for establishing prices. The same methods are used by the Committees for Prices in each of the 15 union republics and by the price departments in the autonomous republics, territories, regions and cities, as well as by the corresponding industrial agencies.

The commodity flow is an extremely flexible thing since the assortment and quality of goods keep changing. Thus, in 1972 alone 215,000 new prices were approved. We were careful to make sure that the new prices did not raise the over-all price index.

The price formation agencies, the Inspectorate of the Ministry of Trade and the price control commissions of the Soviets are responsible for establishing and maintaining prices. The public is very much involved in this work. The trade unions and People's Control organizations also devote a great deal of attention to prices.

A price list is available in every shop or department store.

SOVIET GOVERNMENT POLICY is directed at raising the wages of the lower-paid sections of the population especially, in other words, at narrowing the wage gap. In 1955 the average wage exceeded the minimum wage by 260 per cent; in 1970 the figure dropped to 100 per cent.

In the Ninth Five-Year Plan period (1971-1975) the minimum wage is being raised once again with a simultaneous wage increase for medium-paid workers.

Workers living in areas far from metropolitan centers and in areas with a rigorous climate are especially favored. Last year 12 million people working in the Far North, the Far East, Siberia and the Urals, as well as the north of the European part of the Soviet Union, received higher pay differentials. In the first half of 1974 the new pay schedule was applied in Kazakhstan, Central Asia and the Volga-Vyatka area, and it is now being introduced in the central Volga area. At the end of this year it will be introduced in Rostov Region and the Donbass.

Thanks to the new rates and schedules, average wages in the coal, oil and gas industries, for instance, will rise by 10 to 11 per cent in the five-year period and in the chemical and petrochemical industries by 13 or 14 per cent. The increase will be even higher in light industry and the food-processing industry—14 to 16 per cent.

The rise in the earnings of collective farmers is even higher than that of industrial workers. The ratio is regulated by the state. In 1961-1970 the average pay of industrial workers went up 50 per cent and that of collective farmers 160 per cent. This permanent lead in the earning increment of collective farmers makes it possible to reach one of the most important social goals of the Soviet community earlier—the elimination of the gap between town and countryside.

But to what degree do wages reflect real income?

Income taxes have been cut a number of times, including in the previous (1966-1970) five-year plan period. In this five-year period tax payments were discontinued for workers earning minimum wages and lowered for those in the medium bracket. In the future the two processes (pay raises and no tax for workers in the lower bracket) will go on simultaneously. The wages of the majority of people will therefore approach the average and increase at the same time.

Public consumption funds play an important part in raising real income. These funds are a peculiar feature of socialist society. They pay for free education and medical services, pensions, allowances, student scholarships, accommodations at health and vacation resorts free or at a discount, preschool facilities and other such benefits. These funds increased by 6.5 per cent in the past six months as compared with the equivalent six months of last year. The trend will continue.

When a Soviet customer walks into a food store, he does not even bother to look at the price tags. They have not changed in many years. Today flour, sugar, vegetable oil, milk, sour milk, sour cream, cheese, fruit, vegetables, bread and many sweets cost no more than they did 10 years ago.

What guarantees this stability? Prices on all foodstuffs and manufactured goods in all state-owned stores—there are none that are privately owned in the Soviet Union—are fixed by government agencies.

Prices are stable not only on foodstuffs, clothing and other consumer items. For many years the subway fare in any direction and for any distance has been the same—five kopecks (seven cents).* So has the fare on trolley buses, buses, streetcars and suburban trains, as well as on long-distance trains.

The cost of tickets for sports events, theaters, motion pictures and concerts, as well as the price of a haircut, has been just as stable. There has been no rise in prices of Soviet-made medicines, which incidentally are very cheap. And, especially important, there have been no rent increases anywhere in the country.

Most housing in the USSR is built with state money. Tenants pay only a monthly rent: 13 to 16 kopecks per square meter (less than two cents per square foot) of housing. There is no charge for kitchens, bathrooms and hallways. This figure has not changed since 1928. The rent paid by a Soviet family does not exceed four to five per cent of its total income. Moreover, that includes all utilities: electricity, gas, heat and hot and cold water.

Yes, most prices in the USSR are stable. If they do change, it is, as a rule, downward. For instance, in the past several years prices were reduced on many types of TV sets, washing machines, bicycles, motorcycles and watches. Retail prices on some plastic and synthetic items and clothes were also cut.

In addition to all of the benefits that add to the real income of Soviet citizens, there has also been a steady rise in their cash income. The Twenty-fourth Congress of the Communist Party of the Soviet Union charted an extensive program of economic and social development for the five years from 1971 to 1975. One of the goals stipulated was a rise in living and cultural standards. During this five-year period wages have gone up for railroad and Metro personnel, teachers, doctors and the staffs of children's preschool facilities. Minimum wages generally rose, as did minimum old age pensions. Stipends to students of all Soviet higher and specialized secondary schools were increased very considerably.

All told, the incomes of 34 million Soviet people increased.

Retail prices do not fluctuate in the Soviet Union. This applies to all consumer goods. The prices of food items are the same as they were 10 years ago. Rye bread still costs 12 kopecks a kilogram (7 cents a pound), meat (the best grades) 2 rubles a kilogram ($1.20 a pound), mutton 1.90 rubles a kilogram ($1.15 a pound), milk 28 kopecks a liter (19 cents a quart), potatoes 10 kopecks a kilogram (6 cents a pound).

The same is true of a wide range of manufactured goods. For example, the price of a man's suit made of wool blended with artificial fiber was 63.90 rubles (85 dollars) in 1964; today it is 61.60 rubles (82 dollars). The prices of other items, such as cotton fabrics—77 kopecks a meter (93 cents a yard)—have also not changed in the past 10 years.

* The conversion to dollars and cents from rubles and kopecks is based on the August 1974 rate of exchange, one ruble equals $1.33. There are 100 kopecks to the ruble.

Photograph by Tom Salyer

20-ton map at the entrance to the Soviet Pavilion.

EXPO-74: SOME RESULTS AND IMPRESSIONS

By Alexander Makarov and Oleg Shibko

The first decrees signed by Lenin after the Great October Socialist Revolution, the Decree on Peace and the Decree on Land, are exhibited in the entrance hall.

Photograph by Tom Salyer

THE WORLD'S FAIR EXPO-74—the first international exhibition with ecology as its theme—will close in Spokane, Washington, early in November. The 100-acre exhibit on an island in the curve of the Spokane River will get the last thousands of the five million visitors who have been coming here since the opening in May. Spokane and its 180,000 population will resume their everyday tempo. Spokanites will no longer wait for the fireworks that climaxed every day of the past six months.

"The fair in Spokane is becoming history," said Boris Kokorev, Director of the Soviet Pavilion at EXPO-74. "This was the first world exhibition ever to be devoted to environmental problems. The start, in our opinion, has proved a success. And the spirit of Spokane should be continued by all cities that will host similar undertakings.

"The problem of environment is a dilemma confronting all humanity. We are confident that this problem can and will be resolved through the efforts of all nations."

"Everything for Man, for His Future!"

"Everything for Man, for His Future!" was the slogan of Soviet participation in EXPO-74. More than 30 ministries and departments, including the USSR Academy of Sciences and the State Committee for Science and Technology of the USSR Council of Ministers, took nearly two years to prepare the Soviet exhibit. Thirty conservationists and other experts worked at the Soviet Pavilion. They also took part in most of the environmental symposiums and conferences.

The artists and engineers who designed the pavilion and everyone who had a part in putting it together wanted to highlight the message of the Soviet exhibition: Man has to assume a thoughtful, scientifically oriented attitude toward nature, toward its resources. This is the only alternative to ecological disaster. The Soviet exposition underscored the fact that a planned economy, government control of the utilization of national resources, the participation of the public at large in environmental efforts help us resolve environmental problems on a nationwide scale. It stressed the urgency of international cooperation.

Many prominent ecologists, political and public figures who visited the Soviet Pavilion noted the value of Soviet participation in the fair.

Maurice Strong, Executive Director, United Nations Environment Program: "I am deeply impressed with the very comprehensive exhibit, which demonstrates the commitment of the Soviet Union to environmental protection in your own great country and all over the world. I think you have displayed some of the finest examples of Soviet technology and of Soviet planning and the operation of your system in the environmental field. I think it combines entertainment and education very well.

"A very great man once told me: You must get people's attention first before you can educate them. So, you have captured here people's attention and you have done it in a way that educates them, which demonstrates the message that you are trying to get across."

Russell Train, Administrator, Environmental Protection Agency: "This is a very strongly oriented environmental exhibit, and I think it does a good job in describing some of the attitudes in the policies of the Soviet Government toward environmental protection. It is solution-oriented, which I think, is important. And I think that it is important to show people what can be done to protect the environment. Your exhibit does this in a very good way.

"I am particularly glad to be here because I have been more than involved with the American-Soviet environmental cooperation effort. I am looking forward to visiting the Soviet Union again later this year for the renewal of this cooperative agreement."

Nelson A. Rockefeller, Vice President-designate: "We are grateful to you for this beautiful show. And I know that it is going to contribute to a better understanding of the tremendous achievements of the Soviet Union and the Soviet people here in the United States.

"The theme of the environment is universal in the United States, as it is in the Soviet Union and the world."

Senator Warren Magnuson: "It is a good and solid expression of what the Soviets are doing about their environment. And what they are doing is good."

People-to-People Bridge

"You have brought a beautiful exhibit," said King Cole, director of EXPO-74. "But we are even more impressed with the Soviet people who are working here at the pavilion."

Nearly five million fairgoers visited the Soviet Pavilion. Many of them knew very little about the USSR, had never seen or talked to a Soviet citizen and had their own image of a "Russian," an image built up during the cold war years.

Between 25,000 and 30,000 people came

to the Soviet Pavilion on each of the 184 days of the fair's work and met the guides and specialists, who were always attentive, eager to provide information on the message of the exhibition, the theory of the biosphere elaborated by the great Soviet scientist Vladimir Vernadsky, environmental problems in the USSR and their solution. A trip around the pavilion was like a tour through the Soviet Union. It elicited numerous questions: at times naïve, at times very sophisticated, and at times even unfriendly. These were people-to-people encounters and discussions. And what we probably need as much as environmental protection is getting to know each other better.

Here are some of the impressions of Americans that the Soviet personnel at EXPO-74 are taking home.

Yuri Martin, ecologist from Estonia: "I will always remember the scientific forums we had in Spokane and the direct contacts with my American counterparts. I was familiar with many of their studies, but there is no substitute for personal meetings and our interesting talks and discussions.

"Being able to participate in the scientific program of EXPO-74 (and I was present at more than a dozen symposiums, conferences and forums) was very valuable. The dry scientific reports came alive with the warmth of human communication.

"I have the warmest impressions of Roger Hansen, Executive Director of the Rocky Mountain Center on the Environment, and Valdas Adamkus, Deputy Regional Administrator of the U.S. Environmental Protection Agency. I sincerely hope that our meetings and talks were interesting for the Americans too."

Julietta Isaakyan, a teacher from Armenia: "The most interesting day in my work at EXPO-74 was August 24, when I addressed an international symposium on "Women and the Environment." It was my first speech before an audience. American women were interested in the conditions of women in the USSR, our work, education, how we spend our leisure time, how we bring up children, medical services for women.

"When they learned that for more than 50 years now women have been enjoying equal rights with men in the USSR, one of them asked: 'Could you cite even one instance of sex discrimination in your country?' I answered that I could even cite two: Women are not allowed to work at arduous jobs, and in Armenia a man will never allow a woman to prepare shashlik."

Mark Kazarnovsky, Ministry of Fisheries of the USSR, Moscow: "I was very much impressed with the game fish hatchery of Spokane, the biggest rainbow trout hatchery in the state of Washington. The organization of artificial feeding of trout, new ideas in reproduction of the salmon population, a high degree of mechanization—these and other things I have seen at the hatchery will help me in my work in the Soviet Union."

Galina Volokitina, a guide: "I will always remember the interest, frankness and open friendliness of most of our visitors. This shows the sincere desire of Americans to know as much as possible about the Soviet Union, about our life. And where there is mutual desire, I am confident, there will be better understanding and good relations between our countries."

"Fantastic Visual Experience"

We wanted to know what our visitors think about the Soviet Pavilion and people they meet there, about Soviet-American cooperation. We distributed a questionnaire, which was filled in by more than 200 people from 24 American states and some Canadian provinces. The people varied from 13-year-old youngsters to 70-year-old men and women: students, teachers, businessmen, scientists, farmers, housewives, industrial workers. Here are some of their answers.

Question 1: What impressed you most in our pavilion?

Susan Moore, a teacher from Alaska: "It was a fantastic visual experience with information provided on all aspects of Soviet life."

Mary E. Burger, a teacher from New York: "The success you seem to have had in attacking problems we are still trying to ignore."

Mr. and Mrs. Clive D. Paul from British Columbia: "The measures you went to to try to make people understand your way of life. We appreciate the intellectual detail with which the exhibits are prepared."

Question 2: What do you think about chances for Soviet-American cooperation in environmental protection?

S. Musselman, owner of a dress shop in Pennsylvania: "We hope for complete friendship and cooperation in all areas."

Rita Everett, a high school student from Toppenish, Washington: "We should cooperate more for a better environment."

Bertha Clark from Pullman, Washington: "Good possibilities. We should be able to benefit from one another's know-how and talents. The majority of people in both countries want a beautiful, peaceful environment."

EXPO-74 is coming to a close. But its impact on the ecological consciousness of people and the better understanding between nations to which it has contributed will continue.

Sample of Russian craftsmanship—a huge Matryoshka doll holding 44 replicas in diminishing sizes.

Photograph by Tom Salyer

"AN INSPIRING EXPERIENCE IN PERSON-TO-PERSON COMMUNICATION"

by Robert G. Bates
Director of Public Affairs,
Department of Natural Resources,
State of Washington

ON JULY 16, at EXPO-74, Spokane, Washington state's dynamic Commissioner of Public Lands, Bert L. Cole, accompanied by his colleagues, visited the Soviet Union's outstanding exhibition "Man and the Environment."

One of the purposes of Commissioner Cole's visit was to film two one-half hour TV panel discussions: "Recreation Outdoors—USA-USSR" and "Tomorrow's Heritage."

A bank of 1,000-watt flood lamps beamed down on the panel discussions taking place before the cameras at educational TV station KSPS, Spokane. Libery Alferov, director of the Prioksko-Terrasny State Nature Preserve, was intently describing nature protection in the Soviet Union: "We have 104 wildlife preserves and in addition we have 2,000 game preserves. Each game preserve protects a specific species of animal or bird. Hunting in the preserve is prohibited as are all other activities that destroy the environment of the protected animal or bird."

Answering a question from Gordon Alcorn, chairman of the Washington State Natural Preserves Advisory Committee, on the status of underwater parks and preserves programs in the USSR, Libery answered, "We do not have underwater preserves in our country, but the question of establishing such a preserve in the Far East of the Soviet Union is being discussed." A suggestion was made to discussion participants that the Soviet Union might consider hosting an inter-nation conference on underwater parks and preserves in the near future.

"Since there are no state boundaries in nature," Libery Alferov said, "the adequate study of nature and its protection is possible only under conditions of active international cooperation. I have observed an increase in this cooperation. During the past year two American scientific delegations have visited my preserve."

Referring to the film, Cole said: "This will be a splendid opportunity to provide the American public in general and our high school and college students in particular with up-to-the-minute knowledge about the Soviet Union's advanced outdoor recreation, nature preservation and environmental programs."

The members of Commissioner Cole's group felt that the two-day meeting in the pavilion and a Spokane County nature preserve was an inspiring experience in person-to-person communication, moreover, that the Soviet concern for man and his relationship to the universe and to the planet Earth is deep and sincere. These harmonious relationships will continue in the form of scientific and technical information exchange programs in the future.

YOUR QUESTIONS ON COMMUNISM

THE WORKING CLASS AND THE SCIENTIFIC AND TECHNOLOGICAL REVOLUTION

"The Soviet working class of today differs not only from the pre-revolutionary proletariat but also from the working class of the 1930s when socialism triumphed in the USSR. Its role as the leading socio-political and economic force of society has grown. It is now the largest class in our society. In the years of Soviet rule the working class has grown by six times to a total of 65 million people; more than two-thirds of this number are industrial workers. The level of their education and industrial skill has risen immeasurably."

From the speech by Leonid Brezhnev,
General Secretary of the CPSU Central Committee,
at the Fifteenth Congress of Soviet Trade Unions

TODAY'S SOVIET WORKERS have a good cultural background, the experience to carry out the party's economic policies, a conscientious and creative attitude toward their work. They consider themselves the owners of the Soviet Union's productive facilities and feel responsible for the welfare of the country, for its destiny.

The scientific and technological revolution is having a dramatic effect on the size and character of the working class. First, there is a priority growth in the number of workers in the industries that determine technological progress; secondly, the level of workers' education—general and technical—and industrial skills is rising; thirdly, there is a speedy growth in the number of workers in new trades connected with highly mechanized and automated production; and, fourthly, growing numbers of workers are employed in industrial jobs that require a specialized secondary or even higher education.

Social scientists call this new group of highly skilled workers the "worker-intellectual borderline section." At a number of big plants with high-level comprehensive mechanization and automation this group, including active innovators and inventors, takes in some 20 to 25 per cent of the work force. It has grown out of the current scientific and technological revolution.

To operate up-to-date intricate machines, adjust and tune automated lines and programmed machine tools and assemble electronic equipment, a worker must have the general and special background of a technician and—in some cases—of an engineer. For instance, members of the crew of a walking excavator must have either a higher or specialized secondary education.

The general tendency requires today's worker to do an increasingly larger share of mental work as opposed to manual work. It has been found that mental work takes, on the average, up to 90 per cent of the worktime of the operators servicing automatic control panels at chemical plants and up to 92 per cent of the adjusters of automated machine-tool lines.

By their labor the workers, together with the intelligentsia, transform science into a direct productive force. Their technical creativity, their efforts at innovation and invention, is gathering momentum. In this respect highly skilled workers at many industrial plants are keeping pace with engineers and technicians.

In our socialist society the scientific and technological revolution consolidates the leading position of the working class and enhances its role in building the material and technical basis of communism.

In the course of communist construction the social distinctions between different sections of the working class are gradually disappearing. The scientific and technological revolution creates the preconditions for, and is a potent factor in, these social changes. Also changing is the internal structure of the work force of the basic branches—industry, construction, agriculture, transport and communications, trade and services. The number of workers in science and its ancillary industries is growing particularly fast.

Advanced socialism makes for the greater social homogeneity and moral and political unity of Soviet society. The Communist Party of the Soviet Union facilitates this process, drawing the workers, collective farmers and intellectuals closer, bridging the gap between town and country and between mental and manual work.

USSR AND USA: SCIENTIFIC AND ECONOMIC EXCHANGES

By Vladimir Salimovsky
Chairman, V/O Licensintorg

THE REVOLUTION in science and technology has led to a sweeping growth of international exchanges on a commercial basis, primarily in the form of trade in licenses, know-how and patents.

The rate of growth of this trade far surpasses that of commodity trade and looks as though it will continue. The point is that not a single country seems to find it economically expedient today to carry on research and development with equal intensity in all fields of science and technology. Furthermore, not a single country, even the most highly industrialized, can develop its economy without drawing widely on world achievements.

The Soviet Union has an impressive record in industrial and scientific progress. In 1973 alone about 4,000 new types of machines and equipment were developed and 3,700 new kinds of manufactured items were put into serial production. Presently a quarter of the world's scientists, 1.1 million, are in the Soviet Union. As might be expected, many studies by Soviet specialists have won world recognition and are in demand in many countries.

The terms of our license contracts are those generally accepted in world license trade. At the same time, each license contract is the result of agreement between the two parties on a specific proposition and takes into account the laws of the countries concerned.

Soviet scientific and technological achievements in demand abroad embrace practically every branch of modern industry, from metallurgy, engineering and electronics to pharmaceuticals and medical instruments.

Our continuous steel-pouring installation is well known. Kobe Steel of Japan recently bought one. This is a curvilinear type of machine that makes it possible to pour a series of casts of a single metal grade without stopping the process. All its basic technological operations are mechanized and automated.

The performance of an evaporation cooling system for blast furnaces has been highly praised by purchasers in Japan, Italy and Australia. Thanks to the application of this Soviet method, records of daily and monthly metal output per cubic foot of useful volume of blast furnace were set at blast furnace No. 3 of a Nipon steel plant in Nagoya.

Many interesting technological processes have been worked out for the chemical industry in the Soviet Union. One is a new way of producing sulfuric acid by a shortened flow chart, another is a method of obtaining pure isoprene from isobutylene and formaldehyde that makes it possible to turn out the best grade of artificial rubber.

The Kholod-2 installation for rapid cooling of the human body is successfully used in operations on the heart, the brain or the large blood vessels, as well as in resuscitation.

A highly effective Soviet method of treating glaucoma by special lasers does away with surgery.

The Soviet Union has had interesting results in the application and processing of low-efficiency energy sources, for example, underground gasification of coal and the reprocessing of combustible shales into liquid fuel.

This list could be continued indefinitely.

At present, V/O Licensintorg—the USSR export-import agency responsible for the sale of Soviet licenses and the purchase of foreign licenses—has stable and mutually beneficial commercial relations with many firms in industrially developed countries.

Economic, scientific and technological cooperation between the Soviet Union and the United States has also expanded recently.

V/O Licensintorg has been cooperating with certain U.S. firms for more than 10 years now. The first agreement with the National Patent Development Corporation for a method of treating various diseases by sleep therapy was signed in 1962. There are now agreements with 25 U.S. firms for the sale and purchase of licenses in various fields of technology.

For example, the American Magnesium Company is using a new Soviet method of magnesium electrolysis. A branch of the company in Snyder, Texas, has been reconstructed for the purpose with the aid of Soviet specialists. The results gratified both parties. The Reynolds Company and the Kaiser Aluminum Corporation will use Soviet equipment for teeming aluminum in a magnetic field. Allied Steel has a Soviet license to manufacture pneumatic punchers for building underground communications.

Fansteel Inc. makes milling machines of Soviet design to clean the surfaces of rolled steel components.

The production of powder wire elaborated in the USSR for application in automatic welding machines is to be organized at a plant of the Chemetron Company.

On the other hand, high-capacity turbocompressors will be manufactured at Soviet plants under a license from the Cooper Bessemer Company, high-pressure sodium lamps will be produced under a license from General Electric, and so on.

We are presently holding discussions with many U.S. firms on inventions and patents in different fields. We are convinced that the prospects for mutually beneficial trade in licenses between the USA and the USSR are very promising indeed.

AMATEUR ARTISTS: HONESTY AND SPONTANEITY

Merry-go-round. *Vladimir Zaznobin (born 1900), Yaroslavl Region.*

Russian Troika. *Alexander Tverdokhvalov (born 1906), Krasnoyarsk Territory.*

Haying. *Georgi Popov (born 1939), Vologda Region.*

SUNDAY PAINTERS

By Natalia Shkarovskaya
Art Historian,
"Decorative Art of the USSR" Magazine

MANY GIFTED self-taught artists have been discovered, in recent years, through exhibitions held not only in large metropolitan centers but also in remote parts of the Soviet Union. Their works, fresh and spontaneous, are persuasive evidence of the spread and magnitude, and often distinction, of amateur effort in the visual arts. All the work reproduced in this article, done by farmers, hunters, fishermen, village schoolteachers and farm machine operators, was shown at district, regional and, finally, the countrywide Exhibition of Rural Amateur Arts in Moscow in 1973.

It was the twenties that saw the beginnings of the amateur talent movement, after the October Revolution, with its startlingly new view of art for the masses. The Revolution utilized folk arts to bring its message to the provinces. The very first decrees of Soviet power called for the esthetic education of the working people and the democratization of the arts.

The Commissariat of People's Enlightenment was responsible for organizing lecture programs at clubs, factories and army units; under its direction free art schools and workshops for the whole family were opened in many cities of Russia. Members of the mass organization Proletkult (Proletarian Culture) also promoted interest in art among workers and peasants by staging exhibitions and opening studios. We can see from the catalogues of the times how accurately the work of amateur artists reflected critical developments during that period: the cooperative movement, elections to the Soviets, the campaign to end illiteracy, the drive for proletarian discipline in the factories. Paintings were serious. Wall newspaper cartoons were caustic. And though these drawings were by no means technically perfect, they were unmistakably sincere and socially inspired.

Amateur artists in Russia, the Ukraine and Transcaucasia joined the professionals in their art work for the masses. They designed and executed settings for amateur productions, hand-painted and embroidered banners for factories, trade unions and military units, drew trade union emblems, decked out factories, village clubs and streets for revolutionary holidays. Many of them were invited to paint the pictures on the trains and ships which toured the country between 1918 and 1924. These traveling art galleries brought the meaning of revolutionary slogans to the masses in a pictorial language they were familiar with: Style and color often borrowed from the traditions of the old Russian cartoons, store signs, market show booths and the very popular merry-go-rounds.

As a rule these self-taught artists still had roots in the patriarchal peasant environment. In esthetic ideal their artistic style was akin to the decorative folk paintings, in world outlook they reflected the spirit of the old peasant brightly colored cartoons. Some studied the classical art traditions or urban folklore.

In 1935 the first exhibition of collective farm amateur art was held in Moscow. It was preceded by shows in the villages, districts, regions and national autonomous republics. On exhibit were some 700 works of all types and genres by 215 artists—an enormous creative resource! Critics' opinions reflected the dominating trend of the mid-thirties: Here was a source for replenishing the ranks of professional artists; the self-taught would be encouraged and assisted to become masters of their craft.

We have today, however, outgrown these methods and goals. The amateur art activities of the masses constitute a reserve of creative forces which spring up in many forms and places. In the village, for example, where the old peasant art is still alive here and there; in the factories; at exhibitions. Art is really popular—more than 23 million people devote their leisure time to music, choreography, singing and the fine arts.

The customary forms of amateur art instruction—evening studios and art groups at village and factory clubs, palaces of culture and amateur art clubs of the trade unions or of the Ministry of Culture—draw large numbers of people. But the creative values of this form of amateur study have begun to be questioned and debated by critics because of the quality of the work and the tendency to imitate professional art. There should be, they say, more emphasis on free, individual expression.

An interesting development is art instruction by correspondence, which attracts more people than the studios do. At the Correspondence People's University of Arts in Moscow, founded in 1934, art educators have drawn up a special program for amateurs. The approach to those who demonstrate a highly individualized artistic mentality is altogether different, and many an original self-taught artist with a unique vision of art has been discovered.

Our own twentieth century has produced such talented self-taught artists as the French Henri Rousseau, the Georgian Niko Pirosmani, the Yugoslav Ivan Generalich, the Russian Ivan Nikiforov and many others. The term primitivists for these artists has not taken root in Soviet art studies. Far more appropriate is the description naïve realists, denoting a different esthetic judgment which encourages a poetic art and unusual graphic technique.

This was the kind of work on view at the countrywide rural exhibition in Moscow last year. Considering all this attention, there is little likelihood that today an artist such as Rousseau could have so small an audience during his lifetime or a Pirosmani be left undiscovered.

The work of the naïve artists is an assertion of eternal spiritual values—friendship, the poetry of labor, patriotism, the kinship of man with nature. And defending individuality, the ability of human beings to express themselves in unique and personalized ways, is itself one of the human values touching the very roots of art. The works of Sergei Stepanov, a state farm worker; Pyotr Vozdingov, a collective farmer from a mountain village; Bronus Zavadskis, a Lithuanian forester; Maria Primachenko, a Ukrainian peasant woman, and Gerasim Amiryan, an Armenian pensioner, all reflect the spectrum of their lives: plowing, harvesting, holidays, weddings, funerals. The drawings of the elderly center on the distant days of childhood, the home, ordinary objects, beloved landscapes, dreams and fantasies.

Some of the amateur artists are still tied to traditional peasant art, showing a certain preference for peasant themes and methods akin to folk art. But amateur and peasant art are quite different phenomena, functioning in different spheres. Neither anonymous nor utilitarian, amateur art today is purely creative recreation and is independent in its choice of representation and technique. It reflects social and life experience. It presumes a broad, even unlimited, area for the expression of personality.

One of the important questions here is criteria. The history of the arts cites masters who did not study at academies or in the studios of professional artists, yet they became classics. Gaugin and Van Gogh are perfect examples of artists whose talent was sufficient to carry them to the heights of accomplishment. From time to time other such exceptional artists will emerge.

The development of *all forms* of amateur art is important. At the same time, professional art is still as influential and as vital as it ever was, having its own social function to fulfill. Clearly, an increasingly creative communist society can extend the potentialities and increase the audience of the professional. For working people, who create esthetic values with their own hands, art is no longer beyond their experience, it has become a necessary part of their lives.

ELECTROANALGESIA: NARCOS

UNIVERSAL REMEDY?

Narcosis, a well-known medium for painless surgery, has quite unexpectedly revealed new properties. In this article Matvei Khromchenko, science commentator of our magazine, describes new research in anesthetics.

By Matvei Khromchenko

Photograph by May Nachinkin

WHEN THE ELECTRODES had been attached to his forehead, and the sleep generator had started to pulse, he had seen a brief display of kaleidoscopic patterns and drifting stars. Then they had faded, and darkness had engulfed him." This is how Arthur C. Clarke, British scientist and science fiction writer, describes the effect produced by a "sleep generator" in his famous novel *2001: A Space Odyssey*. Describing the future from the viewpoint of modern technology, he could not have known at the time that a "sleep generator," an apparatus for electronarcosis, would shortly be designed and introduced in medical practice by Soviet physicians. However Michael Newton, a well-known American gynecologist and obstetrician, and Niels Larsen, his counterpart from the Cornell Medical Center, as well as other delegates to the Seventh International Congress of Obstetricians and Gynecologists held in Moscow in 1973, had an opportunity to see for themselves all the advantages offered by this new method of anesthesia and promised it a great future.

But first a few words on the history of the problem.

Must Women Suffer from Labor Pains?

The alleviation of pain has always been a human concern. That is why October 16, 1846, the day American surgeon J. C. Warren removed a tumor from a peacefully sleeping patient in the presence of astounded eyewitnesses, is listed among man's great achievements. William Thomas Morton, an American dental surgeon, suggested and administered the anesthetic. Several months later ether anesthesia began to be used in Great Britain, France and Russia.

Obstetricians have been among the first to welcome anesthesia. But their requirements are exacting. While it must alleviate the sufferings of a woman in labor, it must also be completely harmless to both expectant mother and fetus.

In spite of our great accomplishments in chemistry, we have found no narcotic that is absolutely harmless to the human organism. Deep anesthesia, while lowering sensibility to pain and relaxing the muscles, simultaneously suppresses vitally important centers. Nothing could be more dangerous in labor.

Does that mean that pain during childbirth must, as some obstetricians believe, be considered "an inevitable, perhaps even a necessary source of maternal feeling," and the striving to alleviate pain as serving to bolster an "unworthy weakness of the modern woman"? Of course not. In spite of the natural physiological character of pregnancy, denying medical help does lead to a higher percentage of complications, stillborn infants and morbidity among parturients.

So physicians started looking for non-chemical analgesic methods. In the 1950s Soviet obstetrician I. Velvovsky, basing himself on the work of the great Russian physiologist and Nobel Prize winner Ivan Pavlov, suggested a procedure for psychoprophylactic anesthesia. This system was accepted both in the Soviet Union and abroad. However, it did not become a universal analgesic since the author himself said that it was effective only for healthy pregnant women.

But if neither chemistry nor psychotherapy could be relied upon, what else was there? And then the doctors thought of electricity.

The Stage of "Active Sedation"

Modern physiotherapy makes use of nearly every kind of electric current known to physics. But for a long time electronarcosis remained an object of clinical tests. We know that electric current, particularly impulse current, has a narcotic effect. However, total anesthesia could not be achieved with a small current intensity, while greater intensities were painful.

Psychiatrists were the first to use impulse current. Having abandoned the idea of electronarcosis, which was still out of reach, they applied minimal doses of impulse currents as a rhythmic stimulant to treat sleep disorders. This method, elaborated by Soviet physicians (in an analogy with narcotic sleep, it has been called electric sleep), has been acknowledged abroad. Thus American physicians made wide use of it, having purchased a license for the Soviet apparatus ES-1P (Electric Sleep-1 Portable).

Credit for developing the method of electroanalgesia should go to Academician Leonid Persianinov, Director of the USSR Institute of Obstetrics and Gynecology, and Edward Kastrubin, his disciple at the Moscow Regional Institute.

Academician Persianinov proceeded from the decisive influence of the higher nervous centers on the course of pregnancy and labor. For this the brain must remain in a condition of wakefulness. It meant that general anesthesia, and particularly anesthesia induced by chemical substances, was no good, nor was the weak effect of electric sleep. It was necessary to stop at the stage of "active sedation" or analgesia, when a person loses all feeling of pain but does not lose consciousness.

Before completely devoting himself to impulse currents, Edward Kastrubin studied everything available on traditional chemical anesthesia. He knew that with barbiturates the stage of analgesia could be made to last no more than a minute; with ether, three minutes; with nitrous oxide given with oxygen, 10 minutes. Trilene, the most effective analgesic at the time, acted for 25 minutes. But even this record time was not enough, considering the many painful hours of labor. Persianinov and Kastrubin turned to impulse currents. All they knew about them was that they were harmless up to a certain limit. Applied by electric-sleep apparatus, they cause drowsiness and sedation, restoring vigor and physical activity. But was that enough?

Before the Second World War Professor Ilya Yakovlev experimented in Leningrad on pregnant rabbits. He proved that the animals tolerated impulse currents well both in the initial and later stages of pregnancy, that labor took place at the expected time, and that the young were born healthy and strong. The rabbits even went through a Caesarean section very well.

Kastrubin continued the experiments. Checking the action of impulse currents, he kept changing the position of the electrodes, one time attaching them to the forehead and the upper part of the neck. The result exceeded expectations. In the frontal lobes of the brain are the highest nervous centers, those that control respiration, blood pressure and the activities of the kidneys and the stomach. And as René Leriche, a famous French surgeon, very graphically put it, "Many human diseases are only a reflection of the fatigue of the nervous system exhausted by the pressures of everyday life." What Persianinov and Kastrubin wanted was to use the new method to combat the fatigue of women in labor.

There remained only the last link. To achieve stable analgesia, it was necessary to increase the intensity and frequency of the current from 0.1 of a milliampere to one and even 1.5, and from 14 hertz (cycles per second) to 160 and more.

Here electronics came to the rescue. The cooperation of doctors and engineers resulted in the creation of a new apparatus. It is absolutely harmless, can work on flash-

light or transistor radio batteries and is very simple to operate. Its greatest virtue is that it can produce stable anesthesia whenever necessary at a level required by each individual.

First the new method was used in obstetrics, during labor and one or two months before it when sessions of impulse current relieved a pregnant woman of serious complications caused by pregnancy toxemia. Then it was used in gynecology instead of pharmacological preparations in preoperative and postoperative periods. And, finally, it began to be used in the operating room.

Its debut was in an emergency. An old woman in need of an urgent operation was brought to the institute. Without surgery she would surely have died, but at the same time there was the danger of her not pulling through anesthesia, since her heart, lungs and kidneys were in very bad shape. It is difficult to say what anesthesiologists would have done in the old days—probably turned to traditional remedies. This time they decided to use electroanalgesia, supplementing it with a mixture of nitrous oxide and oxygen, considerably reducing the doses of this harmless anesthetic.

The operation was a brilliant success. It was followed by another, then by a series of operations. And in each operation electronarcosis was combined with the minimum possible doses of gases, whose purpose was mainly to ventilate the lungs.

A Gold Vein

I could finish my story right here. But does not electroanalgesia have potentials beyond its use in labor and in surgery? What properties and mechanisms produce its effect?

According to Persianinov and Kastrubin, the frontal lobes of the brain go through a phase of adaptation to the action of currents, during which the brain receives the necessary rest. It is followed by a phase of heightened functional cortex activity when, having recovered, the nervous centers work with double energy. And, lastly, there is a stabilization phase (remember what Leriche said), which indirectly testifies to the establishment of a self-regulation regimen.

It is worth mentioning that an electroencephalogram taken in the process of pharmacological analgesia shows an upswing in the functional activity of the cortex. While physicians are not yet able to take electroencephalograms during electric analgesia, they already know that immediately after a session of impulse-current treatment, the nervous processes taking place in the cortex become more active.

Electroanalgesia is capable of relieving humans from the paralyzing effect of pain. A patient exhausted by illness requires large doses of medicine. Perhaps the combination of pharmacology and electroanalgesia will make it possible to reduce the dose and sometimes even allow the patient to do without medicine at all. And afterward, when the main condition is cured by therapeutic methods, the same universal analgesia can be used to help restore and develop protective barriers, prevent further illness, maintain good health and morale and relieve fatigue, the strains and stresses of today's fast-paced life.

But more immediately, the apparatus for electroanalgesia has proved itself in clinical tests and will soon go into serial production. In the very near future it will be available to physicians working at the maternity consultation centers and hospitals of the Soviet Union.

AGRICULTURAL MANAGEMENT IS RIPE FOR CHANGE

A GREAT DEAL of work has been done in the past two years to improve industrial management. The same attention is now being focused on farm management.

Several new developments make changes in the present system necessary: Scientific and technological findings are being applied on a fairly wide scale; incentives are motivating farm workers to produce more efficiently; agriculture is undergoing comprehensive mechanization and automation; the area of improved lands is being expanded; chemicals are being used on an increasingly large scale. As a result, state and collective farms are stronger economically, and crop yields are larger.

Economic incentives will continue to play a large part in agriculture, and concentration and specialization of production will proceed at a faster rate. That is why an improved, more flexible pattern of management is necessary.

It is too soon to say what specific changes will be made. The question is being discussed by farm management at all levels, as well as by collective farmers and state farm workers at general meetings.

Leonid Brezhnev, the CPSU Central Committee General Secretary, said recently: "The farmers' proposals to improve management of agriculture are coming to the Central Committee. They should be thoroughly considered and discussed. In any case, when any change in the existing pattern of management is introduced, we must not do it in a haphazard fashion or by intuition, but be guided by experience, experiment, and the achievements of the modern science of management."

These three important factors are being taken into account:

1. Modern methods of management are now being introduced generally. They include economic and mathematical methods, business machines and computers and automated systems.
2. Managerial skills have improved markedly.
3. The system of economic training of managers, specialists and workers has also improved. Today's farmer has a good technical and economic background, enough to make him a professional machine operator.

Of course, no reform will take away any of the rights farm workers have to participate in management. Nor will it affect the system of state management of agriculture.

FORESTS FOR GENERATIONS TO COME

FORESTS FOR THE FUTURE are now being created. What will they look like?

A cybernetics nature laboratory has been set up in the Timiryazev Academy of Agriculture in Moscow. The laboratory has worked out a theory of "programmed forests" which makes it possible, by computers, to find out which forests are most valuable, productive, healthful, or simply beautiful. Sheer fantasy?

"No, it is not fantasy," explains Professor Valentin Nesterov, the laboratory's director. The computer, for example, has calculated programmed forests of the future around Moscow. One of the projects already approved is the Russian forest on the banks of the Oka River. What is the difference between such a programmed forest and an ordinary one? This kind of forest will have the favorable combination of species and soil. The fir tree, which grows best on rich clayey soil, will not be planted in light sandy soil, the domain of the pine."

An annual increase in yield in the programmed forest will be 115 to 140 cubic feet per acre, as compared with 15 to 30 cubic feet in natural forests. Moreover, the programmed forests will be helpful in combating plant diseases. Thus, the Soviet foresters are the first to apply the theory of programmed afforestation.

In modeling a forest, scientists proceed from the fact that it is a unity of plants and environment. Its cultivation and exploitation must therefore take into account soil composition, fire prevention, planting, fighting pests and improving land.

The effect of factories on the environment must also be considered. You have to determine what type of forest is most stable under the specific circumstances and what measures are needed to create the best possible conditions for one or another kind of forest. Programming forests also means indicating the number and type of birds and animals per acre of forest and the quantity and type of fertilizer to be used. The idea is to get the best possible balance of environment and plant organisms.

The laboratory has worked out a single harmonious system "nature—industry" demonstrating that it is not necessary to slow down the development of either component of the system. By designing new technology that produces no waste, we protect nature from the harmful effects of industry.

Take, for example, the construction of a large chemical plant near Yasnaya Polyana, the Leo Tolstoy estate-museum. A wide range of steps has been worked out making it possible to build a complex enterprise that does no damage to the environment.

Says Professor Nesterov: "We must deal with the fact that nature is a great system governed by its own laws. Our task is to maintain the ecological balance while using the riches of nature. By changing nature, we interfere with a complex dynamic self-regulating system. Nature is not perfect; it often lacks the optimal correlation between an environment and the organisms that live in it. That is why we must do what we can to restore the natural balance. Only then will humanity be able to receive from nature not occasional gifts, but steadily increasing output. At the same time it will be able to preserve nature's wealth for generations to come."

BOOKS FOR EVERYBODY

BOOK PEOPLE say that the 360,000 public libraries in the Soviet Union contain almost everything published since the beginning of printing. There are manuscripts dating back some thousand years.

There was a time when Lenin wished the country had 50,000 libraries. Now it has seven times that number.

The network of public libraries not only covers large and small cities and towns but extends to out-of-the-way villages in the taiga, the tundra and high in the mountains. There are even mobile libraries for reindeer breeders and shepherds.

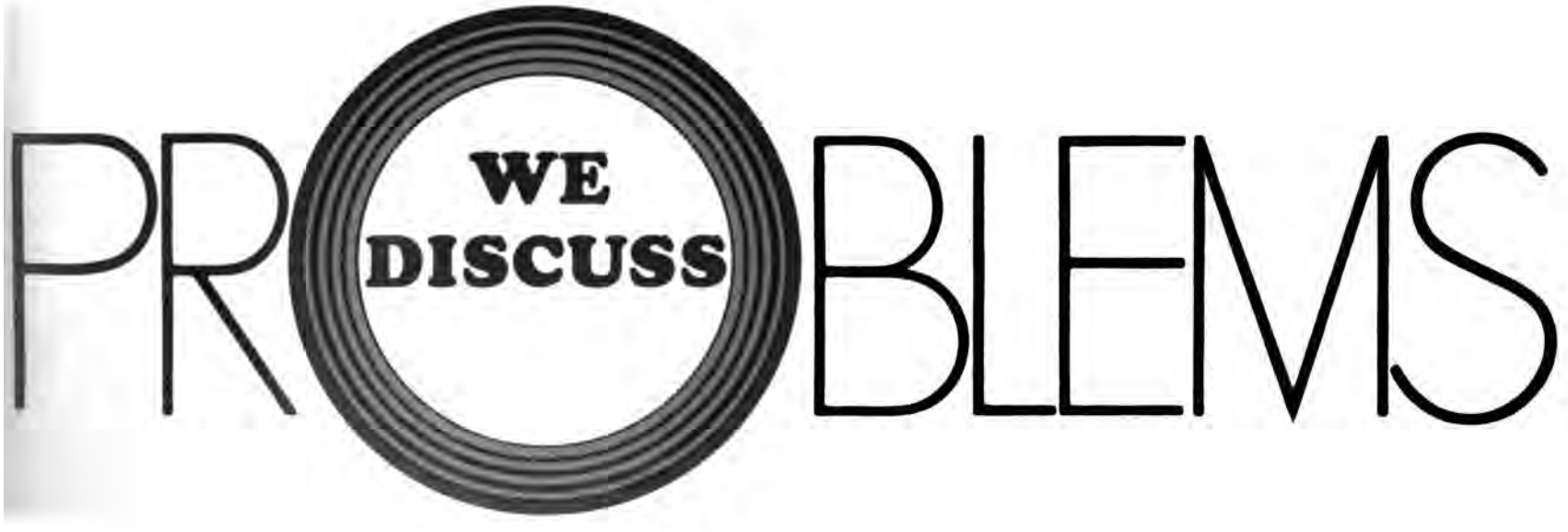
The book fund is enormous. The more than 400 libraries affiliated with the Soviet Academy of Sciences alone contain 22 million volumes. Over a billion and a half book titles are registered in 59,000 technical and other specialized libraries.

The Lenin Library in Moscow is the main depository. On its 155-mile-long shelves are 27 million books, magazines and periodicals in 89 languages of the Soviet peoples and 109 other languages.

Every school and university has a library of its own. In early 1974 there were 537 books and magazines per 100 urban people; the corresponding figure for the rural population came to 616.

Libraries in the Soviet Union are run by the state, trade unions and cooperatives. Librarians are trained in 24 schools of higher education and 125 secondary schools. Regional book collection departments distribute books to city and village libraries. The librarians' job is not only to lend books. They also do bibliographic and reference work, make lists of recommended literature and hold readers conferences.

Despite all that, to keep pace with the time, the Soviet Communist Party's Central Committee has adopted a resolution aimed at improving library services. City and district libraries are to organize an integrated network of book depositories with a single book fund and a unified system of acquisition and processing. This will help make book borrowing more efficient, increase the number of readers and improve the reference service. Books all libraries must have on their shelves are to be printed in larger editions. Book depositories are being set up to store rarely used books. More buildings specially designed to house libraries are to be built.



LITTLE MAGIC HORSE

PYOTR YERSHOV

In 1834 Pyotr Yershov, a 19-year-old student at the University of St. Petersburg, submitted to his professor a paper which was destined to become a favorite book for many generations of Russian children. It was a long fairy tale poem he called *The Little Humpbacked Horse*. Praising Yershov's work, the great Pushkin said: "There is no longer any need for me to write in this genre." In the following 35 years of his life Yershov wrote many other works, but they have all been forgotten. *The Little Humpbacked Horse*, however, has become a literary classic, acknowledged by the specialist and average reader alike.

This is the story told by the poem:

Once upon a time there was an old man with three sons. They grew wheat for the market. Somebody, they found, was stealing their wheat. The brothers decided to take turns watching over it. The oldest and middle brothers fell asleep while on watch; the youngest, Ivan, caught the thief. It turned out to be a gold-maned mare. To buy herself off, the mare gave Ivan a magic little humpbacked horse. With this constant friend and counsel, Ivan went to the czar's court and carried out three of the czar's commands: to catch the Firebird, steal the Czar Maiden and retrieve a ring from the bottom of the sea. As a result of his adventures Ivan married the Czar Maiden and became the czar himself.

How explain this simple story's enduring attraction? A specialist will say, and rightly so, that the plot, language and characters of the poem are intrinsically Russian and that the poem abounds in humor, charm, and so on. But the essential explanation is that it contains the unique element of a genuine work of art that cannot be explained, it can only be appreciated.

"Only those works have outlived the ages that have been genuinely popular at home; in time they become understandable and valuable to other peoples and, finally, to the whole world."

This statement by Alexander Ostrovsky, the Russian playwright, is true of *The Little Humpbacked Horse*. For a century and a half this jolly, witty little horse has been capering around the world, despite the poem's folklore quality which makes translation so difficult. It has been published in many languages and is popular in many countries. We think our American readers must also like it since three different editions have been published in the United States. This is an excerpt from the one translated by Tatiana Balkoff Browne, which she called *Little Magic Horse*.

In the Soviet Union the poem has been printed in millions of copies, the demand for it never wanes. A new edition was recently published, for which the Moscow artist Dmitri Dmitriyev made about a hundred illustrations. Some of them are reproduced here.

Over many hills and dales,
Far beyond the seas and vales,
Opposite the sky, on earth
Lived an old man from his birth,
With three sons. The eldest one
Was the village paragon.
Number two ran as to rule,
While the youngest was a fool.
All the brothers farmed, sowed grain,
Traveled to a near domain
Whose renowned metropolis
Made a pleasant trip of this.
There they traded, sold their wheat—
And, with moneybags replete,
Home returned well pleased with what
They thought not too bad a lot.

In the course of time's advance
There befell them a mischance.
Some marauder came to pillage,
Shake the young wheat in their tillage.
And the poor folk since their birth
Had not met such wrong on earth.
So they thought and planned till they
Had determined on a way
To surprise him at his pillage—
Catch this thief. They'd guard their tillage
Nightly; they'd patrol their bread,
Seal the vandal's doom instead.

With the setting of the sun
Went the brave and eldest one
To stand guard and ne'er relax
With his pitchfork and his ax.
Dark and stormy fell the night,
And he, overcome with fright,
Hid where it was safe and soft,
Spent his vigil in a loft.
When, however, morning broke,
Then the watcher stanch awoke.
First poured water o'er his head
Then went home and knocked and said,
"Hey, you heath cocks, open up!
Let me in. Your sleeping stop.
While you lay dry in your bed,
I've been soaked from foot to head."
Both as one, the brothers hurried
To unlatch the door and, worried,
Asked what happened in the night.
Had he seen a fearsome sight?
Here our hero said a prayer,
Asked God's mercy on them there.
Paused, and haltingly began,
"I have carried out the plan.
Let me add 'twas not a pleasure.
Rain there was, and wind, full measure.
Soaked am I right to the bone.
Shivering and quite alone
Did I walk the whole night through
But saw nothing strange or new."

Him the father praised and said,
"Daniel, boy, you used your head,
And I'm proud to say, my son,
That your task was ably done.
Oft 'tis said; but I repeat,
Grass grows not beneath your feet."

Once again at set of sun,
Time came for the second one
To stand guard and ne'er relax
With his pitchfork and his ax.
Cold and gloomy fell the night.
Bitter was his dreary plight.
Soon his teeth began to chatter,
And he ran from there. No matter
That he spent his time on guard
Marching in the neighbor's yard.
So much for the fearless sentry.
In the morning at the entry
He cried, "Hey, you sleepyheads,
Let me in! Stir! Leave your beds!
In the frost I've walked alone
Till I'm frozen to the bone."
Both as one the brothers hurried
To unlatch the door and, worried,
Asked what happened in the night.
Had he seen a fearsome sight?
Here our hero said a prayer,
Asked God's mercy on them there.
And, still shivering, began,
"I have carried out the plan.
Luckless was my ill-starred fate.
Fierce the cold did penetrate
To the marrow of each bone.
Through the night I froze alone
But did find naught else to do
And saw nothing strange or new."
And to him the father said,
"Gabriel, son, you used your head."

For the third time sets the sun.
Time comes for the youngest one
To stand guard, but he'll not move.
He sits singing on the stove,
Bellows lustily and sighs
Over "Beautiful Soft Eyes."
So the brothers urge and nudge him.
Nothing they can say will budge him.
For he doesn't wish to yield,
Take his turn to watch the field.
So at last the father broaches
The sore subject, and approaches
Him, beseeching, "Listen, Johnny,
Take your turn and stand guard, sonny.
Then I'll buy you new blue jeans,
Give you extra peas and beans."
Johnny rises, limp and slack,
Throws his sheepskin on his back,
Stuffs a bread crust next his chest,
Starts his vigil like the rest.

John patrolled the field. The night
Softly fell. The moon shone bright.
Looking round him, in the hush,
John sat down behind a bush,
Idly counted stars, and just
Nibbled calmly at his crust.
Midnight, and a horse's neigh,
Made him rise. Without delay,
Curious, searching here and there,
He at length espied a mare.
And the mare he saw was so
White as winter's freshest snow.
And a marvel to behold
Fell her mane of tight-curled gold.
"Oh-ho-ho! So this is who
Is this thief! Just wait. Can you
Guess I never fool or play?
Mounting you is more my way.
What a locust! You'll calm down!"
And a moment scarce had flown
When he overtook the mare,
Grabbed her tail's soft curling hair,
And had mounted. But, alack,
He had mounted front to back.

3, swift startled from her grazing,
h her deep eyes fiercely blazing
hed her neck and fled as though
d the arrow from a bow,
cled widely o'er each plain,
cked across each dale in vain,
lloped headlong on each hill,
aring, walked the woods until
k or crook should somehow guide
ier
unseat the stubborn rider.
our John sat firm and bland,
ht her tail grasped in his hand.

aried, she at last stood calm.
d so spoke to him, "Now, John,
ce you've stayed and not been
hrown,
s mete that you should own
. Find me a place to rest
d look after me as best
u are able. And take care,
three dawns rise bright and fair,
me out to roam at will
r the meadow and the hill.
en three days have passed, I'll
ear
u two steeds so wondrous rare
at of them no single word
s been spoken, dreamed, or heard.
d, besides, I'll bear a pony
hands high and rather homely.
rd-long ears he'll have, and bumps
his back like camel humps.
u may sell the pair, of course,
don't trade the little horse
a fancy belt or cap,
e him in a game of crap.
on earth nor underground
ll such loyalty be found.
rmth he'll bring in wintry clime,
a breeze in summertime;
ould you hunger, fetch you bread;
ould you thirst, some mead
instead.
for me, I'll roam the plain
e to try my strength again."

," thinks John. "Quite fine, if
true."
anwhile quickly drives her to
old cattle shed; what's more,
ngs some burlap o'er the door.

Eyes like saucers, round and flat.
Fast he galloped, while his feet
And his tail beat down the wheat.
I'm not one to fool or play;
Mounting him was more my way.
Long he galloped; far he fled,
Almost broke my neck and head.
Still I managed, kept my seat,
Clung to him with hands and feet.
Till at last the sly one tired,
Begged my mercy, and conspired,
'If you let me live on earth,
Promise I a whole year's worth
Of behavior so designed
As to benefit mankind.'
Hoping I had rightly heard,
I took Satan at his word."
At this point the teller stopped.
Yawned just once, in slumber
dropped.
Long the brothers kept straight faces;
They laughed fit to burst their braces
Now, and held their sides as well
At the tale they'd heard him tell.
Laughed the father, 'spite his years,
Till his cheeks were wet with tears,
Though to be so uncontrolled
Is unseemly in the old.

Whether little time or much

With what strength their swift legs
mustered
Made a beeline through the bramble,
Barefoot through the thorns did
scramble.
After they had stumbled thrice,
Stopped to focus each eye twice,
Gently rubbing here and there,
They at last approached the pair
That stands snorting, neighing too.
Burn their eyes of sapphire blue,
Tightly curled with moonlight pale
Falls each horse's golden tail.
Round each diamond hoof is set,
Matched and large, a pearl circlet.
Unsurpassable they are,
Mounts fit only for the Tzar.
Hard the brothers stared and craned
Till their eyes were crossed and
strained.
"By what piece of luck did John
Find them?" asked the eldest one.
"Though I've heard that as a rule
Fortune smiles upon a fool,
Doomsday'd come before the day
That we'd find a dollar. Say,
Gabriel, in a week or so
To the capital let's go,
Sell them to the rich or noble,
Share the profits for our trouble,

Walks the roadway to the shed,
Sings, and gnaws a crust of bread.
When he nears his field of land,
Arms akimbo, feeling grand,
With a swaggering dandy's tread
Sideways walks into the shed.

Though at first all seemed serene,
Gone as though they'd never been
Were the steeds. Before him only
Humpy pranced. The little pony
Clapped his ears in joy and beat
Rhythmic capers with his feet.
Stunned, our Johnny wept and pled,
Leaning 'gainst the cattle shed,
"Tell me, chestnut steeds and gray;
Golden-maned steeds, tell me pray;
Tell me, did I not caress you?
What fiend stole you to possess you?
May he die, the cur, for this,
Perish in some deep abyss!
And of misery have no dearth
Even when he leaves this earth!
Tell me, chestnut steeds and gray;
Golden-maned steeds, tell me, pray."

Then the pony neighed, soft-spoken
Murmured, "John, don't be heart-
broken.
Though the trouble's great, I'll find

d as soon as day does come
nds his cheerful way toward home,
ging loud a rousing song
a "Gallant Brave and Strong."
unts the steps up to the stoop,
kes the knocker by the loop,
ocks with such an awful din
at the roof almost caves in.
outs as though a fire had spread
ud enough to wake the dead.
th the brothers in dismay
ap from bed and, stuttering, say,
ho dares knock so loud? Have
done."
your brother, foolish John."
ey make haste to let him in,
ing the door wide and begin
upbraid him for the scare,
king him, how did he dare?
n, however, does not lose
e in doffing coat or shoes;
his favored stove retires,
ite prepared to talk; desires
weave tales about his plight
d the happenings in the night.
I night long, unsleeping, I
unted stars up in the sky,
d the moon I think, that night,
one with its uncertain light.
ddenly, Old Nick appeared!
had whiskers and a beard,
oked just like an alley cat;

Passed, since John had stood his
watch,
Not a rumor have I heard.
No one's told me, not a word.
But it's not for us to worry
If a year or two should hurry
Past, since time has always flown.
So our story carries on.

So it happened that one day
(I recall the holiday)
Daniel, tipsy, tired, half dead,
Lurched into the cattle shed.
And he sees? Stand wondrous there
Two steeds, golden-maned and rare,
And, besides, a plaything pony
Ten hands high and rather homely;
Yard-long ears he has, and bumps
On his back like camel humps.
"Now I see why foolish John
Spent his nights in here alone."
To himself so Daniel said,
For the shock had cleared his head.
Sobered, he ran home to tell
What he saw to Gabriel.
"Come and see the wondrous pair—
Steeds with manes of golden hair;
That's what foolish John hides out,
Steeds as you've ne'er dreamed
about."

Daniel, Gabriel, eager, flustered,

And with money—well, you know,
You can frolic, drink, or go
Any place. Just smack your stake.
Foolish Johnny's head would break
Long before the thought would come
Where his pair had found a home.
Let him search, both near and far.
Shake on it, Conspirator."
So the brothers in accord
Crossed themselves, without a word
Hugged each other, and went home.
On the way they whispered some;
Talked of horses, of a feast;
Guessed about the wonder-beast.

Time flies swiftly on its way,
Hour by hour and day by day;
Soon a week or so has flown,
And the brothers start for town.
There to trade their usual stock
And inquire, too, at the dock
If the Germans'd made a trip
To the hilltown in their ship,
If the heathen Emperor planned
To harass their Christian land.
First they kneel and say a prayer,
Their aged father's blessing share,
Then in stealth each takes a steed
And departs at topmost speed.

Twilight deepens; evening falls;
John decides that slumber calls,

Ways to help you. Never mind.
Don't blame Satan for all deeds.
Your own brothers stole the steeds.
Words are idle, so let's cease
Talking, Johnny, be at peace;
Quickly mount me, but sit tight
And hang on with all your might.
Though I'm very small, of course,
I'm a match for any horse.
When I start to race, you'll find
Even Satan lags behind."
Down he lay before our John,
Who climbed on him and hung on.
Gripped the little horse's ears,
Shedding large and bitter tears.
Humpy shook himself and then
Rose and shook himself again.
Snorted, tossed his mane, and fled
Swift as ever arrow sped.
And beneath him and behind
Thick the dust churned in the wind.
In a flash the chase had ended
And the thieves were apprehended.

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LITTLE **MAGIC** HORSE

NEXT ISSUE

The peoples of Soviet Central Asia are marking their fiftieth year as members of the Union of Soviet Socialist Republics. A group of articles describes the numerous changes in this area, once a backward hinterland of czarist Russia, during Soviet times. Turkmenia has progressed from a farming and livestock-raising economy to large-scale production of machinery, chemicals and other industrial items, and from almost a hundred per cent illiteracy to its own schools of painting, sculpture and film making. An illustrated article tells about the work of movie director Bolot Shamshiyev. In the Pamir Mountains of Tajikistan, where two of the country's largest rivers begin, the Nurek hydroelectric project will soon provide power for a new industrial complex. In Uzbekistan the experience of Khudzhuma Shukurova, who has a doctorate in history, typifies the movement of Uzbek women from virtual slavery to a majority in such professions as medicine and teaching.

The Moscow Central Children's Theater will be touring the U.S. next month with *The Tales of Pushkin.* These fairy tales, including "The Fisherman and the Little Fish," won over American audiences in 1972 when they were presented at the theater festival in Albany, New York. Nikolai Putintsev, head of the Central Children's Theater literary section, traces his organization's growth since it began 50 years ago with "stage games" in which the spectators joined the actors. It became the prototype of some 150 children's theaters in the USSR.

When the *Ile de France* arrived in New York in the winter of 1929, one of its passengers was the noted artist Alexei Kravchenko. He had come to arrange the sale of pictures at an exhibition by Soviet painters. New York made a profound impression on him ("I am absolutely amazed and overwhelmed by the grandeur of the city," he wrote his wife), and he did a number of expressive sketches of the city. These sketches were used for large etchings and woodcuts displayed at his one-man show in Kiev the following year. Such works as *Edison's Factory, The Brooklyn Bridge* and a view of Central Park reflected his interest in New York's industrial landscape and natural surroundings. An article illustrated by Kravchenko's paintings.

Delegates to the new session of the USSR Supreme Soviet began work this summer after the June general elections. More than half of them are workers and farmers; almost a third are women, and almost two out of five are young people. The December issue tells how our electoral system works and how parliament members fulfill pledges to constituents.

"Centaur" is what his associates call Pyotr Kapitsa, the distinguished 80-year-old physicist. The title refers to his energy and reputation for overcoming obstacles. An account of his work in England and at home.

An article on the cultural changes brought about by the more than 100 nationalities that form a new historical community of people, the USSR.

COMING SOON

Development of the Nonchernozem Lands

World champions in sports acrobatics. In the center is Nadezhda Masloboishchikova (USSR), gold medal winner. To her right, second prize winner Natalya Timofeyeva (USSR); to her left, third prize winner Denise Tanny of the United States.

COOPERATION THROUGH SPORTS COMPETITIONS

Photographs by Igor Utkin

American and Soviet basketball players trade souvenirs. Center: Heavyweight Amory Chapman, 1974 AAU and Golden Gloves champion (right) beat Pyotr Zayev, runner-up in the last USSR championships, on points. Opposite page: The gold medal in the acrobatics mixed pair went to Galina and Yuri Savelyev (USSR).

ardless of who comes out
ad, the result is better sports
rowth in understanding.

ACROBATICS' WORLD DEBUT

ACROBATICS, a very ancient sport, won international citizenship only recently. The founding Congress of the International Acrobatics Federation convened in November 1973 in Moscow, and the first acrobatics world championship was also held here this past June. It was not mere chance that brought this honor to Moscow. Acrobatics has been popular in the USSR for a good many years. Countrywide competitions have been held since 1939. Some 300,000 people are active in the sport.

Those of our readers who saw the Soviet acrobats perform in the USA just before the championship will agree that acrobatics is a fascinating spectacle.

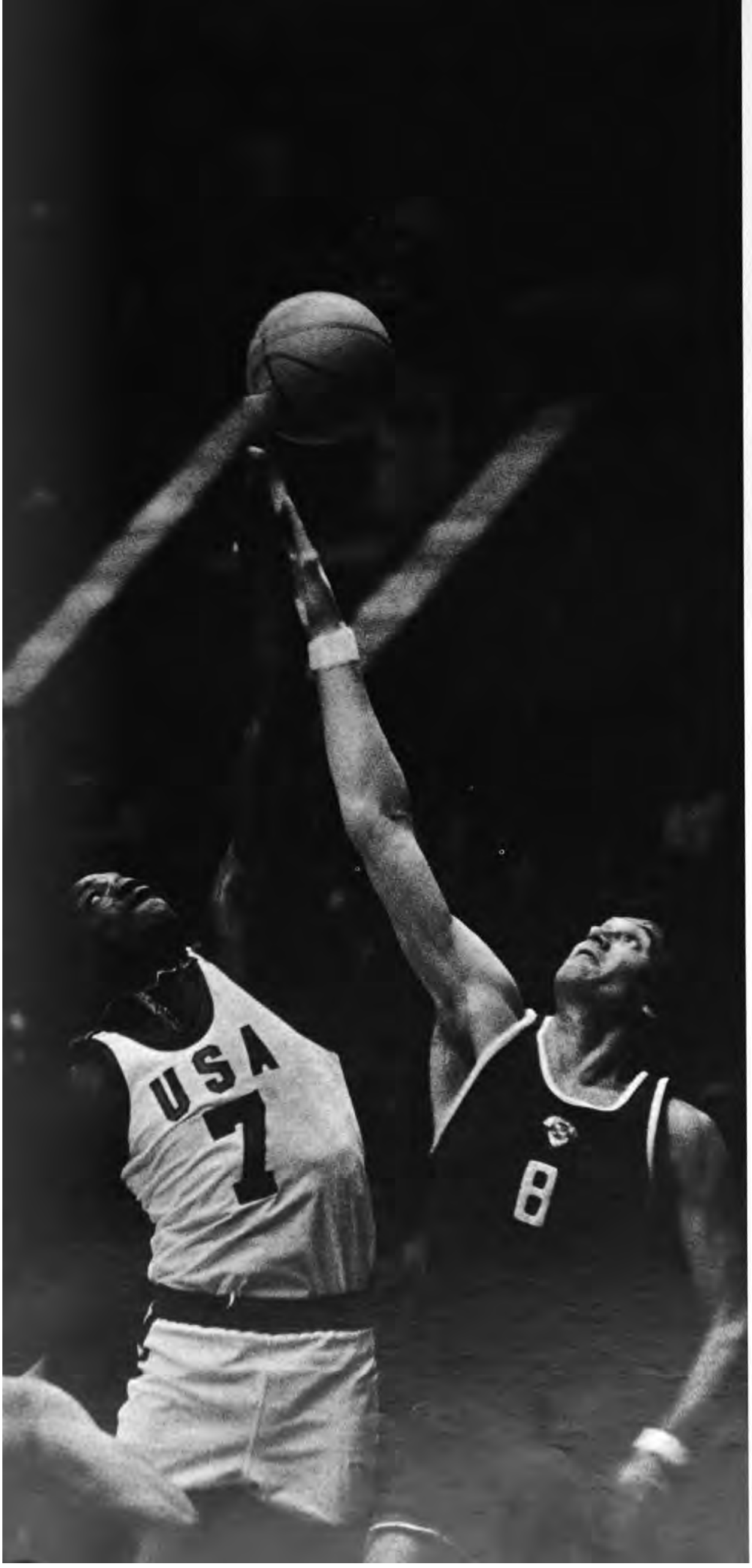
The world debut of acrobatics, held in Luzhniki's Sports Palace, brought together 86 contestants from eight countries: Bulgaria, Great Britain, Hungary, Poland, the USSR, the USA, Switzerland and the Federal Republic of Germany.

There were a number of professional acrobats—circus and variety show performers—among the spectators in Moscow. This sport, they said, has reached artistic heights. So commented Alexander Sosin, a veteran circus acrobat, first in the world to do a double somersault. That feat took place back in 1914, and when he appeared in the sports hall, all the contestants, coaches and judges rose to give him their applause.

When the competitions were over, it was clear that most of the gold medals had gone to the hosts, but there was nothing unexpected about that since only in a few of the events did the guests have any real chance. There were, however, a few surprises in the events in which Soviet athletes competed among themselves. For instance, Vasili Skakun, a famous 30-year-old acrobat from Stavropol, in the Northern Caucasus, whose phenomenal leaps the Americans had seen last November, made a few errors and in the multiple event finals was beaten by Yuri Zikunov, a young rival from Minsk, Byelorussia. However, in the exercises Skakun came back and won handily.

Among the U.S. athletes, the best performance was by Denise Tanny. She placed fourth in acrobatic leaps in the multiple event finals (first place was won by Nadezhda Masloboishchikova, from the Volga Auto Plant in Togliatti). In one of the exercises Denise placed third.

Her young fellow countryman, 15-year-old Eddie Goodman, unfortunately did not make the finals, coming out one-tenth of a point short after a risky try. But the spectators took a decided liking to this snub-nosed redheaded boy—his courage and eagerness won their hearts. In acrobatics, if you don't take risks, you never win. Everyone agreed that Eddie was an athlete of great promise. He himself said he had no regrets at all about his trip to Moscow, he had seen a lot of exciting things.



SCORE IN SPORTS' FAVOR

By Yuri Rtishchev

BASKETBALL PLAYERS of the USSR and the USA first met in Helsinki, site of the Olympic games in 1952. In the 22 years since, teams of the world's leading basketball countries have played 13 matches in official tournaments. Beginning in 1958, when American athletes made their first tour of the Soviet Union, 35 matches have been played on the national team level alone. All told, the national teams of the USA and the USSR have played 96 matches in the two countries (40 in the USA and 56 in the USSR).* The USA has played in Moscow, Leningrad, Kiev, Tbilisi, Minsk, Tallinn and Vilnius. In the latest, seventh, tour (May 1974) the Americans saw still another Soviet city—Riga, capital of Latvia.

The total score this time was 6 to 3, in favor of the visitors, and, on the national team level, it was a 1 to 1 draw. The first match was won by the Soviet team (89 to 85), the second, by the American (83 to 77). In the other meetings the U.S. team played, and mostly won, against the USSR youth national team as well as the teams of Leningrad, the Ukraine, Latvia and Estonia.

In an interview with Soviet reporters the basketball administrator of the Amateur Athletic Union of the U.S., James Fox, said that in forming their national team, the Americans were determined to pit against the Soviet team the best amateur players in the United States. Larry Brown, senior coach of the U.S. team, picked the strongest players for the trip to the Soviet Union, not necessarily the leading stars, but all 12 exhibited uniformly high-class play.

Fast, athletic, and technically skillful, that was the basketball demonstrated by the Americans in the Soviet Union. The team's trump cards were many and impressive: excellent physical condition, collective action on the court, strict play discipline, refined technique, three or four combinations at the ready when the situation called for them and sureness of play under the backboard.

Larry Brown believes you can't win without a good defense, and he prefers basketballers who like to play defense and are good at it.

The hosts did not have especially tall players this time, so they tried to outplay their rivals with speed, lightning attacks and an active defense. In some of the meets these techniques worked.

For both teams the May meetings were one of the stages in preparation for the seventh world championship, which was held in Puerto Rico in July. The reader may remember that it was won by the Soviet team, which was victorious in the decisive match against the Americans by a margin of 11 points. Our coaches and players must have learned a thing or two from the unofficial meets.

But the value of such meetings is not, of course, just practical. As Fox said, sports ties between our countries help substantially to promote friendship between the peoples of the USA and the USSR. Larry Brown agreed with Fox. "When boys crowd around and pelt us with questions about our country and eagerly answer our own, there can be no doubt that contacts between Soviet and U.S. athletes are more than just sports get-togethers," he said.

TENTH ROUND

By Mikhail Lukashev

AMATEUR BOXERS of the United States and the Soviet Union are continuing their series of matches, started five years ago. Everyone involved is of the opinion that both sides have profited from these bouts which have given fans the chance to see Olympic, European and Pan-American winners in action.

On this latest—the tenth—occasion, the Soviet Union did not enter the best of its boxers, who were scheduled for other international tournaments being held just about the same time, such well-known matmen, for instance, as USSR, European and Olympic titleholder Vyacheslav Lemeshev.

Only four of the eleven 1974 Soviet champions appeared in the ring of the Moscow Sports Palace in the Luzhniki district. The visitors came to the USSR capital this time with their youngest-ever aggregation in international competition. The hosts won seven of the 11 bouts. In the two subsequent minimatches the Soviet boxers also came out on top. The Americans won two bouts and lost four in the resort town of Kislovodsk, in the Northern Caucasus, and were defeated, 5 to 3, by the select Kazakhstan team in Alma-Ata, the capital of that Soviet republic. Despite the setbacks, spectator comment was that the Americans exhibited real boxing grit.

This time, it was noted, they did not stick to the professional pattern, which in earlier years they tried hard to emulate; it has seldom been successful in the brief three-round amateur clash. In the latest matches practically every overseas contender maintained a sizzling pace from start to finish, rejecting the doubtful tactic of waiting for an opportunity to land a kayo punch.

It was obvious that the Americans were far better on the offensive than on the defensive.

Here are brief accounts of some of the bouts.

In the lightest (100-pound) class, the temperamental U.S. champion Albert Sandoval put up a fast and furious battle against the Soviet titleholder, Yevgeni Yudin, a design engineer of Kuibyshev, on the Volga. Though he showed the same pace in the final round, Sandoval let his rival score more blows than he did and lost. In the second bout, in Kazakhstan, V. Plakushchy also managed to outpoint the swift-moving American.

William Berry found himself pitted against Olympic featherweight champion Boris Kuznetsov. He was unable to break out of the spell his adversary's reputation seemed to have cast on him, even forgetting to use the advantage of his longer arms. Berry was also beaten by Ashot Avetisyan of Armenia in Kislovodsk.

The first point for the U.S. team was chalked up by lightweight Aaron Pryor, the U.S. champion, who has an original fighting style. He threw punches from the most unexpected positions and came through all his three bouts in the USSR undefeated. Vasili Solomin and Valeri Lvov were two of the losers.

Soviet fans applauded the performance of 17-year-old Ray Leonard in the 140-pound class. With less experience than twice USSR champion Anatoli Kamnev, the very promising boxer fearlessly took on the latter and lost by a close decision.

The 1974 Golden Glove middleweight champion, Vonzell Johnson, equaled Pryor's success, emerging triumphant in all three of his bouts. His opponents, including the 1973 Soviet and European titleholder Anatoli Klimanov, could not figure him out.

In a talk with his U.S. opposite number, William Gammings, Soviet team coach Yuri Radoniak asked about the training of heavyweights in America. One reason for his interest is that for many years now, ever since the days of our famous heavyweights—the late Nikolai Korolyov, the World War II guerrilla with lethal hands, and Algirdas Socikas, the elegant Lithuanian fighter—we have not had another fighter of their caliber. In the USSR versus USA series and in other tournaments, our boxers were outclassed by the Americans.

There are, however, signs of improvement now in our heavyweight ranks. Amory Chapman, the 1974 AAU and Golden Glove champion, also beat Pyotr Zayev, runner-up in the last USSR championships, but only by the slightest margin. Chapman lost on points to European titleholder Victor Ulyanich of Rostov and failed to go the full distance against V. Grebeniuk.

But after all is said and done, there is something more important than victory and defeat—it is the mutual understanding that develops. On the eve of departure, Roland Schwartz, boxing chairman of the Amateur Athletic Union of the U.S. and head of the overseas delegation, said that the American boxers had made new friends in the USSR everywhere they went.

Basketball
is as popular in the
Soviet Union as in the
United States. The national
teams of the two countries
have played about 100
matches since
1958.

SOVIET LIFE

THE NEW PARLIAMENT STARTS ITS WORK

PEOPLE OF SOVIET CENTRAL ASIA

December 1974 • 50 cents

LIBRARIES

A fascinated spectator reacting to a scene from *No Sweet Without Sweat*, a fairy tale play by the late Samuil Marshak. He is probably the favorite children's writer in the country. Young people know his poems and plays by heart.

Moscow Children's Theater Presentations

Photographs by Alexander Nevezhin

The theater stages plays for children and young people from seven to seventeen. Subject matter ranges from familiar fairy tales to such pressing problems of growing up as friendship, love and choice of career. The repertoire includes British and American classics *Oliver Twist* and *Uncle Tom's Cabin.*

Story on page 52.

The country celebrates New Year with

From the staff of SOVIET LIFE to each and every one of our readers in the United States: Our heartfelt wishes for a peaceful, happy, healthy and prosperous 1975

Workers at the Ust-Ilinsk hydroelectric project in Siberia welcome Grandfather Frost and the Snow Maiden. Right: Just what he wished for. Right center: Don Quixote and his horse appear at a party for children in the Kremlin.

JINGLE*BELLS TIME

for kids and grownups

with a variety of regional touches.

For two weeks during New Year's vacation, the children take over Moscow's Trade Union House.

Very much in season is this young figure skater at the capital's palace of sports. Left: And very much out of season is this swimmer who defies the weather and gets flowers from Grandfather Frost himself. Bottom left: A Ukrainian welcome to the New Year in the town of Rakhov.

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LETTERS TO THE EDITOR

After a few months of reading SOVIET LIFE I am very much enlightened about life in the Soviet Union. Some of the aspects of the government and how it operates interest me very much.

Maybe someday, if I can afford it, I would like to visit the Soviet Union. After I read every copy of SOVIET LIFE I feel closer than ever to the Soviet people.

Conrad Antaya
New Bedford, Massachusetts

This is an excellent magazine and I watch for it at my public library every month.

Mrs. N. D. Roche
Temple Hills, Maryland

I have been a subscriber to SOVIET LIFE for some years now and greatly appreciate the fine job you are doing. You are certainly putting out a beautiful and informative magazine which is an important means of informing the American people of the USSR and its many activities. I had the pleasure again of visiting your great country this year and am greatly impressed with it and your wonderful accomplishments. The Soviet Union, from my humble viewpoint, is certainly one of the most pleasant countries to visit that I have seen (I have been in twenty nations) and the people's friendly nature and cooperation makes a visit there a warm and memorable experience.

Gilbert Holding
Anaheim, California

How wonderful for American students if SOVIET LIFE were on the required reading list of all elementary and secondary schools better still if it were accessible for them to read.

Yes I am a student of Russian culture, language and history. My greatest dream is to go to Russia.

Bette Nichol
Dallas, Texas

I am delighted with October's SOVIET LIFE. As always it is full of new information, ideas and worthwhile news.

This time the Adventures of Octopus Jr. by Mr. Leonid Sergeyev is another beautiful surprise.

Anna P. Armbruster
Waterbury, Connecticut

I am filled with admiration for the July issue of SOVIET LIFE with the lead articles about oceanography. A. Kharkovsky's report on the new world of the neuston in particular is of significance, I believe. I would look forward to reporting a joint US-USSR exploration of the deep undersea, much as we are engaged jointly in the Apollo-Soyuz program.

Beautiful cover art by N. Smolyakov, too!

Jerry Hannifin
Time Magazine
Washington, D.C.

EDITOR'S NOTES

CONTACTS ON ALL LEVELS

IN THIS ISSUE the reader will find three articles that, in one way or another, reflect the growing ties between our two countries: the first, on the annual track and field "match of giants," held this year in Durham, North Carolina; the second, on the Moscow Central Theater for Children, which participated in a theater festival in Albany, New York; the third, on a Soviet secondary school that gives extra time and attention to the study of English and the history and culture of the United States.

These examples, obviously, constitute only a small part of the Soviet-American contacts of the past year. Actually mutual relations have embraced many spheres of activity and taken the most diverse forms. The Soviet people are pleased with this process and would like to see it continue.

It is worth recalling that the third Soviet-American summit meeting was held this summer. The talks in the Moscow Kremlin and Oreanda between the leaders of the Soviet Union and the United States made a significant contribution to Soviet-American relations. They helped to further relax international tensions, thereby meeting the interests of the peoples of the USSR and the USA and promoting world peace.

As a result of the first two Soviet-American summits—in May 1972 in Moscow and in June 1973 in the USA—important documents were signed: the Basic Principles of Relations Between the USSR and the USA, the Agreement on the Prevention of Nuclear War, the Treaty on the Limitation of Anti-Ballistic Missile Systems and the Interim Agreement on Certain Measures with Respect to the Limitation of Strategic Offensive Arms.

At the third meeting in 1974 the parties concluded that it was necessary to maintain and implement the basic policy set forth in 1972-1973. A more concrete agreement was reached on limiting anti-ballistic missile systems and the underground testing of nuclear weapons and on further efforts to limit strategic offensive arms. Steps were also agreed upon toward banning chemical weapons. All this is a substantial advance in the direction of strengthening peace and mutual trust: It indicates the determination of both parties to do everything they can to reduce the risk of military conflict between the USSR and the USA.

The Soviet people welcome the pledge of the new President of the United States to continue the course of relations with the Soviet Union followed by his predecessor during the last three years. In his message to Gerald R. Ford dated August 10, 1974, the President of the Presidium of the USSR Supreme Soviet, Nikolai Podgorny, expressed confidence that relations between the USSR and the USA in the coming years would continue to benefit our peoples and to strengthen universal peace and international security.

As a result of improved relations in the field of foreign policy, mutual ties between our two countries have expanded in other areas, notably in economic exchanges. The Moscow weekly *Ekonomicheskaya Gazeta* made the following comparison recently: In 1971 trade turnover between the USSR and the USA came to a mere 181 million rubles, while in 1973 it reached 1.5 billion rubles. The mistaken idea often expressed in U.S. business circles that there was "nothing to buy" from the Soviet Union has been visibly shaken in the last few years. Various American firms have signed large contracts with Soviet foreign trade agencies to buy our hydrofoil ships, Belarus farm tractors, a number of types of metal-cutting machines, electronic computers, watches and other manufactured items that have won a good reputation on the world market. In turn, the Soviet Union has placed several solid orders with U.S. firms for industrial equipment, notably for the big Kama Truck Plant now under construction.

In 1973 the U.S.-USSR Trade and Economic Council was organized. This is a bilateral organization made up of representatives of U.S. business circles and Soviet economic agencies. The purpose of the council, says its charter, is to promote mutually advantageous trade, economic, scientific and technical ties. Its board includes 26 representatives from each side. The cochairmen are Donald Kendall, Chairman of Pepsico, Inc., and USSR Deputy Minister of Foreign Trade Vladimir Alkhimov. In June 1974 Kendall visited Moscow and talked with Leonid Brezhnev, General Secretary of the Central Committee of the Communist Party of the Soviet Union: The council promises to be very useful to both countries.

Incidentally, the prospects for trade and economic ties were given due attention during the third Soviet-American summit meeting. Both sides recognized that the expansion of these ties on equal, nondiscriminatory terms is an important part of the foundation on which the entire complex of Soviet-American relations is being built. They expressed hope that in 1975 the total volume of trade between the USSR and the USA would reach two to three billion dollars.

Environmental protection, the theme of EXPO-74, is one of the fields in which joint Soviet-American research is particularly extensive. At the Soviet Pavilion in Spokane visitors could see what the USSR was doing about the 11 major ecological problems which the USA-USSR joint action program has designated top priority. Nelson Rockefeller, after visiting our pavilion, noted that the display would do much to help Americans understand the remarkable achievements of the Soviet people.

In the past year, in the United States as well as in the Soviet Union, American and Soviet specialists continued their joint preparations for the experimental Soyuz-Apollo flight scheduled for 1975. Glynn Lunney, program manager of the project for the American side, told a press conference in Moscow in September 1974 that the main idea behind the new docking system developed for the flight was a universal design that could be used by other countries as well.

And a very good idea it is! Similarly, we might say that the entire system of peaceful relations and cooperation between our two countries, worked out by joint efforts in these past years, can be useful to other nations with differing social systems.

As far as the Soviet Union is concerned, it will do everything possible to continue and broaden the cooperation between our two countries, despite the difficulties still in the way. As Leonid Brezhnev noted in a speech this summer:

"Giving full credit to what has already been done, we cannot close our eyes to difficulties and problems which still remain. They do exist. But it is even more important to make full use of all the possibilities existing today for further progress. . . . We want Soviet-U.S. relations to become really stable and not dependent on considerations of expediency. We want both our countries and the world as a whole to benefit from the further development of these relations."

SOVIET NATIONALITIES: NEW STAGE OF RELATIONS

By Victor Perevedentsev
Demographer

THE SOVIET PEOPLE comprise a new historical community of people that has taken shape and developed in less than six decades. Leonid Brezhnev, General Secretary of the CPSU Central Committee, said in a speech marking the fiftieth anniversary of the formation of the USSR: "The emergence in our country of a new historical entity of men, the Soviet people, is our great accomplishment. . . . We are justified in regarding it as the epitome of the economic and sociopolitical changes that have taken place in this country in the past 50 years." [1]

The Soviet Union today has a population of 250 million people of more than 100 nationalities. They are members of two major racial stocks: the Europeoid, which constitutes the majority, and the Mongoloid.

This complexity of ethnic composition was one of the reasons for the continual international tension and conflict in the former Russian Empire. The concept of backward national areas in remote parts of the country was a common one in old Russia. The more developed central regions had traversed a definite path of capitalist development, but these other regions lagged behind in all respects: economic, social (survival and even domination of the feudal and prefeudal—communal and tribal—social structure) and cultural (almost 100 per cent illiteracy). It was a distressing legacy the Soviet Union inherited.

The history of the USSR confirmed in practice that national contradictions were only a reflection of class contradictions. To quote Marx's and Engels' *Manifesto of the Communist Party*, ". . . as the antagonism between classes within the nation vanishes, the hostility of one nation to another will come to an end." [2]

The Soviet peoples moved toward cohesion, unity and all-round integration once they were freed of social and national oppression and the conditions were created for the development of each nation, large and small. The principled position of the Communist Party was expressed by Lenin in these words: "We want a *voluntary* union of nations—a union which precludes any coercion of one nation by another—a union founded on complete confidence, on a clear recognition of brotherly unity, on absolutely voluntary consent." [3]

Right after the October 1917 Revolution, the Soviet state published the Declaration of Rights of the Peoples of Russia, putting on record its nationalities policy: the equality and sovereignty of the peoples of Russia; the right of nations to self-determination, including secession and the establishment of an independent state;[4] the abolition of all national and national-religious privileges and restrictions, and the free development of the national minorities.

The significance that was and is attributed to the nationalities policy can be judged by the fact that it underlies the administrative and territorial division of the USSR. The emergence of national territorial units and their transformation was gradual. We shall not trace their history here, but merely point out that the Soviet Union at present consists of 15 equal constituent republics which include 20 autonomous Soviet socialist republics, 8 autonomous regions and 10 national areas. In other words, there are 53 national administrative units. All large peoples have their own national statehood, and so do many small ones that compactly populate a given area or make up a considerable portion of the area's inhabitants. In almost every union republic the nationality that gave it its name constitutes the majority of the population. However, none of the republics have an absolutely homogeneous population in terms of nationality. According to the 1970 census, the most homogeneous was that of the Armenian SSR (Armenians 90 per cent), and the most mixed that of Kazakhstan, whose population was swelled by other nationalities as a result of the rapid growth of the republic's industry and the development of its virgin lands (Kazakhs 33%, Russians 42% and other nationalities 25%). In most autonomous republics, on the other hand, the nationality responsible for the name constitutes a minority and, in some instances, even a very small fraction.

All national state units have considerable economic, cultural and other rights and are represented in the highest organ of state power, the Supreme Soviet of the USSR, as well as in the Supreme Soviet of their union republic.

During the first years of Soviet power the sharply differentiated economic, social and cultural level of the population of different territories called for a special policy to equalize their development, with assistance from the more developed nations and the economically advanced regions of the central part of the country. Such areas as Central Asia and Kazakhstan are now among the most prosperous, but at the outset of the Soviet period, newly emerged from colonialism, they were at a very low level of economic and cultural development. In the early twenties more than 80 per cent of Kazakhstan's population and more than 90 per cent of Central Asia's could neither read nor write, their social structure was essentially feudal, and their economy primitive and almost exclusively agricultural, based on manual labor. The stock breeders were mostly nomads.

Considering the means and possibilities available then, the backward national areas were given tremendous economic assistance. Before the Revolution manufacturing was concentrated mainly in the central regions of the country. In accordance with the decisions of the Tenth Party Congress (1921), there was a "planned location of in-

[1] Leonid Brezhnev, *The Fiftieth Anniversary of the Union of Soviet Socialist Republics* (Moscow: Novosti Press Agency Publishing House, 1972), p. 33.
[2] Karl Marx and Friedrich Engels, *Manifesto of the Communist Party* (New York: International Publishers, 1932), p. 28.
[3] Vladimir Lenin, *Collected Works*, English edition (Moscow: Progress Publishers, 1965), vol. 30, p. 293.
[4] Finland then immediately availed itself of that right.

dustry on the outskirts through a transfer of factories to the source of raw materials."[5]

The lagging republics received considererable assistance in the form of subsidies from the State Budget. For instance, in 1924 and 1925 only a little over 10 per cent of the revenues in the budget of the Turkmen Republic were contributed by the republic itself.[6]

Experienced specialists were sent to the national areas. Local national personnel was trained in an accelerated program. Large contingents of local young people were admitted to the higher and specialized secondary schools in big industrial and cultural centers.

As a result of the accelerated development of the once backward national areas, variations were eliminated in the level of development throughout the country.

This helped put an end to the carryovers of earlier national discord and unite all the nations and nationalities around the same economy the same ideology. The heroism with which the Soviet people sustained the grim trials of World War II demonstrated the complete unity of the country's nations and nationalities: The Soviet Union had become their motherland.

In cultural matters, the policy adopted from the very outset was the development and drawing together of national cultures. Unlike the state of affairs in prerevolutionary Russia, the press in the national languages expanded rapidly, and where a nationality had no alphabet of its own, one was invented and a written language created. That included written languages for many of the peoples in the North with populations numbering only several thousand.

National languages, proclaimed equal, began to be used widely in all spheres of life. In this connection, we should point out that there is no single official language in the USSR. Clerical work in all government institutions is done in the languages of the national union republics, legal proceedings are conducted in the predominant language of a given locality, and participants in court trials have the right to use any language they find most convenient. The teaching in schools is done in the language chosen by the pupils' parents; in primary schools this is usually the native language even in the case of numerically small peoples. Newspapers and magazines are published in all the languages widely used in a particular area. Russian books and books in the languages of other Soviet peoples, as well as in foreign languages, are translated in large numbers into the native language of almost every fairly large nation or nationality. Radio and television programs are broadcast in the language of the nationality predominating in a given area, and when the population is mixed, in several languages.

However, this is only one aspect of cultural life.

A second is the comprehensive drawing together of nationalities and national cultures. Underlying this tendency are pressing economic requirements. In 1917 the country entered a period of rapid industrialization and urbanization. The proportion of city dwellers to the country's total population rose from 18 per cent in 1926 to 60 per cent in 1974. (Their number increased during this period from 26 million to 150 million.) In composition of population and, hence, in culture, the countryside is, as a rule, national and the city multinational. Usually the native peoples of the union republic and Russians predominate in the cities. However, in every fairly large city there are also dozens of other nationalities. Similarly, people belonging to dozens of nationalities make up the student bodies in the grade schools, specialized secondary schools and colleges, as well as the staffs of industrial plants, construction projects and institutions. New cities and all-Union shock construction projects are particularly multinational. Thus, more than 70 nationalities live and work in the city of Naberezhniye Chelny, where a giant industrial complex is going up for the manufacture of heavy-duty trucks —people of practically all nationalities make up both construction and factory staffs.

Obviously, given the size, mobility, rapid urbanization and multinational composition of our student bodies and labor collectives, a language of inter-national communication is essential. The Russian language, with a rich vocabulary well adapted to a variety of functions, has become that language. Russians comprise a good half of the country's population, and the Ukrainians and Byelorussians closely resemble them in language and national culture. Together, these three nations account for three-fourths of the population. They are distributed throughout the country, particularly in the cities.

Bilingualism has become widespread. The 1970 census showed that 48.6 per cent of the non-Russian population—almost a half, and excluding infants, more than half—speak fluent Russian and consider it their native or second language.

The first decades of Soviet power saw the active consolidation of socialist nations, that is, an ethnic drawing together within nations, the shaping of a certain homogeneity, the disappearance of particular dialects and local cultural peculiarities, and a growing ethnic self-awareness. With most nations this process has been completed, and a process of integration is now under way within the entire population of the Soviet Union.

Marriages between people of different nationalities—a development that has been increasing lately—speed up the process of integration. Intermarriage in old Russia was very rare. The church strictly forbade marriage of people of different faiths. The separation of church and state and the spread of atheistic views among the younger generation eliminated the direct influence of religious prohibitions. Today our youth has practically no national prejudices. In places where young people comprise a particularly large section of the population and where there are many nationalities, the number of marriages between people of different nationalities is very high. Thus, in Naberezhniye Chelny a good third of the marriages are mixed. In Dushanbe, capital of Tajikistan, of 55,000 marriages between 1946 and 1966, some 22,000, or 40 per cent, were mixed.

In his report marking the fiftieth anniversary of the USSR, Leonid Brezhnev said, "In each of the Soviet republics, in each region and in each major city you will find men and women of many nationalities living as neighbors and working together. Throughout the country there is a growing number of mixed marriages, which now run into millions."[7]

The increase in mixed marriages is evident from the census figures. In 1959 there were 102 mixed marriages per 1,000 families, and in 1970, 135, an increase of one-third. This despite the fact that such marriages are rare in some areas, particularly in the countryside, because of the comparative homogeneity of the population.

Census takers determine people's nationalities by their own replies to the questionnaire, that is, by their national self-awareness. The nationality of children is decided by their parents. In most instances, especially in the East, we find a strong leaning to the father's nationality or to the one that predominates in the particular locality (especially if it is also the nationality of the union republic). That is why mixed marriages on a large scale lead to a more rapid growth of some nationalities and a slowing down in the growth of others. Thus, a decrease in the number of Mordvinians, Karelians, Poles, Finns and certain other nationalities was observed in the period between the 1959 and 1970 censuses.

The ever increasing number of marriages between people of different nationalities is the best sign of a comprehensive drawing together of nationalities, the disappearance of prejudices and the reduced significance of national origins. Children of mixed marriages generally retain the best skills and viewpoints of both parents and choose the way of life most suited to their present surroundings. Everything in their inheritance that is unrelated to the modern world, everything that is merely traditional, tends to disappear. It is usually in families of mixed nationality that we find people who are fluent in two languages. As of today, a number of marginal groups have appeared among the largest Soviet nations: Their relation to this or that particular nationality is largely conventional. For many of the children, the national culture of either parent is almost equally compatible.

In the USSR everything is done to acquaint readers with the best features, ancient as well as modern, of all national cultures. Just as Alexander Pushkin is familiar to every educated Georgian, Uzbek or Tajik, so are the great medieval poets of the East —the Georgian Shota Rustaveli, the Uzbek Alisher Navoi and the Tajik Rudaki—appreciated by Russians.

The cultural value of a literary work does not depend on the nation—large or small, formerly advanced or backward—to which the contemporary author belongs. The works of Kirghiz writer Chinghiz Aitmatov, Avar poet Rasul Gamzatov and other representatives of comparatively small nationalities are popular throughout the Soviet Union.

Obviously, the best from each nation and nationality is contributing to our cultural treasury as all the national cultures cooperate, interact and enrich one another.

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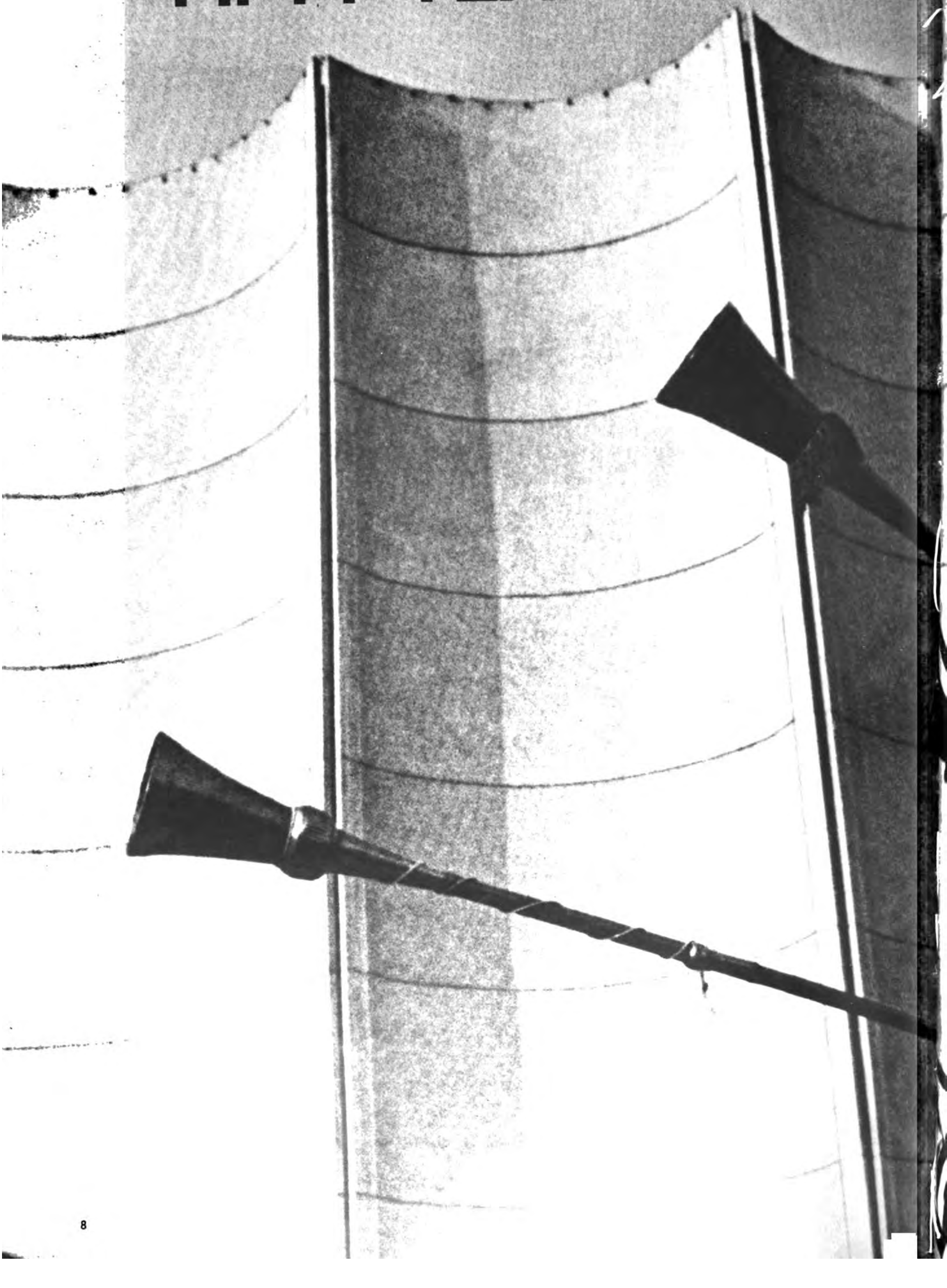
[5] *The CPSU in the Resolutions and Decisions of Congresses, Conferences and Central Committee Plenary Meetings*, vol. 2, p. 252.

[6] Brezhnev, *Fiftieth Anniversary*, p. 21.

[7] Brezhnev, *Fiftieth Anniversary*, p. 30.

The United Nations organization has designated 1974 World Population Year.

FIFTY YEARS OF NA

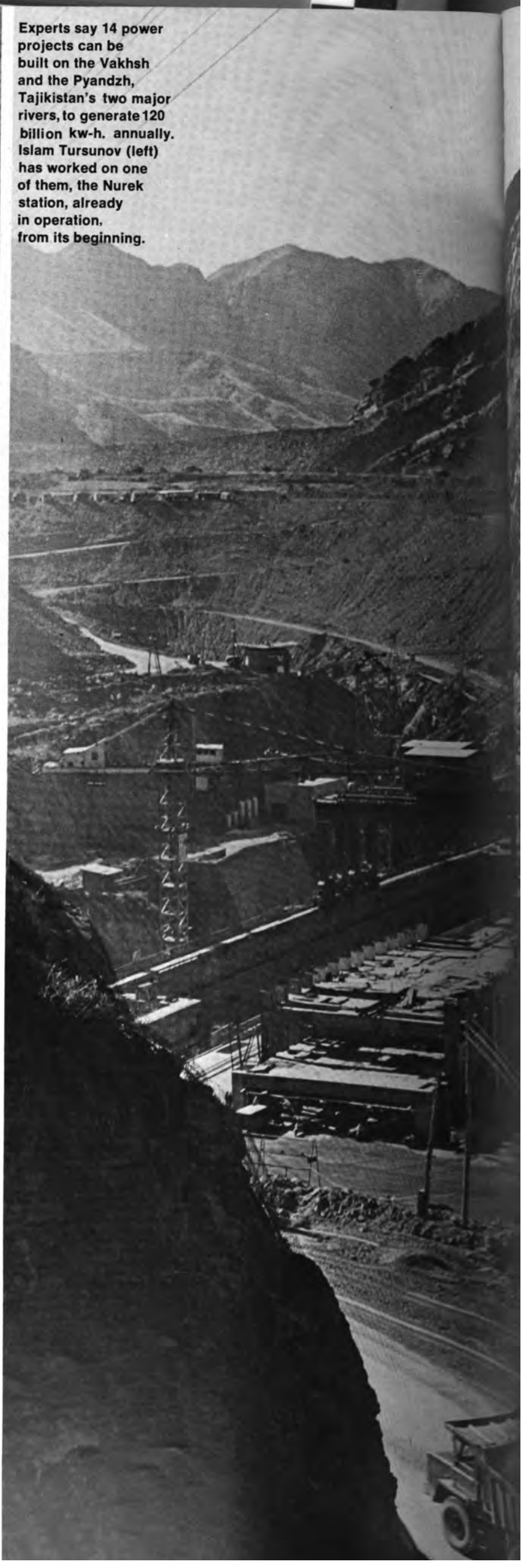


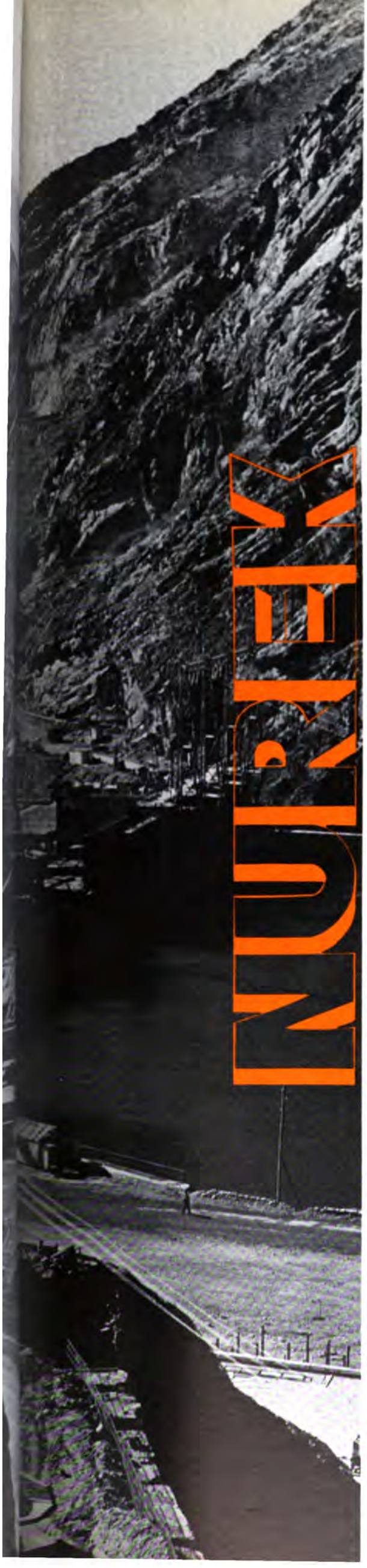
ONAL SOVEREIGNTY

The industrial and cultural development of the Soviet Central Asian peoples began when they achieved national statehood as members of the Union of Soviet Socialist Republics. ›

Hydroelectric power stations in southern Tajikistan are a key to the economic development of all the other Soviet republics in Central Asia. Water and cheap electricity will decide their future.

Experts say 14 power projects can be built on the Vakhsh and the Pyandzh, Tajikistan's two major rivers, to generate 120 billion kw-h. annually. Islam Tursunov (left) has worked on one of them, the Nurek station, already in operation, from its beginning.





INDUSTRIAL GIANT ON THE WAY

THE WATER POWER RESOURCES of Tajikistan are second only to those of Eastern Siberia. The Vakhsh and the Pyandzh, its principal rivers, have their source in the Pamirs and are unmatched in the Soviet Union for channel capacity. Experts estimate that 14 big hydroelectric stations with a combined annual production of 120 billion kilowatt-hours can be built on these two rivers.

One such power project, the 2.7-million-kilowatt Nurek station, is now generating electricity. Design estimates have already been completed for another, the 3.6-million-kilowatt Rogun station on the Vakhsh River.

Water from the reservoirs and energy from the power plants will be used not only in Tajikistan, but in the neighboring Soviet republics as well.

All of Central Asia needs water, the other republics even more than Tajikistan. Its territory is almost all mountainous, and the part that can be used for cotton cultivation has already been largely developed. The situation is different in neighboring Turkmenia and Uzbekistan. Huge irrigation systems were built there in Soviet times; the cotton-growing area is larger than in Tajikistan, but many millions of acres still require irrigation. This is where most of the water from Tajikistan's reservoirs will go. From the Dashtidzhum Dam's reservoir alone (on the Pyandzh River) 635 billion cubic feet of water will be taken annually, enough to irrigate 2.5 million acres of virgin land in Turkmenia and Uzbekistan.

Economic considerations also dictate the transmission of southern Tajikistan's power beyond the borders of the republic.

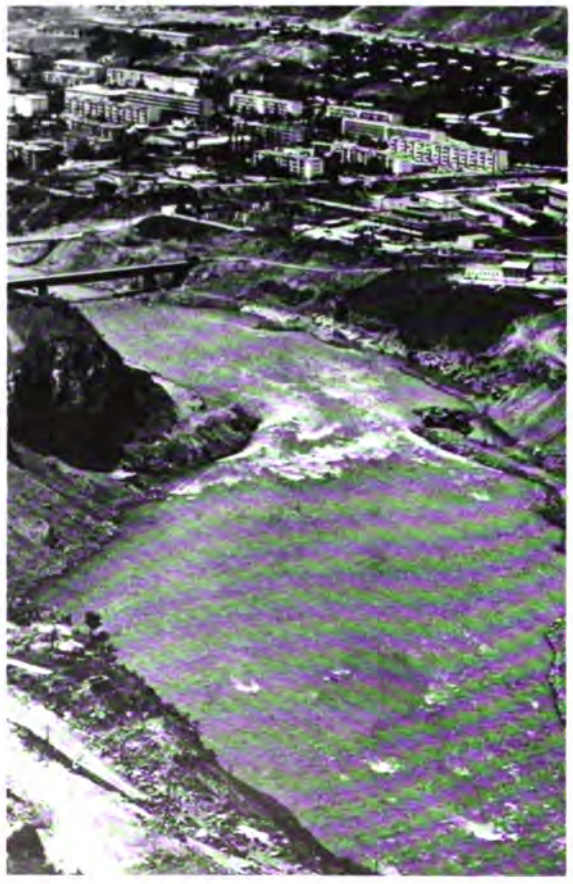
All the neighboring republics are potentially self-sufficient in energy production. Uzbekistan is one of the richest in the country in natural gas, Turkmenia has enough natural gas and oil, Kirghizia has considerable water-power resources. Gas and oil, however, are valuable primary products for the chemical industry, and it would be uneconomical to burn them to produce power that could be generated at hydroelectric plants.

At present a power line is under construction that will tie the hydroelectric projects of southern Tajikistan into the power grid of Central Asia and Kazakhstan.

As for Tajikistan, in the very near future the republic will make a great leap in its industrial development. Here, in the Vakhsh and Pyandzh valleys, a large industrial complex is being built. Government investments

Continued on page 14

The new town of Nurek has sprung up on the shore of the Vakhsh River. Its population is 25,000.



TAJIKISTAN

The Tajik Soviet Socialist Republic with a population of three million covers an area of 55,000 square miles. Its capital is Dushanbe.

As far back as the Middle Ages, the Tajik people gave the world such renowned poets as Rudaki, Firdausi and Omar Khayyam, and such scholars and scientists as Avicenna. Before the October Socialist Revolution, however, Tajikistan did not even appear on the map. The people who lived in this mountainous land washed by the Pyandzh and Amu Darya rivers were impoverished, deprived of their most elementary rights.

This is bountiful and varied country, ranging from subtropical heat in the valleys of the Pamirs to the Arctic cold on the plateaus.

The highland farm areas of Tajikistan, 10,000 to 11,500 feet above sea level, are the highest in the Soviet Union. The republic is famous for its long-fiber cotton with yields unmatched anywhere else in the world. Sheep, goats, horses and yaks graze in the mountain pastures.

In recent years there has been a rapid development of power engineering. The word electricity was unknown to the Tajiks half a century ago; today the republic generates 2 billion kilowatt-hours a year, more than did the whole of czarist Russia. It has a large-scale industry of almost 100 different branches. Its factories make electrical equipment, farm machinery components and automatic looms, among many other things.

The everyday life of the Tajiks has changed radically. Before the October Revolution there were few literate people here, and virtually no books or magazines were published. Now the republic has many secondary, technical and higher schools. Newspapers, books and magazines are printed in millions of copies in the Tajik and Russian languages.

The national art of Tajikistan has progressed from the *dutara* and *doira* (native instruments) to the symphony orchestra, and from the *akyns* (wandering singers) to the modern opera. Tajik literature is one of the most ancient in the East. Today it is enriched by many new literary forms. The republic has its own poets, novelists and playwrights.

For centuries the Tajiks have been perfecting their skills in the decorative arts. They have created amazing works of architecture adorned with woodcarving and mosaics. Tajik ornamentation is treasured for its delicacy of design and subtle color combinations.

Nurek's temperature hits close to the top of the thermometer in the summertime, so the architects provided for children's pools in almost every courtyard.

Left: Nurek is very much a young people's city, with more than the usual number of just-marrieds and a population explosion of its own. The town's many new kindergartens take care of the preschoolers while their parents are at work.

Shashlik, traditionally a Tajik dish, has been taken over by people of all the nationalities working in and around Nurek.

NUREK

The birth rate in Central Asia has always been high. Wherever you go there are little children. Nurek today is no exception.

Continued from page 11

in the complex—one of the construction projects of the current five-year plan (1971-75)—are three billion rubles. Fifty research and development institutions and 400 major enterprises from all over the country are working on the project.

This will be a complex of energy-producing and energy-consuming enterprises, the main ones to be the Nurek hydroelectric project, the Regar aluminum plant and the Yavan electrochemical plant.

The complex will also include dozens of other enterprises. Some of them are already in operation, others are being designed.

In Tajikistan, where getting nails or a pick was a problem in the not-too-remote past, there are now over 300 mines, factories and mills for almost a hundred industries, and this process of diversification will continue.

The electrochemical plant was built in Tajikistan because of the republic's abundant mineral wealth. Several dozen miles from Nurek there are huge mountains of almost pure limestone and dolomite. The Soviet Union's biggest deposits of salt have been discovered nearby. There is plenty of natural gas and water—in a word, everything needed to start large-scale production of many valuable items.

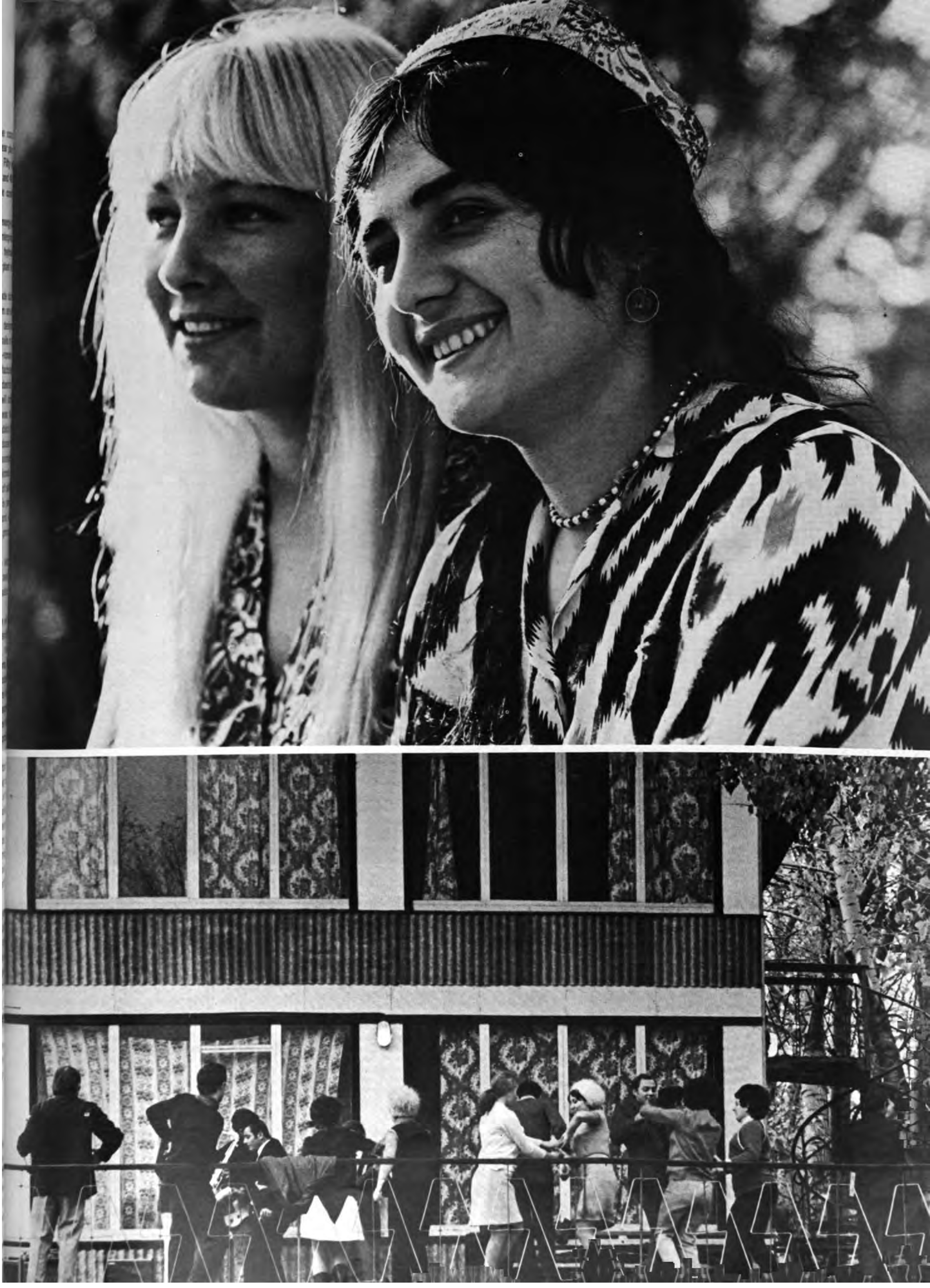
The first stage of the future industrial giant is now being built. Not far away is a booming city planned for a population of 120,000.

The southern Tajikistan complex will produce nonferrous metals, chemical fertilizers, plastic items and bulk plastics, various machines including automatic looms, natural and synthetic fabrics and foodstuffs. For Tajikistan the complex means the fullest possible use of its natural and manpower resources for the entire country, one more step in the rational allocation of its productive forces.

The population factor was important in choosing Tajikistan as the site for a big new industrial region. The main projects of the complex are located in the fertile valleys, where two-thirds (about two million people) of the republic's population live. Most of these people are employed in farming, which is undergoing intensive mechanization now, thus providing the new industrial complex with manpower.

Despite this, people of 50 nations and nationalities from all over the Soviet Union are working on the site. There is no contradiction here, for the local people lack experience, and former shepherds and cotton growers have to be taught how to dam such rivers as the Vakhsh and to build an aluminum plant and one of the biggest electrochemical plants in the country. The teachers—Russians, Ukrainians, Byelorussians, Georgians and others—are those who have already worked on such projects in other republics.

Dancing in the open at Nurek's youth café. Above right: Bookkeeper Yekaterina Uzhegova comes from the Russian Federation. Seamstress Hamro Kamilova is from Dushanbe, the Tajik capital. They met in Nurek and have become close friends.



UZBEK WOMAN— THEN AND NOW

Khudzhuma Shukurova's doctoral thesis —she has a doctor's degree in history— focused on one of the great social achievements of Soviet power—the emancipation of women in the Soviet East. The dissertation covered two decades of Uzbek history: 1917-1937.

Her book *Socialism and the Women of Uzbekistan*, published recently in Tashkent, does not mention Khudzhuma herself or her family. Tamara Alexandrova supplies that unwritten chapter.

UZBEKISTAN

The Uzbek Soviet Socialist Republic with a population of about 12 million covers an area of 173,500 square miles. Its capital is Tashkent.

Uzbek cotton—the 5.5 million tons grown annually constitute 70 per cent of the country's total—goes to all parts of the Soviet Union and far beyond its borders. The republic's skillful growers have learned to raise cotton in the very heart of the desert.

"Land ends where water ends" is an Oriental saying. Irrigation is the only way to transform desert areas into oases. For centuries the Uzbeks have been building irrigation canals, but in Soviet times the work has taken on tremendous scope. With modern machinery, the republic has built unique irrigation canals and a series of reservoirs: The total length of its irrigation network exceeds 60,000 miles. Water has made Uzbekistan the Soviet Union's largest producer of cotton. At the same time, the republic is expanding its output of silk, rice, fruits, grapes and karakul.

However, Uzbekistan is known for more than its cotton, grapes and other farm products. It also has highly developed mining, chemical, ferrous and nonferrous metal, gas and engineering industries. Heavy industry holds the leading place in the republic's economy. Uzbek cotton combines, tractors, diesels, excavators, and equipment for cotton-processing, chemical and textile factories are exported to nearly 70 countries. Modern machinery is used to extract coal, gold, oil, gas and sulfur.

Uzbekistan, the most densely populated republic in Soviet Central Asia, has an ancient national culture. Samarkand, Bukhara, Khiva and Kokand are virtual museums of Moslem architecture. In the last 50 years Uzbekistan has made enormous strides in education. More than three million people study in the republic's secondary, technical and higher schools. The institutes of the Uzbek Academy of Sciences work on problems of nuclear physics, biology, geography and economics. Such Uzbek writers as Gafur Gulyam and Kamil Yashen are read widely in all the Soviet republics.

The Uzbeks have a great love of music. They have their own original classic forms—the *makomas*, vocal and instrumental suites with parts for soloists and ensembles.

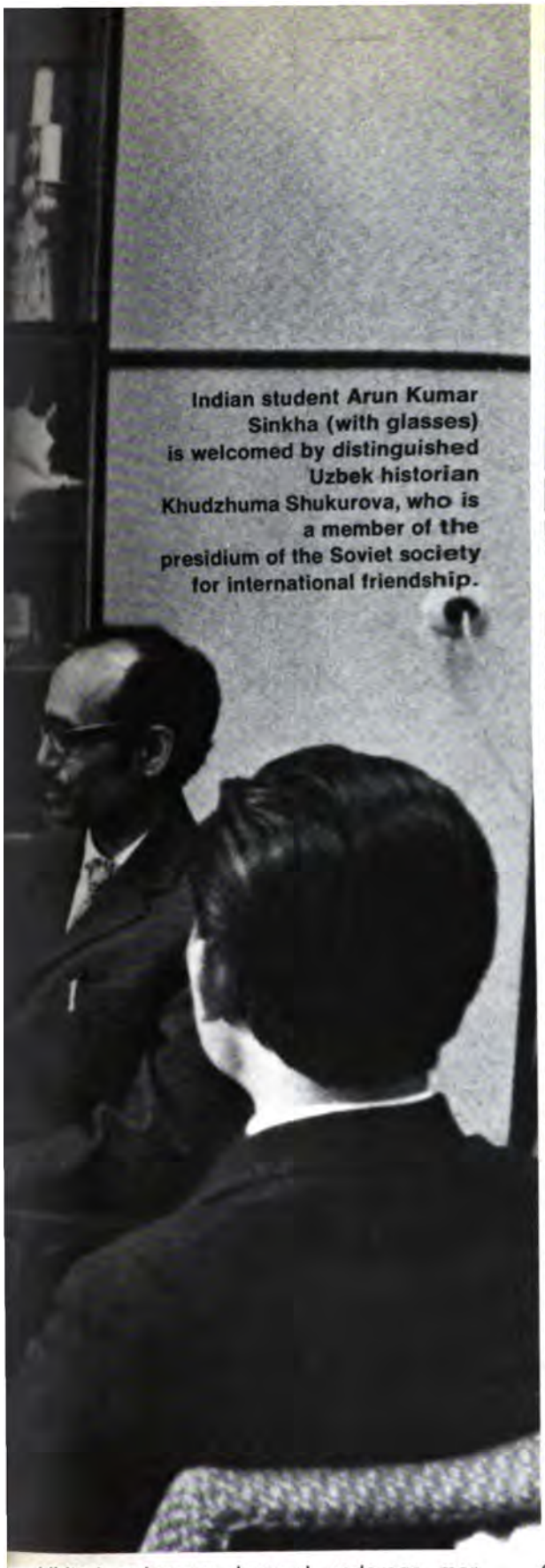
Before the Revolution, the republic had no theater of its own. It was born in Soviet times and soon reached a high professional level.

KHUDZHUMA Shukurova's grandmother did not live to see any of her grandchildren. She died at an early age in childbirth. Before the Revolution Uzbek women bore their children without any medical help. When their time came, they prayed to Allah for compassion, forgetting that he, too, turned a deaf ear to women. From early childhood it was hammered into every Uzbek woman's head that she was an inferior creature. Even in death she was denied equality with men—her grave was dug a foot lower than her husband's.

There is no picture of Grandmother in the family album. And even if there were, nobody could see her face. From the age of 11 every Uzbek girl wore a *paranja*, which was a long gray cloak thrown over the head and falling down to the heels. It had false sleeves fastened at the back as a symbol of submission. Attached to the *paranja* was a *chachvan*, a black horsehair net covering the face. Like a slave, an Uzbek woman could be sold, exchanged for a sack of rice or even killed with impunity.

The Socialist Revolution put an end to all such practices.

The Uzbek people—all of them—became equals among equals. Soviet power pro-



Indian student Arun Kumar Sinkha (with glasses) is welcomed by distinguished Uzbek historian Khudzhuma Shukurova, who is a member of the presidium of the Soviet society for international friendship.

Architect Farkhad Tursunov explains a model of the friendship society's projected new headquarters. Right: Shukurova describes an international pen pals project to Tashkent high school students. The society, which has numerous branches at factories, offices and schools, attracts members of all ages and occupations.

hibited polygamy, banned underage marriage, gave women equal rights with men.

Russian women Communists organized the first women's clubs and classes in the Uzbek Republic. It was a dangerous thing to do. This was a land which by custom practiced the intimidation of women. "Only a sister would take risks for a sister as they do for us. Only a sister would sympathize with a sister as they sympathize with us," Uzbek women used to say to one another.

If a woman gained her freedom earlier than others did, it was usually due to the help of a Russian sister who defended the wife against her enraged husband, taught her to be unafraid, encouraged her to go to school.

Khudzhuma's mother was among the first Uzbek women to tear off the *paranja*. She never forgot that day when, for the first time, she went out into the street with her face uncovered. Everything around seemed so beautiful and so bright, it was as if she had been set down in a strange city.

The country was in deep economic trouble, but the Soviet Government somehow found the money to build schools and hospitals in Uzbekistan. Uzbek women deputies administered state affairs in the Soviets on an equal footing with men.

In 1927 the enemies of Soviet power in Uzbekistan went on a rampage. In the Tashkent Kukeldash Madrasah the mullahs made short work of women who had dared take off the *paranja*. They were sewn into sacks and thrown down from the roof of the madrasah. Religious fanatics buried alive women who sided with Soviet power; as many as 259 fell victim to the enemies of socialism that year.

But nothing could stop progress. In all the republic's cities and in many of the villages the women burned their *paranjas* and, with this gesture, discarded their past. Over 5,000 Uzbek women began their education.

Khudzhuma was born in that uneasy spring. Her name in Uzbek means offensive; the birth of a girl was something contemptible.

Although she does not write about her own family, Khudzhuma's book is as much about their experience as other women's in recent Uzbek history. She and her younger sister Malika both finished high school with honors. Then they studied at higher educational institutions and, after defending their graduation theses, were urged to go on to research. Today both sisters are Doctors of Science—the highest academic degree. Malika got her degree in medicine and is a professor at the Tashkent Medical Institute. Khudzhuma got hers in history. Their mother became a grandmother and helped Khudzhuma bring up her three sons; she does not have time for everything. After all, Khudzhuma is not only a historian but a distinguished public figure, member of the Soviet Women's Committee and of the Presidium of the Union of Soviet Societies for Friendship and Cultural Relations with Foreign Countries. She has traveled in Asia, Europe and America. Every morning letters come to her desk from the USA, Mongolia, France, Bangladesh.

Many of her correspondents ask how Uzbek women live today. Once they were chattels, now they constitute 57 per cent of all the doctors in the republic and more than half the teachers. There are no illiterate women in Uzbekistan. The daughters and granddaughters of women who were deprived of all rights and whose first names in Uzbek mean unwanted, clumsy, unknown are happy wives and mothers, skilled specialists, people known—and respected—throughout the republic and the whole country.

TURKMENIA

The Turkmen Soviet Socialist Republic covers an area of almost 195,000 square miles and has a population of over two million. The capital is Ashkhabad. On the republic's vast expanses are three-mile-high mountains and depressions hundreds of feet below sea level, barren quicksands and wooded river valleys, canyons overgrown with subtropical thicket and the Caspian Sea, the world's largest salt lake. The Kara Kum Desert occupies 80 per cent of the total area.

For centuries the Turkmens lived in the Kara Kum, grazing livestock and tilling the oases. Almost completely illiterate and slaves to tribal tradition, they were outrageously exploited by local feudal lords and the czar's governors. Before the October 1917 Revolution they were divided into warring tribes having no national statehood.

Soviet power gave the Turkmens a new kind of life. Today the republic can stand with many advanced states. Turkmenia's natural wealth largely determines the pattern of its economy. It has rich deposits of oil, gas, mirabilite, sulfur and bentonite. Oil extraction has become the leading industry, producing 16 million tons of oil a year. Forty per cent of the USSR's output of sodium sulfate and much of its iodine and bromine come from Turkmenia. The republic's gas production is growing by leaps and bounds; the Central Asia-Center gas pipeline, one of the world's longest such carriers, distributes gas to the major industrial cities of the Soviet Union. Machine building, Turkmenia's newest industry, is making rapid progress. Recently built high-powered chemical factories are operating on natural gas and oil.

Berdy Kerbabayev, the Turkmenian writer, has said: "If you ask me what is new in the cultural life of the Turkmen people, the answer is: everything!" It is a fact that before the Revolution Turkmenia had no artists. Now it has painters, sculptors, art schools and fine arts museums. Turkmenian writing, which developed only after the Revolution, has revealed the striking and original beauty of the national poetry, prose and drama. Dramatic and musical theaters have been established; their repertoires include plays, operas and ballets of Turkmenian and Russian playwrights and composers as well as of those from other Soviet republics and abroad.

The Kara-Kum Canal now irrigates almost half the arable land of Turkmenia. It brings high yields of cotton, a good living for the republic's farmers. Construction of the canal began in the late 1940s. It now stretches for some 560 miles across the desert.

CANAL IN TH

Less than two per cent of the area of the Kara-Kum Desert, in the Turkmen Republic, is under cultivation. The long-term plan for one of the world's largest expanses of arid sand is to double or triple the size of the oases. The most that can be hoped for at this point is to cultivate eight per cent of the desert's over-all area—no more.

Even so, in the last half-century alone more has been accomplished in the Kara-Kum than in the thousands of years preceding the Revolution. Consider these figures: By the early twentieth century some

ESERT, 870 MILES LONG

By Lev Voskresensky

750,000 acres of Turkmenia had been irrigated. That was the sum total of thousands of years of labor. Compare that with the 1,300,000 acres irrigated in just the past 50 years. Another statistic: Half a century ago the annual cotton crop, the money crop of the region, was a few hundred tons; the 1973 harvest topped the million-ton mark.

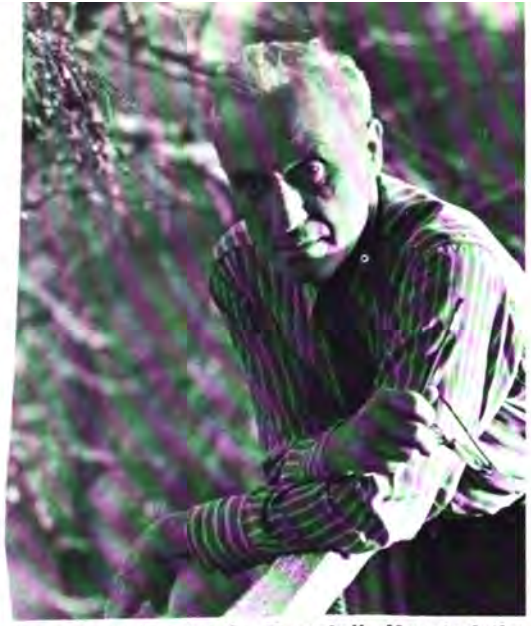
What happened in the last half-century to account for this tremendous progress? Nothing less than the birth and maturation of the Turkmen Soviet Socialist Republic.

The modern world took a long time getting to Turkmenia. Before the 1917 Socialist Revolution it was a land of nomads.

That time is past and so are the years when we looked upon cliffs and sands as dead and nonproductive, of no use to man except, perhaps, as picturesque landscape. The energy crisis has brought home to us something we tend to forget—that these torrid sands are responsible for the comfort and well-being of millions of people. Oil, gas, ores and cotton—that is what the world desert represents. Its development is one of the urgent tasks of our time.

DARVAZA is a settlement 170 miles from the nearest oasis, right in the heart of the Kara-Kum Desert. The last camel-drawn caravan came to Darvaza from Ashkhabad, the capital of the Turkmen Republic, in 1936. The trip took one month. A plane makes it in 48 minutes.

Three elderly Turkmen women were my fellow travelers. Without one glance out of the plane window, they settled back in their seats and fell asleep right away. Flying is an ordinary affair in this vast country



Georgian Konstantin Tsereteli directed the construction of 400 miles of the canal.

for people who live and work in the desert.

The first Soviet researcher to study the Kara-Kum was Dr. Alexander Fersman, a member of the Academy of Sciences, who headed an expedition that crossed the desert in 1929. Dr. Fersman at that time maintained the Kara-Kum was not a barren and lifeless desert that nothing could be done with. No, he said, it was an unacknowledged storehouse of natural treasures that could and should be developed. Now aviation supports that opinion in a very concrete way by charting roads for geologists and drillers.

If Turkmenia's oil- and gas-bearing regions were identified on the map, then practically the whole of the great desert, which is equal in size to Italy and Switzerland, would be covered with pins.

The gas deposits in the central part of the Kara-Kum are among the biggest in the Soviet Union. The first fountain of gas poured out near Darvaza in May 1959. In the early sixties no more than a radius of 30 to 40 miles had been surveyed. Ten years later it had expanded to 95 miles, and it is still growing. Today, over 16 million tons of oil and more than 600 billion cubic feet of natural gas are extracted every year in Turkmenia.

When I flew into Darvaza, I realized I was hopelessly late for the exotic scenery I had expected. Late by a few decades.

The restaurant offered me the usual three-course meal: borscht, goulash and coffee. The mineral water I drank came out of a refrigerator. The bread was from a nearby bakery. A street corner loudspeaker gave me the latest international news. There was a movie house if I was looking for an evening's entertainment. And, if I should need them, there were doctors, a drugstore and a hospital.

But what really makes you forget that you are in the heart of the desert is the school. The faces of familiar writers and poets look down from the walls of a long, cool corridor. The classrooms are spacious and full of light, and there is the usual collection of student newspapers posted on all the walls. The teachers are young, all with the little blue badge of the college or university graduate. The only thing that gives the Darvaza high school a different look from those of Moscow, the Baltic area or the Ukraine is the girls' dresses. The traditional brown uniform and white or black apron has not taken hold in Turkmenia. Schoolgirls here continue to wear their long national dresses of green or red silk in every shade. A little crowd of schoolgirls looks like something out of a festival, and it was probably the one exotic thing I came across in Turkmenia.

Naturally, I missed trees, and bushes and grass in the streets of the settlement. Not a single blade of green. Water is brought in by aircraft, and it would be terribly wasteful to use it for plants. They say it costs the state more than beer does, but it is sold here at four kopecks the bucket, more an appeal for economy than the actual value of the water.

The climate here is distinctly continental. It gets quite cold in winter although in summer the mercury goes up to 122 degrees in the shade, if you can find the shade. The temperature of the sand runs as high as 176 degrees.

Not at all an easy place to live in, especially for those who come from the oases or from the European part of the country.

And if there were no planes to bring the water, food and other necessities, if there were no cross-country vehicles to take you home for shelter from the storm, where you can make tea on a gas stove, read the latest paper in a room lit by electricity, if all those things didn't exist, it would be impossible to live here.

But they do. That is why, even 170 miles from the nearest oasis, there is no reason to feel lost in a wilderness or torn from civilization and normal living conditions.

It is obvious that the most important undertaking in the Turkmen desert is the construction of the Kara-Kum Canal. It will bring water to the arid foothills of southern Turkmenia by directing some of the overflow of the Amu Darya to the Murgab and Tedzhenskiy oases and then on to Ashkhabad, and after that on to the Caspian Sea. The Amu Darya flows from south to north toward the Aral Sea. The canal will become its artificial tributary, crossing the desert from east to west, a distance of 870 miles.

Large-scale construction began in 1954; by 1967 the canal reached Ashkhabad. It has passed the 560-mile mark.

How important the canal is for Turkmenia can be understood when you realize that at present practically half the republic's arable land is irrigated by the Amu Darya. Plans to enlarge the oases are primarily for the development of virgin lands along the Kara-Kum Canal.

The Moskva Collective Farm, in the Murgab oasis, is an example of what is going on in the region. Its name is a tribute to the Russian people and to the capital of the Union of Soviet Socialist Republics. Although people representing 36 nationalities of the USSR are working on the construction site, most numerous are the Russians. More than 200 Soviet towns are supplying the project with equipment and building materials.

When the Moskva Collective Farm got a sufficient supply of water, it increased the area sown to cotton. In 1958 that was some 3,500 acres. By last year the area had increased to 6,000 acres.

The man-made Khauz-Khan Reservoir of the canal, 11 miles long and 7.5 miles wide, is 50 miles west of the Murgab oasis. Irrigation work is going on there: building bridges, a collector-drainage network and roads. After that is completed, the land, ready to cultivate, is handed over to the collective farms of the Murgab oasis for their permanent use. This year the Moskva Collective Farm planted 7,500 acres of cotton in the Khauz-Khan area.

Thanks to the Kara-Kum Canal, the farm has increased the cotton area by almost four times—to 13,600 acres.

The achievements of Soviet Turkmenia so far are impressive, but judging by immediate expectations, they represent only the beginnings of the cultivation of the desert.

The Kara-Kum's mineral deposits have not been fully prospected.

Construction of the Kara-Kum Canal has not been completed.

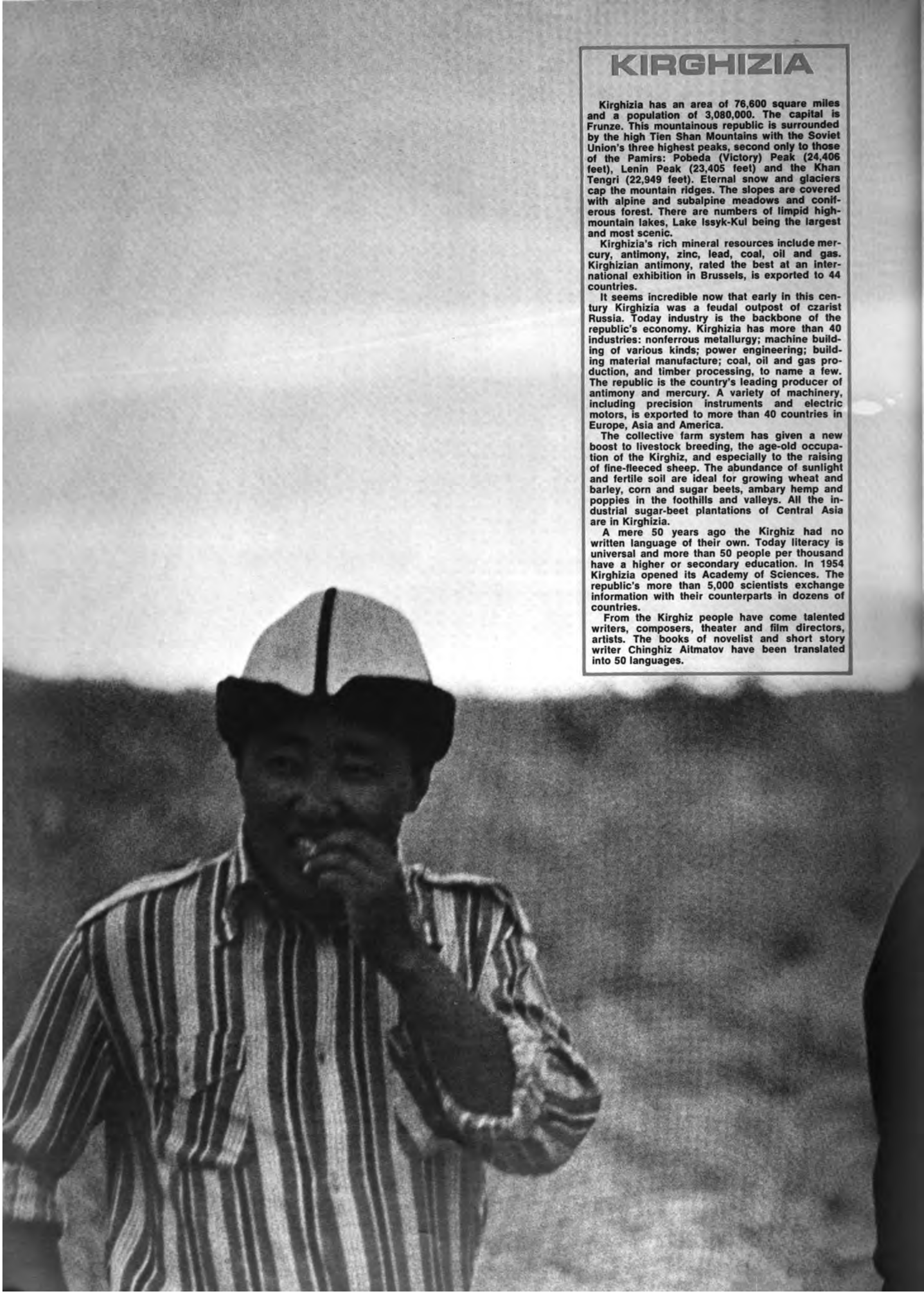
And all the virgin lands that the Amu Darya can irrigate have not been cultivated.

But people are working in the desert. And the most interesting discoveries are still to come.

Droughts no longer threaten the republic's sheep-raising industry. Below: The canal has changed even the types of recreation.

A Big Industrial Boom in the Making

Turkmenia has rich deposits of oil, gas, sulfur and other minerals. Its present oil output is 17.6 million tons a year. Machine building, its newest industry, is growing, and high-powered chemical plants have been built.



KIRGHIZIA

Kirghizia has an area of 76,600 square miles and a population of 3,080,000. The capital is Frunze. This mountainous republic is surrounded by the high Tien Shan Mountains with the Soviet Union's three highest peaks, second only to those of the Pamirs: Pobeda (Victory) Peak (24,406 feet), Lenin Peak (23,405 feet) and the Khan Tengri (22,949 feet). Eternal snow and glaciers cap the mountain ridges. The slopes are covered with alpine and subalpine meadows and coniferous forest. There are numbers of limpid high-mountain lakes, Lake Issyk-Kul being the largest and most scenic.

Kirghizia's rich mineral resources include mercury, antimony, zinc, lead, coal, oil and gas. Kirghizian antimony, rated the best at an international exhibition in Brussels, is exported to 44 countries.

It seems incredible now that early in this century Kirghizia was a feudal outpost of czarist Russia. Today industry is the backbone of the republic's economy. Kirghizia has more than 40 industries: nonferrous metallurgy; machine building of various kinds; power engineering; building material manufacture; coal, oil and gas production, and timber processing, to name a few. The republic is the country's leading producer of antimony and mercury. A variety of machinery, including precision instruments and electric motors, is exported to more than 40 countries in Europe, Asia and America.

The collective farm system has given a new boost to livestock breeding, the age-old occupation of the Kirghiz, and especially to the raising of fine-fleeced sheep. The abundance of sunlight and fertile soil are ideal for growing wheat and barley, corn and sugar beets, ambary hemp and poppies in the foothills and valleys. All the industrial sugar-beet plantations of Central Asia are in Kirghizia.

A mere 50 years ago the Kirghiz had no written language of their own. Today literacy is universal and more than 50 people per thousand have a higher or secondary education. In 1954 Kirghizia opened its Academy of Sciences. The republic's more than 5,000 scientists exchange information with their counterparts in dozens of countries.

From the Kirghiz people have come talented writers, composers, theater and film directors, artists. The books of novelist and short story writer Chinghiz Aitmatov have been translated into 50 languages.

Kirghiz director who makes Westerns with a distinctly Soviet flavor

NEW NAME IN FILM MAKING

SEVERAL YEARS AGO a documentary film about a Kirghiz folk singer won a top prize at the Oberhausen International Film Festival in the Federal Republic of Germany.

Manaschi was the graduation project of Bolot Shamshiev, student at the Moscow Institute of Cinematography. The 25-year-old Kirghiz director won out over many of the world's leading producers of documentary films.

Shamshiev's second work, *Shepherd,* another documentary, proved that his first success was no accident. It also won a prize, this time at the International Film Festival in Mannheim, West Germany.

His next picture, *A Shot on the Karash Pass,* was a feature film on the dramatic events of an uprising in 1916, when, in the Kazakh and Kirghiz steppe, the oppressed people's wrath could no longer be contained. The film brought him fame both at home and abroad. *A Shot on the Karash Pass* is impressive for historical authenticity, development of the characters, its psychological design and fascinating plot.

Viewers abroad have classified the movie as a Western.

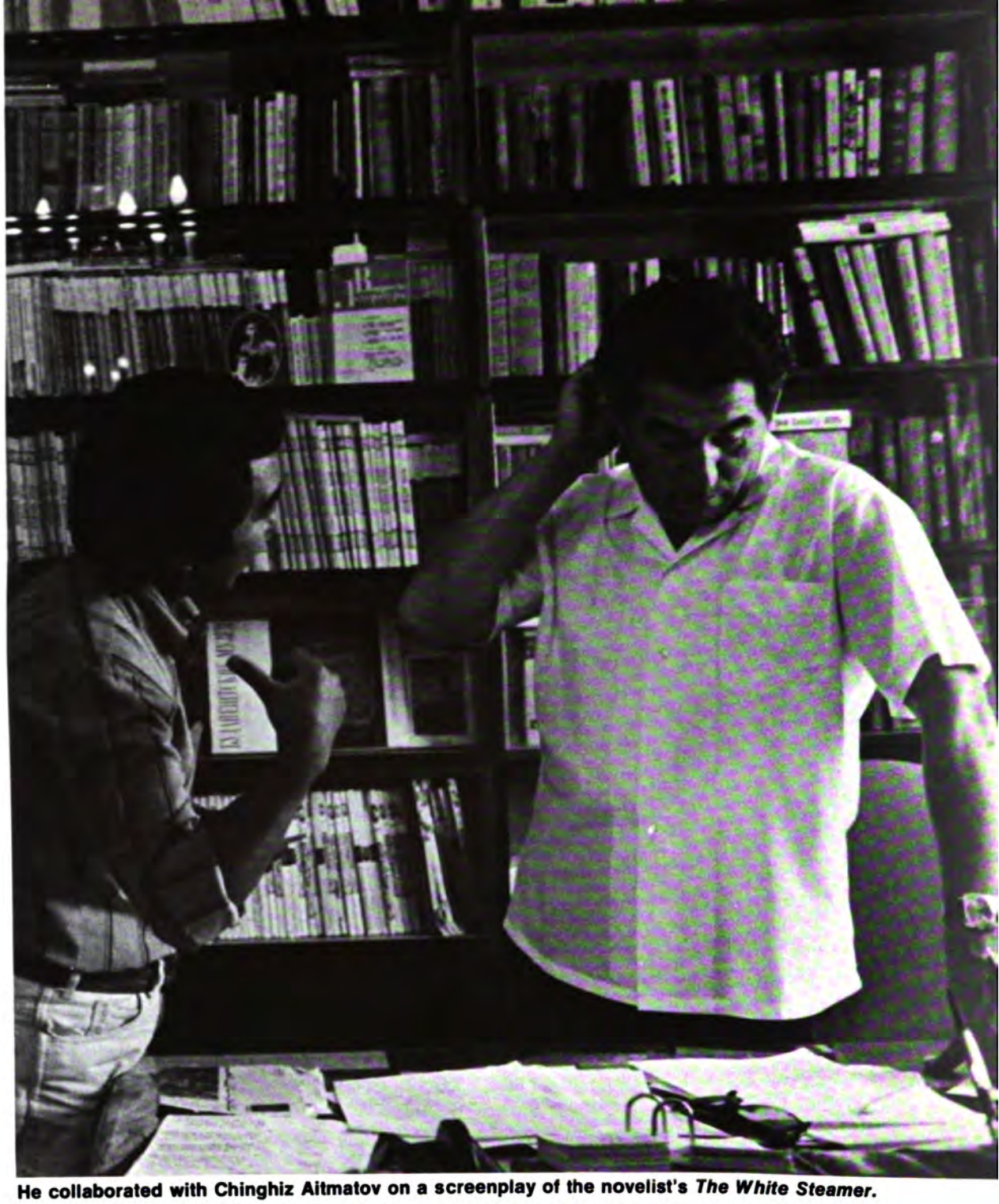
"A Western? Well, in some ways, yes," says Shamshiev. "It has a dynamic quality, with all the actors galloping about on horses and the shooting. I like Westerns, I think we ought to pick up the good features of the genre. The history of my people —they are horsemen—gives us good reason to do that. But we have to remember that

The first two movies young Bolot Shamshiev directed won prizes at international film festivals.

Kirghiz film making is no more than 20 years old.

The Kirghiz have always been famous for their horsemanship. Left: Shamshiev made a poetic documentary of shepherd Kumen Dzhamankulov and his family a few years ago.

Directing actress Sabira Kumushalieva. Shamshiev's first, highly successful, film efforts were as actor in *Heat*, adapted from a story by Chinghiz Aitmatov.



He collaborated with Chinghiz Aitmatov on a screenplay of the novelist's *The White Steamer.*

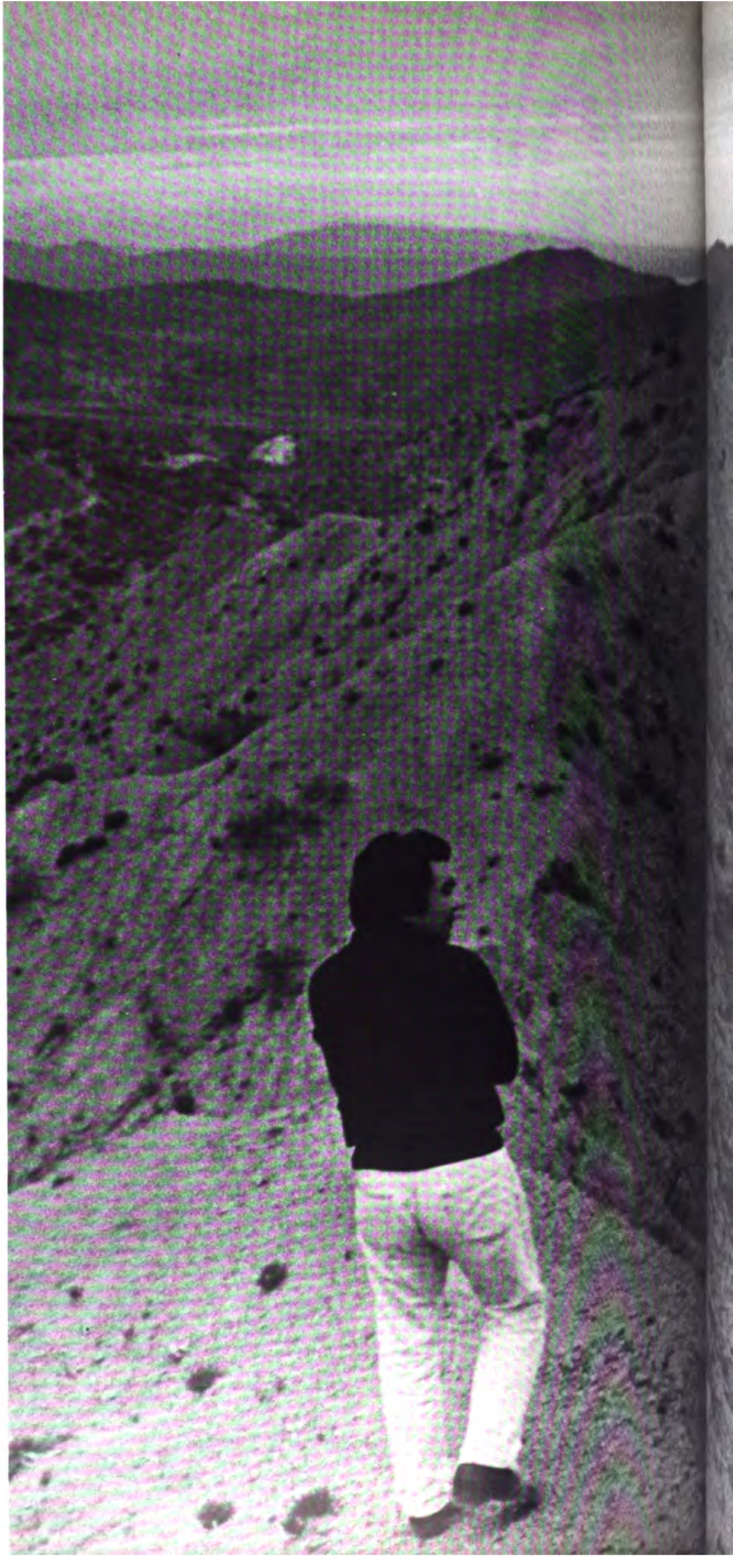
Shamshiev travels to the most remote parts of Kirghizia looking for authentic background.

an American Western is, after all, fiction, a story. And we watch good Westerns with enjoyment precisely because they are captivating tales. My picture, however, is sober, historical truth. Only superficially can it resemble a Western."

Some 20 years ago there was no Kirghiz film making to speak of. Today it is difficult to imagine Soviet cinema without such excellent Kirghiz studio productions as *Heat, The First Teacher, White Mountains, The Sky of Our Childhood, Mother's Field* and others.

"I think the late emergence of our film was lucky for us in a way," says Bolot. "We started when all of Soviet cinema had reached a very high level. I'm speaking not only of Russian, Urkrainian and Georgian films, with their rich experience and traditions, but also of the ones more recently produced in the Central Asian republics. So we had people to learn from and the concrete results of their experience."

Something else had a special effect upon the development of Kirghiz cinema. By the



The director looks over the terrain. Some of the scenes for the Aitmatov-Shamshiev film *The White Steamer* will be shot in these mountains.

time film in Kirghizia was taking its first, at times timid, steps, national belles-lettres, particularly prose, made undoubted headway. One must keep in mind that the Kirghiz people had no written literature, theater or fine arts before the October Revolution. The development of Kirghizia's film art to its present level is closely connected with the work of the best writers of the republic, particularly that of Chinghiz Aitmatov. The subtle characters, wealth of dramatic and tragic conflicts, as well as the lyricism of Aitmatov's books, all provide rich material for the screen.

Shamshiev had the good fortune to be able to draw from Aitmatov's wellspring at the beginning of his career. His first efforts were not as a director—he was an actor. When still at school, he was offered one of the leading roles in *Heat,* a film version of Aitmatov's story "Camel's Eye." He handled the role superbly.

Bolot, whose father is a writer and mother a doctor, was neither an especially "good" child nor an exceptional student. After high school he started working as a garage mechanic. But even then he was dreaming about films: script writing, the actors' craft, but, especially, the art and the role of the film director.

His latest picture is *Red Poppies of the Issyk-Kul.* This action picture is the story of an early twenties Red Army detachment. The soldiers hunted down a group of smugglers who grew opium poppies near Issyk-Kul Lake and tried to take the narcotics abroad.

Red Poppies of the Issyk-Kul was still being shot when Shamshiev started working on the plot of a new picture based on Aitmatov's novel *The White Steamer.* So the roads of the famous Kirghiz writer and the young film director have crossed again. This time Aitmatov and Shamshiev are collaborating on the script.

Around the Country

STUDYING THE FAUNA OF LAKE BAIKAL

The animal species of Lake Baikal are unique: Three-quarters of them are found only in this world's deepest lake.

The area is a gathering place for scientists. Presently researchers from the Limnological Institute of the Siberian Branch, USSR Academy of Sciences, are working there. They are studying specimens of the lake's fauna living at different depths. A special television installation lowered to the lake bed enables scientists to watch deepwater organisms in their natural habitat.

NOISELESS RACING

Everyone who has been to go-cart races knows that the noise of the hopped-up engines can be deafening. By replacing the two-stroke engine with an electric motor, the Kharkov Highway Institute in the Ukraine has produced a practically noiseless model. Its batteries last an hour and a half without recharging at speeds of over 30 miles an hour.

The noiseless engine permits indoor competition, and the simple driving techniques make the chart helpful in the initial training of automobile drivers.

AN ANCIENT SETTING FOR OPERA

People in the old Russian city of Yaroslavl saw an unusual performance of the opera *Prince Igor* staged outdoors. The Opera Theater of Kuibyshev (a big city in the Volga area) and the Yaroslav Historical and Architectural Museum decided to stage *Prince Igor* where the manuscript of the famous monument of ancient Russian literature, *The Lay of Igor's Host*, was found. Composer Alexander Borodin based his opera on the poem.

THE COMPOSER IS EIGHT YEARS OLD

Eight-year-old Asya Minosyan was a pleasant surprise for music lovers when she participated in a republic youth concert in Yerevan, capital of Armenia, and performed several of her own compositions for piano.

Asya was four when she wrote her first work. She has since composed a number of pieces, including sonatinas, dances and songs.

SUMMER COURSE IN RUSSIAN

This summer a special course in the Russian language was given to foreign teachers, students and specialists in various fields. It was arranged in Moscow by the Union of Soviet Societies for Friendship and Cultural Relations with Foreign Countries.

About 350 people arrived from Britain, Austria, Belgium, Italy, France, Scandinavia, Japan and other countries for the three-month course.

The students heard lectures on the history of the Russian language and literature, familiarized themselves with new methods of teaching and new audiovisual aids, went sightseeing in Moscow and visited literary and historical museums.

The popularity of the Russian language abroad continues to grow. Over 500 million people now know Russian, and it is being studied in 87 countries.

NEW RECREATION CENTER FOR CHILDREN

A children's education and health center has been planned for the Far East. It will cover 370 acres on the picturesque coast of the Amur estuary and accommodate 2,400 schoolchildren. Besides the dormitories, the plans call for a Young Pioneers' palace with an auditorium for films and concerts, a library, an exhibition hall, and an open-air theater that seats 2,500. Sports facilities will include playing fields, a swimming pool with showers, rooms, a solarium and a beach. The center will house campers in summer and provide combine

TCHAIKOVSKY COMPETITION

The Fifth International Tchaikovsky Competition, held in Moscow in June and July, brought together 281 young musicians from 37 countries. It was the first time that young people from the Arab Republic of Egypt, Panama, Ireland, Salvador and Iran took part in this most exacting competition.

The contest evoked worldwide interest, with many participants coming from the United States, France, Japan and Finland. The Soviet Union was represented by 40 entrants. The competition was held in three rounds, with those who took part in the third round performing to the accompaniment of leading Moscow orchestras.

Gold prizes went to cellist Boris Pergamenshchikov, singer Ivan Ponomarenko and pianist Andrei Gavrilov of the USSR. Second prizes went to pianist Myung Whun Chung (USA), cellist Ivan Monigetti (USSR), singers Stefanka Yevstatiyeva (Bulgaria), Sylvia Sass and Kolos Kovacs (Hungary), violinists Eugene Fodor (USA) and Ruben Agaronyan (USSR).

PAPER OUT OF STONE

The Ukrainian Research Institute of the Pulp and Paper Industry has found an unusual raw material for paper: stone. Basalt is melted to produce the fibers. The paper will be used in branches of industry where a high resistance to heat is required. It does not burn till it reaches a temperature of 800 degrees centigrade, is not affected by microorganisms and does not rot.

STONE AGE SETTLEMENT

Kirghiz archeologists have determined that valleys of the Tien Shan were settled some 20,000 years ago. In the Baratash-Unkur Cave of the Ketmen-Tyube

The ancient belfry, fortress walls and towers served as the setting. Obviously the old Russian architects were familiar with acoustics: the voices and the orchestra come through strong and clear.

A RARE MEDAL

It took years for Sevastopol citizen Nikolai Grandmerzon to gather his collection of medals. One of them is very rare. Engraved on one side is "Sevastopol, 1853-1854." On the other side is an inscription in English: "To American Colleagues from Grateful Doctors in Memory of Joint Work and Privation."

What does it signify? During the Crimean War (1853-1856), fought by Russia against the allied forces of Britain, France, Turkey and Sardinia, progressive American organizations sent their doctors to the Black Sea port of Sevastopol to help wounded Russian soldiers and sailors. Working at hospitals of the besieged city, the Americans earned the respect and admiration of its heroic defenders.

MINIATURES EXHIBIT

An exhibition called World of Wonders has opened in the Polytechnic Museum in Moscow. Its displays include such tiny handmade articles as an electric motor the size of a dust particle, a lock 50,000 times smaller than a poppy seed, and the world's smallest mosaic globe and smallest book.

Pyotr Maslyuk, a music teacher in Zhmerinka (the Ukraine), displays a train with 20 freight cars, which can be seen only under a microscope. Nine-tenths of a millimeter long, it can pass through a tunnel the diameter of a human hair. Another of Maslyuk's creations is a tractor with two trailers on a cross section of a hair. About 750 such tractors can fit in an area of one square millimeter.

Ashot Kazaryan, conductor of the Yerevan Symphony Orchestra (Armenia), exhibits a sculpture of the legendary Armenian hero, David of Sasun, on horseback. It is an exact replica, a twenty-fifth of a millimeter tall, of the one erected in his native city.

AIR MOVES OIL DERRICKS

A remarkable sight indeed: a huge oil derrick moved to a new spot in 20 to 30 minutes without tractors. It's an everyday occurrence in the rich oilfields of Tyumen, Western Siberia.

Ordinarily it takes 1.5 work shifts and seven or eight tractors to do the job. In the method worked out by a group of engineers from the derrick-erection office in Tyumen, the work of tractors is done by special pneumatic hoists that smoothly shift a 200-ton derrick.

TURBINES FOR A POWER PLANT

The Toktogul Hydroelectric Power Station on the Naryn River, in the mountains of Kirghizia, is one of the largest construction projects of Central Asia. It is notable for many technical innovations, among them its turbines.

First, they are the country's most powerful radialaxial units (360,000 kilowatts each). Second, for the first time in Soviet power-machine building the stators of these turbines have been made without machining. Third, the rotors are fashioned of stainless steel —also for the first time. The rotors are assembled and welded on the construction site round the clock to prevent the metal, heated to 300 degrees centigrade, from cooling. These rotors will have the world's highest efficiency, 95.5 per cent.

study and recreation facilities in fall and winter.

NATURE PRESERVE IN THE SEA

The northern part of the Caspian Sea is to be declared a nature preserve for rare fish and sea animals. This zone is the best in the Caspian Sea for spawning and breeding valuable fish varieties.

Among the activities prohibited there are the discharge of dirty drainage water, the use of explosives, canal damming, the construction of new water-consuming plants and the expansion of those presently operating, timber rafting and the building of hydrotechnical structures, with the exception of those needed for fish breeding.

VEGETABLE GARDEN IN THE WHITE SEA

In the Dolgaya Bay of the White Sea, 100 miles beyond the polar circle, is an unusual vegetable garden. A valuable variety of algae used for cattle feed is grown here. The sea plantation, on an area of 110,000 square feet, is man-made. It was created on the initiative of Kseniya Gemp, who is in charge of a laboratory at the Polar Research Institute.

Three other plantations like it are projected for the White Sea area.

BROTHER FOUND THROUGH NEWSPAPER

During World War II, the Soviet steamer *Byelorussia* was torpedoed by an enemy submarine. Only a few people survived.

Thirty years after the ship was sunk, a group of war veterans, former members of the *Byelorussia* crew, held a reunion, and a photograph of them was published in a Vladivostok newspaper.

Taxi driver Nikolai Pechorin bought a copy of the newspaper and saw the photograph. It struck him that the veteran identified as Yakov Pochernin resembled his brother. The initials were the same although the surname was spelled differently. Nikolai Pechorin visited the editors of the newspaper, and a few hours later he was embracing his brother Yakov! The two met after a separation of over 40 years.

How did the brothers get different surnames? While Yakov was serving in the merchant fleet, the brothers were orphaned and Nikolai, the younger of the two, was taken to a children's home where his name was spelled Pechorin.

"The newspaper gave my brother back to me!" says Nikolai.

FILM CENTER FOR MOSCOW

Construction of a national film research center has started in Moscow. The new complex includes an auditorium for film showings and lectures that seats 800, a foyer, restaurant, film museum, library and research department. There will be three preview halls seating 200, 75 and 20. Films will be delivered from the depositories by conveyor. The center will have experimental laboratories for printing still pictures and films, as well as a printshop.

Valley, they found stone knives and other household utensils dating back to the Upper Paleolithic age. Excavations in the area are continuing.

WOODLAND SCHOOL

The Koze-Lyukati School is located in a pine grove on the bank of the Pirita River, not far from Tallinn, capital of the Estonian Republic. This is one of the republic's seven special health schools: Youngsters with respiratory diseases are sent here on the doctor's recommendation. Board and tuition are free.

The schoolday begins with morning exercise and breakfast, then the children attend classes and rest. When the weather permits, they go for a walk each morning to breathe the fresh air fragrant with pine. The school emphasizes natural therapeutic methods, including a strict daily regimen and a diet rich in vitamins.

HEALTH RESORT IN THE MOUNTAINS

Lake Issyk-Kul, 5,193 feet above sea level in the Tien Shan Mountains of Kirghizia, is a resort area. Its 46 boarding houses, 11 sanatoriums, 69 hotels, 32 children's camps and nine tourist centers can accommodate as many as 200,000 people.

This year a new tourist camp for 100 people was opened on the shore of the lake. It consists of felt tents similar to the ones used long ago by the nomadic cattle breeders of the steppes. Most tourists prefer these tents to cottages because they are cooler on very hot days. Several such camps are to be built on the shore of Issyk-Kul.

AN EVEREST OF SALT

In the Manych Depression near the Caspian Sea is an enormous underground hill of salt, taller than Mount Everest: the Chelkar salt dome. Scientists from the Kazakh Academy of Sciences have spent 15 years studying it. They found that the dome is more than 300 million years old and contains billions of tons of rock salt, magnesium, iodine and other valuable raw materials for the chemical industry.

DAMS OUT OF FABRIC

Many of the country's collective and state farms have to build dams and reservoirs on small rivers for their own needs. Not every farm can afford to use concrete for such construction. Engineers have therefore designed a "soft" (inflatable) dam made of synthetic rubber. Though these dams are small, they are very sturdy. Thus, the inflatable dam built across a small river near Rostov-on-Don, the Russian Federation, is 75 feet wide and can withstand the pressure of 16 feet of water. Another dam on the Chermoz River is 130 feet wide.

CHICHAGOV COAST

The coastal strip of the Taimyr Peninsula from Dickson Island to Cape Vkhodnoy is to be named for Pyotr Chichagov. Copies of documents received from the National Library in Paris have confirmed that in 1725-1730 he was the first Russian traveler to do topographic surveys of the coast and map its outline.

With one-tenth of the world's population, the member countries of the Council for Mutual Economic Assistance account for one-quarter of its total national income and one-third of its industrial output. Their economies are developing at a high and steady rate.

In CMEA's 25 years, the cooperation of its member countries has gone through several stages, each with its specific tasks and forms and methods of work. From relatively narrow areas—initially in the spheres of trade, technical and economic cooperation and scientific and technical exchange—they have moved on to increasingly effective coordination of plans and broader economic collaboration.

In the first stage of development the Soviet Union gave its partners in CMEA considerable support and assistance, particularly in building up their heavy industry, in constructing ferrous and nonferrous metal mills, oil refineries, petrochemical plants, machine-building plants, power projects and other enterprises, and in equipping them with modern machinery.

Its CMEA partners, in turn, have supplied the Soviet Union with equipment for various industries, particularly the chemical, built ships for it, invested in the development of Soviet raw material and fuel resources, and supplied a number of commodities which are very popular with Soviet consumers.

Such joint undertakings as the Mir (Peace) Power Grid, the Druzhba (Friendship) Oil Pipeline, the Freight Truck Pool and a number of international specialized organizations—the International Bank of Economic Cooperation and the International Investment Bank—was another stage.

A major landmark in cooperation was the long-term Comprehensive Program of Socialist Economic Integration adopted in 1971. The program touches all important areas of economic relations of the socialist community: science and technology, trade, currency and finance, and diverse aspects of treaty and legal relations.

The necessity for such a program of cooperation is very clear. For instance, the need for oil, gas, iron ore, ferrous and nonferrous metals and electrical energy has increased so much and is growing so fast that only multilateral efforts of the countries concerned can develop the essential production capacities and transport facilities. That is why the CMEA countries are considering the joint construction of a number of large enterprises in the extractive industries.

Another problem, no less important, is to meet the needs of CMEA countries for high-capacity equipment and modern machinery. Already established are Interatomenergo (cooperation in production, delivery of equipment and provision of technical assistance in the construction of atomic power stations), Intertextilmach (manufacture of technological equipment for the textile industry) and Interatominstrument (production of nuclear instruments).

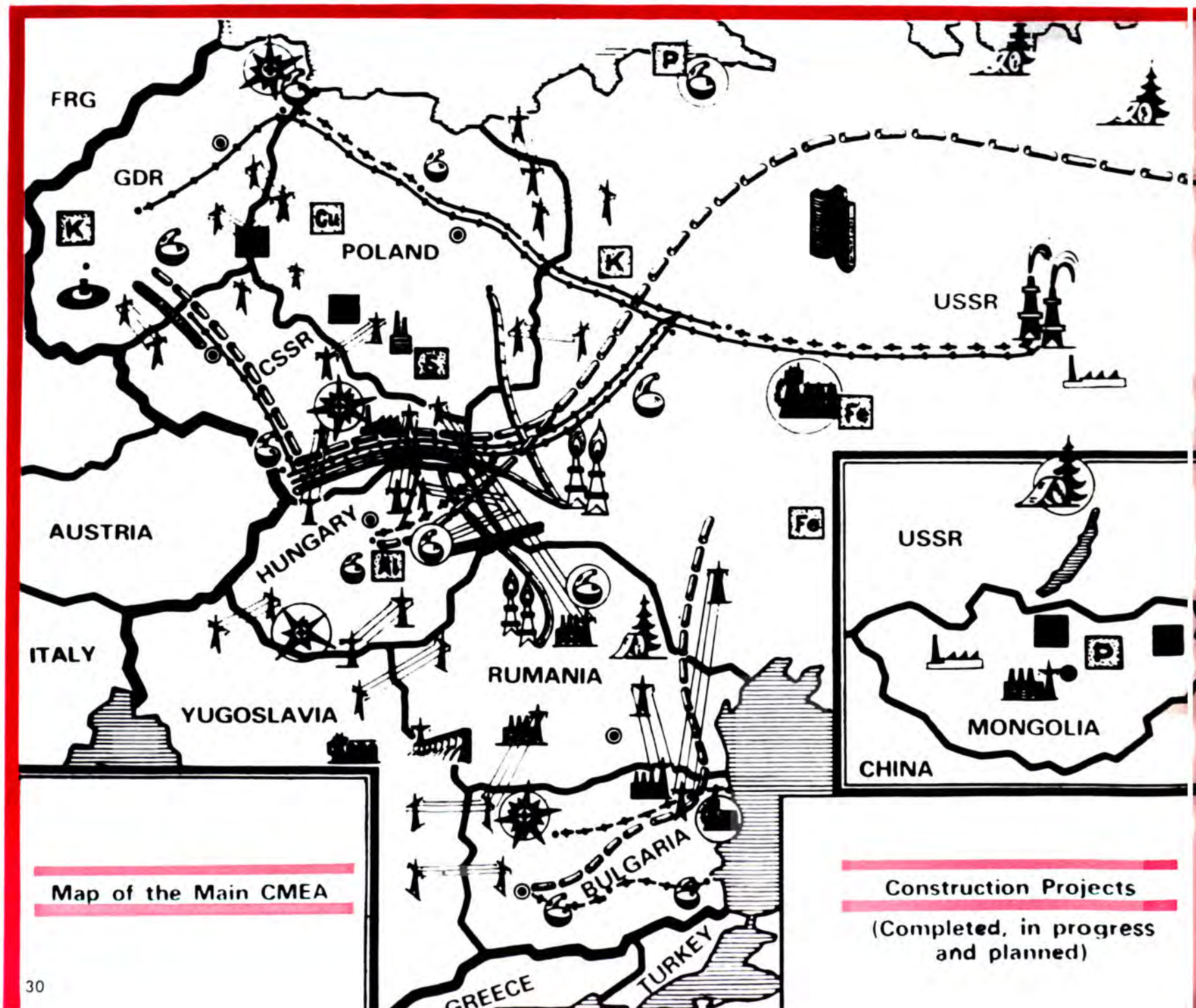
All these efforts directed toward greater integration have moved the CMEA into its present stage: the drive to complete coordination of their economic plans for 1976 to 1980.

Courtesy of *Novoye Vremya*

25 YEARS OF COOPERATION

CMEA

DEPUTY PREMIER
MIKHAIL LESECHKO
Permanent USSR
Representative to the CMEA



Map of the Main CMEA Construction Projects (Completed, in progress and planned)

By Ivan Laponogov

IT IS three decades since those memorable days when the war in Europe ended and the liberated peoples of a number of countries chose socialism for their future course of development.

The paths Poland, Czechoslovakia, Hungary, Yugoslavia, Bulgaria and Rumania took were not quite the same. But then, neither were these countries.

All those years ago Henri Barbusse called Bulgaria a "country of feudal backwardness" and Rumania "the most dreadful of Dante circles of the Balkan hell." The West German journal *Der Spiegel* carried a more recent evaluation in the travel notes by sculptor Franz Weidel of his tourist trip around the Danube countries. "For those who lived in the East European countries before the war and saw the crowds of ragged, inveterate drunkards, what has occurred there over the past years is a genuine miracle."

The cooperation within the framework of the Council for Mutual Economic Assistance set up in 1949 has given an enormous boost to the industrial growth and living standard of its member states. Between 1950 and 1972 the industrial output of the CMEA countries increased eightfold, the developed capitalist countries only threefold. As compared with 1950, the national income of the CMEA countries had grown by a multiple of 5.7 by 1973, the developed capitalist countries by a multiple of only 2.8.

But that is not the only evidence of the growing economic strength of the socialist community. The gradual drawing closer and evening out of the levels of economic development is a continuing process. As stipulated by the Comprehensive Program, it is proceeding along two closely connected lines: maximum mobilization of the internal resources and efforts of each CMEA country, and a greater degree of international socialist division of labor. While a quarter of a century ago the CMEA countries were predominantly agro-industrial and agrarian, they now receive the greater part of their national income from industry.

The London paper *The Observer* wrote that before 1945 such countries as Rumania, Bulgaria and Hungary were producing agricultural goods and raw materials and selling them to the industrially developed countries of the West but that after the war the East European countries set up their own heavy industry. The present economic situation compels Western businessmen to look at the East in a different way. Suddenly the socialist states have become attractive. Today they are rescuing a Western capitalism that is suffering from inflation, the newspaper declared.

The Comprehensive Program of Socialist Economic Integration was adopted in July 1971. The following year the Council for Mutual Economic Assistance stated: Coordination of the national economic development plans of the socialist countries makes it already possible to see the outlines of the grand development program of the community of nations with a total population of 382 million. There is every reason to believe that in some 15 to 20 years these countries will constitute one of the most highly developed industrial areas in the world.

There is a large colored map at CMEA headquarters in Moscow charting the collective effort of the member states of this international organization. Two trans-European trunklines—the Druzhba Oil Pipeline and the Bratstvo (Fraternity) Gas Pipeline—extend across the whole map from east to west, now approaching, now crossing each other. With their help the CMEA countries are successfully solving that most current and pressing of problems: fuel and power engineering.

The controller's office of the Druzhba Oil Pipeline is located in Moscow, next to the multistory Rossiya Hotel. Prompt communication is maintained around the clock with all the most important points of the oil main, which extends for over 2,800 miles—from the Volga shores across the territory of five countries: the Soviet Union, the German Democratic Republic, Poland, Czechoslovakia and Hungary. The decision to build the oil pipeline was made in 1958. As it extended from the Byelorussian town of Mozyr to the northwest, beyond the territory of the Soviet Union, big industrial chemical centers were set up in the CMEA countries.

Over 270 million tons of oil have been carried by the Druzhba pipeline since it went into operation. Now the second stage of the pipeline is being built, like the first one, with the technical and financial assistance of all the countries involved. The sources of this mighty oil river have been augmented. Not only oil from the Volga area but also oil from Siberia now flows through the Druzhba pipes. The stream has almost doubled in volume.

Raw material for the chemical industry and cheap fuel reach the socialist countries through the Bratstvo and East-West gas pipelines. Most CMEA countries do not have their own resources of natural gas and can therefore improve their fuel and power engineering balance only with the aid of the Soviet Union, making use of its colossal reserves of valuable raw material.

The Mir Power Grid enables the socialist countries to make mutual deliveries of electrical power that increase in volume with every passing year. The countries using the power grid are located in different time zones, and their peak hours in energy consumption do not coincide. The Mir grid makes it possible to coordinate the flow of energy at different times of the day. It also makes allowance for situations where one or another country requires an additional supply of electrical energy not provided for by the plan.

Such a situation occurred, for instance, in the winter of 1971 when snowdrifts closed the opencast coal mines in Poland and Czechoslovakia. The Soviet Union sent these countries an additional 17 million kilowatt-hours.

The joint work of the united power grids has proved so effective that there is practically no one in the CMEA countries who advocates isolated work of national power grids.

The headquarters of Intermetal, the international organization for cooperation in iron and steel production, is located in Budapest. Its members are Bulgaria, Hungary, the GDR, Poland, the Soviet Union and Czechoslovakia; Yugoslavia and Rumania are cooperating with it.

Intermetal was set up in 1964. Its importance has grown with the general surge forward of the CMEA countries' metallurgical industry. The smelting of steel in the CMEA region has multiplied by 4.5 times in the past two decades, and its share in the world balance has gone up from 18.9 per cent in 1950 to 28.1 per cent in 1971. The progress is largely a product of CMEA cooperation. It includes joint elaboration of projects, the construction of metallurgical enterprises, exchange of raw material supplies and manufactured goods.

A special role in the work of Intermetal is played by the Soviet Union, with its highly developed industry, rich natural resources and experienced personnel. More than 40 metallurgical complexes and big plants have been or are being built in CMEA countries with the assistance of the Soviet Union. Now preparations are under way for the joint construction by the interested socialist states of a gigantic metallurgical complex around the Kursk Magnetic Anomaly, the huge iron ore deposit in the Soviet Union. Its rated capacity is 10 million to 12 million tons of steel a year.

More than 20 specialized agencies are operating within the CMEA framework. Their goal is to stimulate socialist integration in every possible way. The CMEA International Investment Bank, set up in the early seventies, has the same function. It finances the construction of big industrial projects in which all the CMEA countries or a number of them are interested. In its first two years of operation the bank granted credits for the construction and reconstruction of 26 projects amounting to a total of some 280 million transferable rubles.

The experience gathered by the CMEA countries shows beyond all doubt that under socialism inter-state specialization and cooperation accelerates the comprehensive economic development of the individual countries.

Mines and quarries

Iron and steel industries

Nonferrous metals industry

Chemical and petrochemical industry

Enterprises of the pulp and paper industry

Enterprises of the light industry

Oil pipe lines already in operation

Oil pipelines under construction or planned

Heat and power plants

Atomic power stations

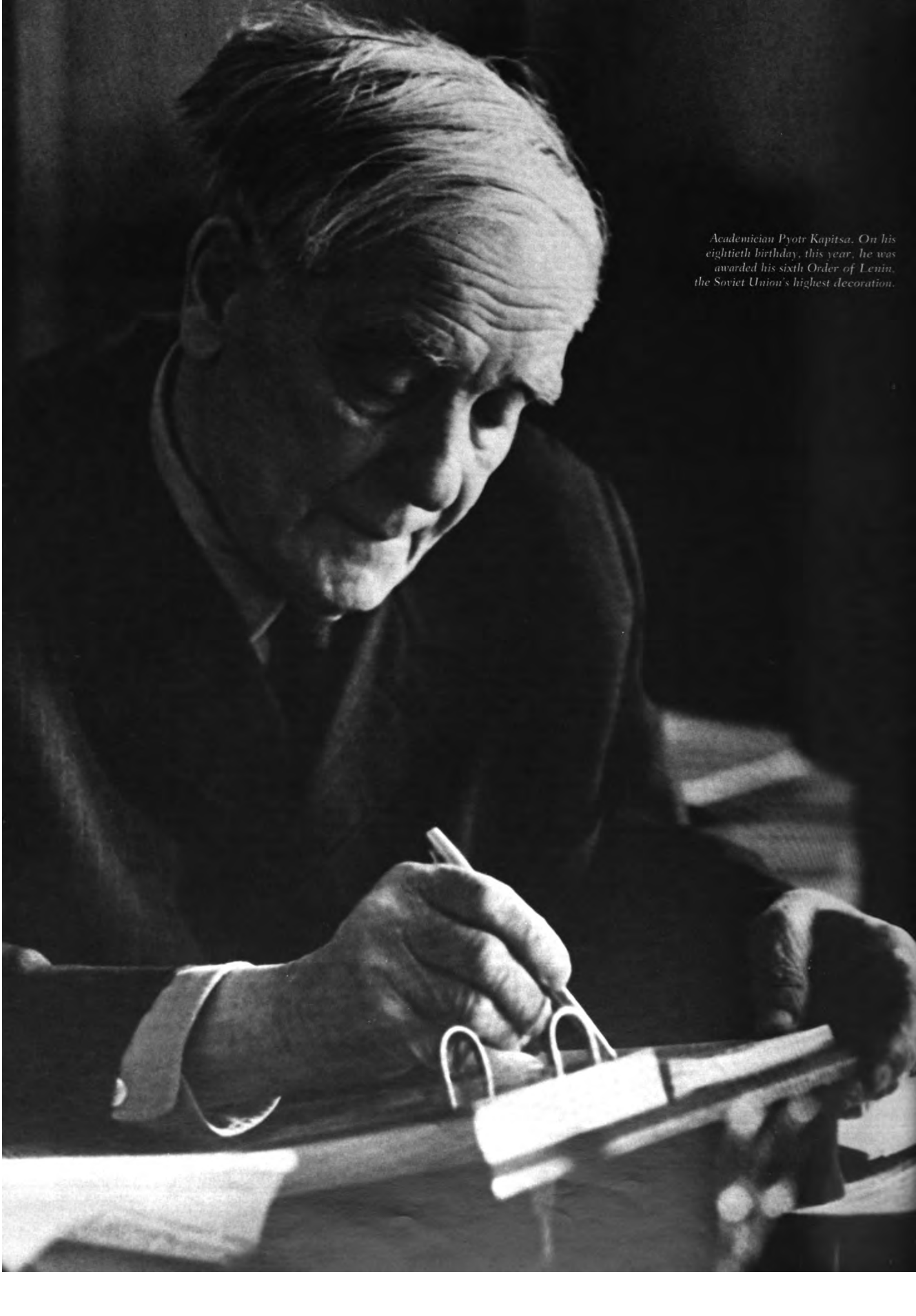
Power transmission lines

Ethylene pipelines

Projects construction or planned

Gas pipelines already in operation

Gas pipelines under construction or planned



Academician Pyotr Kapitsa. On his eightieth birthday, this year, he was awarded his sixth Order of Lenin, the Soviet Union's highest decoration.

«CENTAUR», a disciple of «CROCODILE»

By Leonid Maksimov
Candidate of Science
(Engineering)

Photographs by
Nikolai Lavrentyev

MEMBER OF the USSR Academy of Sciences, fellow of the British Royal Society, honorary member of the Royal Danish Academy of Sciences and Letters, honorary member of the Indian Academy of Sciences, member of Trinity College, member of the Cambridge Philosophical Society, fellow of the American Physical Society, honorary member of the British Institute of Metals, honorary doctor of the Sorbonne and the University of Oslo, honorary member . . . and so on and on and on.

Were it necessary for this man to introduce himself in that formal fashion, the list of titles would be much longer. But the name Pyotr Kapitsa is, in fact, sufficient introduction. There are not many names in physics that rank with his.

Kapitsa entered that area of science at a difficult period in its development. At the close of the nineteenth, and even in the early twentieth century, it seemed to many that physics was a finished science. Finished in the sense that, say, arithmetic is finished: All its laws had been established, all its phenomena investigated. There was little left to do, just to refine a definition or two. From then on, to solve problems, all that would be required would be the appropriate figures to substitute for the formulas that had been evolved. Einstein's first work on the theory of relativity had just appeared, and almost no one yet realized that this marked the beginning of a revolution in physics. It was before Ernest Rutherford had proposed his planetary model, and Niels Bohr had not yet formulated his quantum theory.

There were few among the young who were interested in devoting their lives to physics, especially since the star of aviation was emerging, glowing so much more brightly, powerful superdreadnoughts were being built, canals dug and transatlantic cables laid.

In Russia there were perhaps no more than a hundred professional physicists at the time. Nevertheless, Pyotr Kapitsa, the son of an eminent military engineer, builder of the world-famous Kronstadt Fortress, made physics his discipline: first in technical high school and then as a student in the Electromechanical Department of the St. Petersburg Polytechnic Institute, named after Peter the Great and probably the best of the technical schools in Russia.

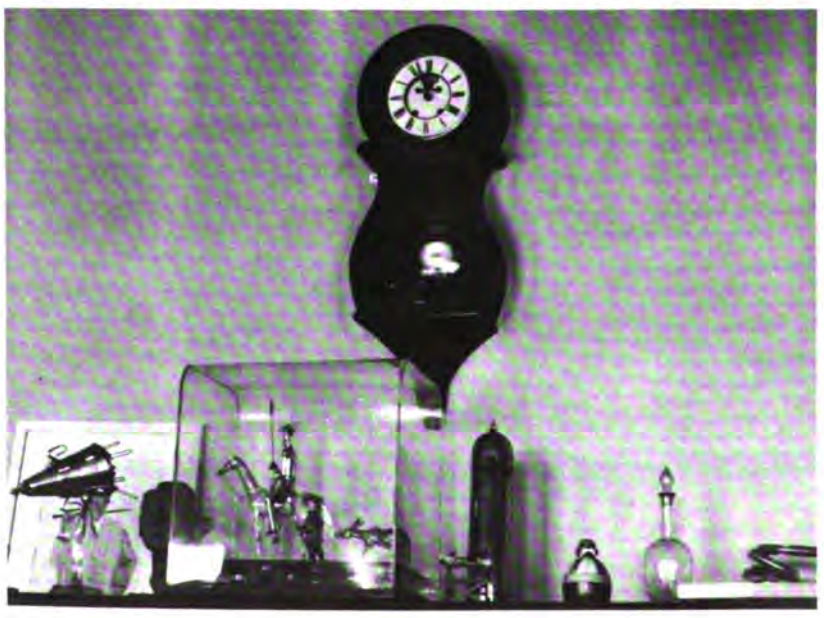
The guiding principle at the institute was that physics should be learned not by ear—at lectures—but by touch—in laboratories, in independent experimental work. The seeds of that approach were sown by eminent scientists like chemist Dmitri Mendeleyev; Dmitri Chernov, outstanding metallurgist; Alexander Popov, physicist and electrical engineer, and other professors of the institute. Kapitsa had the guidance of such institute instructors as Alexei Krylov, a leading mechanical engineer and naval architect; Mikhail Shatelen, a distinguished electrical engineer; and the celebrated physicist Abram Ioffe, who became student Kapitsa's first research adviser.

Even then, in Pyotr's first independent work as a student, an individual and characteristic quality was exhibited. Lev Landau said, many years later: "Kapitsa has inexhaustible curiosity multiplied by boundless inventiveness." For example, Kapitsa needed some very fine quartz thread for precision measurement. No one could figure out how to make it so he suggested his own method. Soft velvet was laid on the floor of a long narrow corridor. A toy bow and arrow served as the tool. The point of the arrow was dipped in melted quartz and shot down the corridor. In the arrow's wake a fine quartz thread extended and dropped smoothly onto the velvet—exactly what he needed.

But the most wonderful thread spun in those days was the one of mutual respect and friendship that bound together such different and at the same time congenial people as Abram Ioffe and his pupils, men who later became world famous—Lukirsky, Frenkel, Semenov, Kapitsa. Despite the cold and deprivations of those years—the World War I period and after—despite the lack of the most essential laboratory equipment, physicists in Petrograd, isolated from the entire scientific world by the blockade, performed research of the highest level.

As early as 1920 Kapitsa and Semenov suggested passing a stream of ferric vapor between the poles of a powerful magnet. The atoms, revolving in different directions, would, under those conditions, declinate in the magnetic field differently. This would

A corner of his study. There are not many names in physics that rank with Kapitsa's. His research capacity has not diminished with the years.



make it possible to determine one of the major characteristics of atoms—their magnetic moments. Too much time, unfortunately, was needed in those days to prepare and conduct such an experiment in Petrograd. The first to do it, a year later, were Otto Stern and Walther Gerlach in Rostock. But no one now had any doubt that topnotch physicists were maturing under Ioffe.

That was why, when on Lenin's instructions, the most prominent and authoritative scientists were to be sent abroad in 1921 to reestablish scientific contacts, academicians Ioffe and Krylov and 27-year-old Kapitsa were chosen to go.

The most incredible rumors were afloat in England then about Soviet Russia. So much the greater was the interest with which the young Russian physicist was received at the world-famous Cavendish Laboratory, where Ernest Rutherford, founder of experimental nuclear physics, was conducting his research. And that interest was rewarded. Kapitsa set an almost incomprehensible record: He completed the laboratory's practical training course in physics in two weeks instead of the usual two years. After that Rutherford took a personal interest in him.

Kapitsa became Rutherford's acknowledged favorite. They had much in common—the direction of their research, clarity and keenness of judgment, a passion for argument, imagination unbounded and complete dedication to physics.

Under Rutherford, Pyotr Kapitsa began to study the properties of the then mysterious alpha particles. For this he needed very powerful electromagnets. We are accustomed today to physical equipment weighing hundreds and thousands of tons, the synchrophasotron or the nuclear reactor, for instance. But in those days most scientists managed with apparatus that could fit on a desk or, at most, into a small room.

Kapitsa boldly began to batter down this tradition. Many years later Norbert Wiener said: "But there was one very expensive laboratory in Cambridge that had all the latest equipment. I am referring to Russian physicist Kapitsa's laboratory. He designed special high-power generators. . . . Wires hissed and crackled like angered snakes. . . . Kapitsa was a pioneer in the creation of plant laboratories with high-power equipment." Wiener didn't tell—or know—the whole story. The wires didn't simply hiss and crackle. Unable to stand the superload, magnets flew to bits, smashing everything around them and chopping holes in the walls.

Kapitsa, with his characteristic humor, wrote to Rutherford, who was vacationing in Cairo: "I want to tell you that we have already . . . managed to develop a field of over 270,000 gauss. We couldn't go further because the coil, unable to stand it, went to pieces with an awful roar, which would probably have amused you greatly. . . . The power in the circuit was 13,500 kilowatts, approximately the capacity of three Cambridge city electric stations. . . . Now we know what a 13,000-ampere arc looks like."

But he kept on, developing for several hundredth fractions of a second fields that have not yet been surpassed.

These two sketches were among the many made by his colleagues for the birthday album they prepared for him.

With the unique superpowerful magnets and apparatus he created, Kapitsa could conduct experiments that were beyond the powers of any other physicist in the world. That was also why he was able to do a successful study of the changes of metal resistivity in a powerful magnetic field and get a paradoxical result.

Kapitsa has often said that an experimenter should do experiments that drive theoreticians crazy. That was the case with metal resistivity. He established the existence of a linear increase of metal resistivity (this is true for most metals) with the increase of the magnetic field. For 30 years this linear principle of Kapitsa's did not fit into any theory and as late as 1957 was looked upon as glaring proof of the contradiction between theory and experiment. Only recently have theorists been able to reconcile the contradiction, to Kapitsa's no small pleasure.

His brilliant studies were much admired by English colleagues. As early as 1923 the degree of Doctor of Philosophy of Cambridge University was conferred upon him. That same year he was awarded the Maxwell Prize, one of the most coveted in the scientific world. And in another five years he was elected to the Royal Society, which is the British academy of sciences. Russian physicist Pyotr Kapitsa was the first foreigner in 200 years to be so honored!

But the highest recognition of his scientific services came when Lord Rutherford made him his assistant and put the best equipped laboratory—the Mond—at his disposal. At its opening in February 1933 Kapitsa permitted himself what he believes to be the boldest joke in his life. On the façade of the laboratory the venerable and eminent guests saw the depiction of a crocodile. Kapitsa explained: "That's the crocodile of science. A crocodile cannot turn its head. Like science it has to keep advancing with a wide-open all-devouring maw."

Both the picture and the explanation carried a double meaning: Rutherford had long had the nickname crocodile. He was aware of it and not especially enthusiastic about it. Rutherford was a quick-tempered man, so it was hard to anticipate what his reaction would be to the joke. But his sense of humor prevailed.

A year later Kapitsa left for his native country. The Soviet Government offered Cambridge University the substantial sum of 30,000 pounds sterling for the equipment of the Mond Laboratory. But so much effort and ingenuity had gone into its making. It was considered the pride of Cambridge, giving the university indisputable advantages over all other scientific centers. The administration wavered. And much, if not everything, depended on Rutherford, who had a positive veneration for apparatus and experimental installations. The slightest malfunction or carelessness in handling brought out such rounded oaths that the brick walls of neighboring buildings blushed. But this time he declared: "These machines can't work without Kapitsa. And Kapitsa can't work without them." He persuaded the university to turn over the equipment to the Soviet Union.

The Institute of Physical Problems, personally blueprinted by Kapitsa, was erected beyond the Neskuchny Sad (Banish Boredom Garden) in what was then the outskirts of Moscow, and Kapitsa was appointed director. This was not Cambridge, but the spirit prevailing there was the spirit of the institute. Kapitsa himself said it best. He announced that every worker at the institute, regardless of office and title, should believe his work to be the most important and insist that "if the management did not understand that, then it didn't understand anything and had only itself to blame."

At the new establishment, Kapitsa concentrated on extremely low temperatures. He was not jumping from one extreme to another (from superhigh fields to superlow temperatures), as might appear to a layman. The point is that the action of the magnetic field on metal, which continued to interest Kapitsa, depends not only on the value of the magnetic field but also on the ratio of magnetic to thermal energy. The lower the temperature, the greater this ratio and the more noticeable the field's effect upon the substance.

To "freeze" specimens, the experimenters needed a very large volume of liquid hydrogen and helium. Refrigerating engineering of those days could not meet the institute's requirements. And Kapitsa, not for the first time, invaded an absolutely new region, bringing about therein what amounted to revolution.

The piston installations then used for the production of liquid gases were very bulky and operated with an efficiency of no more than 10 to 15 per cent. Kapitsa approached his problem with characteristic boldness: He threw out all the orthodox notions. The search for fundamentally new solutions called for sacrifice. Again, exploding metal thundered and flying fragments whistled in the laboratory. But the day came when an astounded government commission, set up

exclusively to check the new machinery, saw it in action. Its 80 per cent efficiency was almost 10 times the operating effectiveness of the old installation.

Academician Vladimir Veksler once said that the size of a piece of equipment is always in inverse ratio to a designer's talent. Kapitsa's turbine, the heart of his machine, weighed only 8.82 ounces. Despite its size, it processed more than 21,000 cubic feet of liquid air an hour. A compressor weighing three and a half tons was needed to service this little turbine!

Kapitsa's turbodetander basically revised the construction of gas liquefaction and separation apparatus. In effect, it ushered in a new epoch in this field of engineering.

But for the physicists it was only a tool, a means of penetrating into the world of superlow temperatures. And there Kapitsa made one of his greatest discoveries. He found that at a temperature of only a little over two degrees centigrade above absolute zero, the viscosity of helium practically disappeared. It became superfluid. This discovery completely exploded existing concepts of the properties of liquids and marked the beginning of a new science—quantum hydrodynamics. The discovery of superfluidity can well be ranked alongside Kamerlingh Onnes's discovery of the phenomenon of superconductivity.

World War II interrupted Kapitsa's work on superfluidity. During the war years he devoted all his talent as an engineer and scientist to the defense of his country. Without leaving the Institute of Physical Problems, he became head of Glavkislorod (the Main Oxygen Board), an agency supplying industry and the front with liquid oxygen.

The war finally over, a new peacetime project was undertaken. An absolutely new one, differing fundamentally from all previous studies. Kapitsa again began the exploration of an untouched field of science and engineering—power electronics.

The very combination of these two words is unusual.

For many years it was held that electronics, by its nature, was meant to deal only with the transmission of signals, not with power, let alone high power. Indeed, the electrons that work in electronic instruments, for example, the familiar radio tube, are very mobile particles of very small bulk. Racing in the tube between the cathode and the anode, they meet almost no resistance and, thanks to their infinitesimal mass, can be easily controlled by setting up in their way metal grids to which this or that particular voltage is fed. But to transfer large amounts of energy in this manner, and over great distances to boot, was absolutely impossible. This was considered to be unshakable fact.

It was not, however, the first unshakable fact Pyotr Kapitsa had shaken, and not only shaken but scrapped completely. Here he emerged in quite an unexpected capacity, as an outstanding theorist and in the field of mathematics.

Having proposed an elegant solution, he mathematically proved that electrons could transmit not only watts but kilowatts, thousands of kilowatts, even millions. Then he confirmed his mathematical calculations with functioning apparatus, constructed not only according to his own design but largely with his own hands.

Only one person was really capable of coming to grips with, and solving, all the problems, someone combining intellectual scope, enthusiasm and an approach to physics from the engineer's point of view. In contemporary science, specialization determines not only the branch the scientist is engaged in but also the way in which he studied it theoretically or with the help of experiment. This is so because the methods of both theoretical and experimental physics are too complicated for a single person to master fully. Kapitsa is the rare exception.

Today his power electronics stands firmly on its own feet. Endless perspectives spread before it, a grand future, when rivers of electricity will flow through the country practically without losses along endless pipes—waveguides. The very industrial landscape will change. Tall electric transmission towers with their garlands of insulators, which today symbolize technical progress and industrial might, will become a thing of the past. Not only will methods of electric power transmission change but also the technology of the utilization of electricity, which will be poured straight from waveguides into fire-breathing funnels of blast and open-hearth furnaces and will be pumped into wells, smelting metal and ore rock. It will be beamed through space vacuum to sputniks and near-earth stations and do many more things we cannot foresee today.

Pyotr Kapitsa has the amazing gift of prevision as well as a sense of what the possibilities are for penetrating the innermost secrets of nature. Physicists and power engineers are not the only ones aware that our future is inseparably linked with the mastery of controlled thermonuclear reaction, which will use the ordinary water of rivers, lakes and oceans as the source of power. People generally understand this. Thermonuclear electric stations will rid mankind of any worry over fuel, but they will not discharge harmful waste or pollute the environment.

Problems relating to the control of thermonuclear reaction are presently being studied in scores of large laboratories all over the world. At a session of the Presidium of the USSR Academy of Sciences on April 21, 1959, Pyotr Kapitsa reported that his laboratory had obtained steady-state hot plasma in the form of a constricted discharge in gases under atmospheric, and even higher, pressures. This was a great step toward the solution of contemporary physics' Problem No. 1—the effective control of thermonuclear reaction processes.

In July 1970 the newspapers carried a report that the Committee for Inventions and Discoveries of the USSR Council of Ministers had registered the following discovery: "Pyotr Kapitsa. 'Formation of High-Temperature Plasma in a Constricted High-Frequency Discharge Under High Pressure.' Diploma No. 89." The number means there have been only 88 previous discoveries of this magnitude in Soviet science. Kapitsa's present capacity for work shows no diminution of the abilities that so distinguished him in Cambridge in the distant twenties.

He and his wife Anna, daughter of the famous academician Alexei Krylov, have two sons. The burden of their father's fame does not keep his sons from going their own road.

Sergei Kapitsa, Doctor of Science (Physics and Mathematics), is a researcher at the institute his father heads.

Andrei Kapitsa chose another career. Like Pyotr Kapitsa, who many years ago dedicated himself to the then unfashionable physics, so Andrei is as seriously involved in geography. In our age, when the time of the great geographical discoveries has long passed! When all (or almost all) the capes, islands and peninsulas have been described and measured in every conceivable way.

Like his father, Andrei and his friends are discovering the new where many have long since abandoned the search. He conducts explorations in the Antarctic and studies rock fractures in Central Africa.

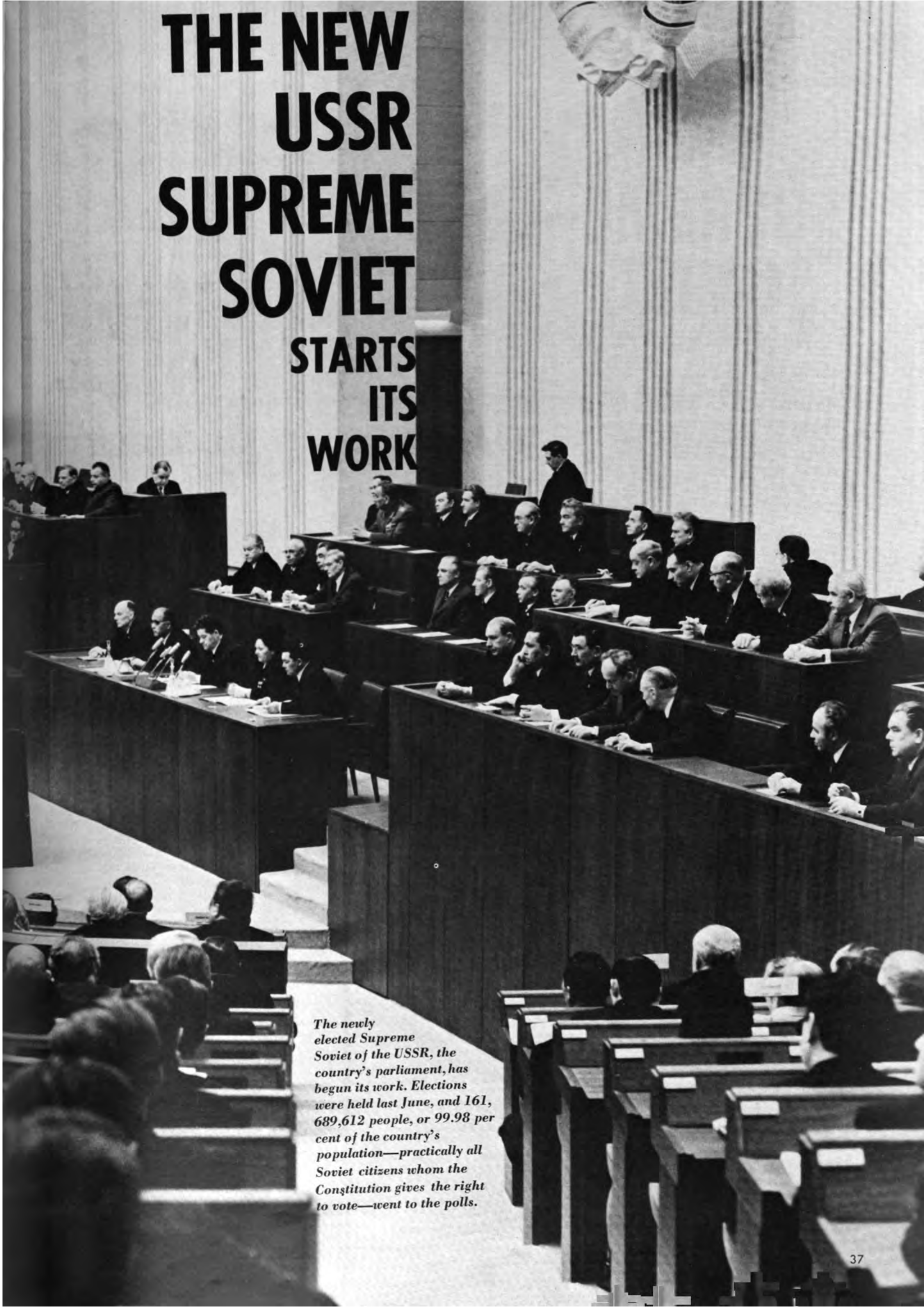
At present Andrei heads the Far Eastern Science Center. It is only a few years old, but its research has already attracted world attention.

Mythology has brought us colorful accounts of the exploits of the centaurs—those tireless half-men, half-horses. Possessing inexhaustible, unhuman energy, they knew no barriers, sweeping aside everything in their way toward their goal.

Pyotr Kapitsa is often referred to as the centaur. He knows, of course, and smiles.

From a history written by students of Moscow's Physico-Technical Institute.

THE NEW USSR SUPREME SOVIET STARTS ITS WORK



The newly elected Supreme Soviet of the USSR, the country's parliament, has begun its work. Elections were held last June, and 161,689,612 people, or 99.98 per cent of the country's population—practically all Soviet citizens whom the Constitution gives the right to vote—went to the polls.

U S S R

SUPREME SOVIET

More than 50.7 per cent of the deputies to the USSR Supreme Soviet are workers and farmers. Their proportion in the parliament has been steadily rising: from 44.8 per cent in 1962, to 46 per cent in 1966, to 50.3 per cent in 1970. This reflects the fact that increasing numbers of people are involved in running the state.
All other sections of the population, including engineers, executives, writers, scientists, cultural workers, are represented in the USSR Supreme Soviet. Women make up 31.3 per cent of the total, and deputies under 30 years of age 18.4 per cent.

THE CONSTITUTION gives the Supreme Soviet of the USSR combined legislative and executive power.

Only the Supreme Soviet has the right to amend the Constitution, admit new republics to the USSR, ratify the formation of new autonomous republics and autonomous regions, approve the State Economic Development Plan and the State Budget and enact nationwide laws.

The Supreme Soviet of the USSR also makes decisions on matters of domestic and foreign policy, on war and peace; hears government reports on key problems; elects the highest judicial body, the Supreme Court of the USSR, and appoints the Procurator General of the USSR.

The Chambers of the Supreme Soviet

The Supreme Soviet consists of two chambers, the Soviet of the Union and the Soviet of Nationalities.

The Soviet of the Union expresses the interests of all the working people of the USSR, irrespective of nationality. The Soviet of Nationalities expresses the specific national interests of the different peoples of the USSR and their state structures. Chambers with this function are not found in the parliaments of bourgeois states.

The Supreme Soviet of the USSR also differs from the two-chamber parliaments of most countries in that its chambers have equal powers and are not designated as the upper and the lower.

The Soviet of the Union is elected on the basis of one deputy for every 300,000 people. The identical system of election to the Soviet of Nationalities would result in the numerical superiority of representatives of the Russians, Ukrainians and other larger national groups. To ensure actual, that is, political rather than mathematical, equality of the peoples, the Soviet of Nationalities is elected by the citizens of the USSR voting by union republics, autonomous republics, autonomous regions and national areas on the basis of 32 deputies from each union republic, 11 deputies from each autonomous republic, five deputies from each autonomous region and one deputy from each national area. Consequently, 32 representatives are elected to the Soviet of Nationalities from the Russian Federation and the same number are elected from Estonia, even though Estonia's population is about one-hundredth the size of the RSFSR's (1.4 million and 133 million respectively).

The deputies to both chambers are elected for the same term (four years) and at the same time. (Compare the situation in France, for example, where the Senate may be elected for a term of nine years, or Britain, where the House of Lords is not elective at all and members are seated by right of inheritance, while the lower chambers in both these countries are elected for a shorter term.)

The Constitution gives the Soviet of the Union and the Soviet of Nationalities equal power to initiate legislation. There is no shuttling a bill back and forth nor right of veto in Soviet practice. No chamber can directly or indirectly impose its will on the other. A law is considered adopted if passed by both chambers by a simple majority vote in each.

Both chambers take equal part in forming the central organs of the USSR and exercise the equal right of controlling their activities. For example, at a joint session of its two chambers the Supreme Soviet of the USSR elects the country's collective president, the Presidium of the Supreme Soviet of the USSR, and appoints the Union government, the Council of Ministers of the USSR.

Article 47 of the Constitution declares that in the event of disagreement between the Soviet of the Union and the Soviet of Nationalities, the question is referred for settlement to an arbitration commission formed by the chambers on a parity basis. If the commission fails to arrive at an agreement or if its decision fails to satisfy one of the chambers, the question is considered for a second time by the chambers. Failing agreement of the two chambers, the Presidium is authorized to dissolve the Supreme Soviet and order new elections.

An important condition guaranteeing the equality of the chambers is their identical regime of work. The Supreme Soviet discusses draft laws in the chambers, ensuring the parallelism and simultaneity of the discussion and the adoption of a draft law. In some cases the discussion takes place at a joint session, but the voting is held separately.

Joint sessions of the Supreme Soviet are chaired alternately by the chairpeople of the Soviet of the Union and the Soviet of Nationalities.

The Soviet parliament is not subject to the head of the state or government. It (and not the Constitutional Court, for example) judges the legality of the election of its members. The government may not pose the question of confidence to the Supreme Soviet with a view to winning the adoption of one or another draft law. Usually in the USSR members of the government are themselves elected deputies, and they must therefore answer to both the parliament and their constituents.

The Supreme Soviet has the unlimited right to regulate the activity of any state body, from the central government to the local agencies. It may appoint investigating and auditing committees on any question and summon ministers to report. All offices and officials must comply with the demands of these committees and present the documents they ask for.

Unlike members of parliament in other countries, deputies to the Supreme Soviet of the USSR never become independent of their constituents. They are all required to make periodic reports to the voters who elected them.

Why One Candidate?

According to the Constitution of the USSR and the Election Statute, the right to nominate candidates for election to the Soviets belongs to collective bodies: mass organizations, societies of the working people, general meetings of factory and office workers (at their places of work), general meetings of farmers (on collective farms and in villages) and servicemen (in army units). They nominate people they know well, people they respect. The procedure is a continuation of those in the Paris Commune and the first Soviets in Russia. Trade unions in many countries generally follow the same procedure in electing their leaders.

The Soviet Constitution does not preclude the nomination of several candidates in a single district. More than that, the Election Statute requires electoral commissions to register each nomination made by the mass organizations

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New Deputy: Overcoming Obstacles

LEONID KARTAUZOV, a tractor driver from Kazakhstan, has been elected a deputy to the highest legislative body in the USSR.

Kartauzov's life has been far from easy. He lost his mother when he was five. Soon after that, in 1941, nazi Germany attacked the USSR. The boy was then visiting relatives in a village in Central Russia. As the Nazis neared the area, many of the people joined the partisans; Leonid was one of them. Not long after, he got word that his father had starved to death, a victim of the siege of Leningrad.

When the region where the partisans were operating was liberated by the Soviet Army, the soldiers of a rifle division decided to take the boy with them. He went through the battles in which the division participated, was seriously wounded but survived, with both legs gone. That was when his childhood ended, he was going on 11.

After the war Leonid was brought up in a Children's Home. At 15 he entered a vocational school in Leningrad and learned the trade of shoemaker. He worked like everyone else and went to night school. Reading became his hobby.

Kartauzov divides his life into two periods: up to 1955 and the years since. The campaign to reclaim the virgin lands in Kazakhstan began in 1955, and the Young Communist League appealed to its members to volunteer. It meant hard work under tough conditions, but every acre of plowed land promised more grain for the country. Leonid joined up and set out for Kazakhstan.

The turning point in his life, however, came a year later, when he sat down at the controls of a tractor.

"I think that was the first time I felt as good as the next man," recalls Leonid today. "I simply can't describe my emotions at that time, it seems to me I could feel the ties on my feet." And so Kartauzov got to do what he had wanted to ever since the days of the war: to help raise grain; in those grim years people died because there was so little of it. Since then he has been working as hard as the rest and often harder. He overfulfilled his quota regularly, very often doubled it.

The year Leonid became a tractor driver, a girl from Daghestan named Anna came to the farm. They got married and are now the parents of four children.

Two years ago, Kartauzov was awarded the title Hero of Socialist Labor for his contribution to the development of the virgin lands. Last year his fellow villagers elected him deputy to the Regional Council of Workers' Deputies. He must have measured up to their expectations. This year they elected him to the USSR Supreme Soviet.

Kirghiz Shepherds Send Their Representative to Parliament

SHEEPHERDING is a hereditary occupation in Kirghizia, and the shepherds' experience is passed down from generation to generation. But before Soviet times it was exclusively a male occupation. Now women work in shepherds camps, and, moreover, they work as senior shepherds, team leaders.

"The women do as well as the men, sometimes better," says Burulbu Turdubayeva, a senior shepherd of the Birdik Collective farm in Karabulak, in the central part of the Tien Shan Mountains. "My father is from a family of shepherds, and we children were taught to respect his work."

After finishing a rural school, Turdubayeva took a special course because shepherds today must be familiar with machinery: Fodder is processed and sheep are clipped by machine.

After three years as a helper she asked for a flock of her own. That was something new at the time. Women had always been given auxiliary jobs and only men entrusted with the flocks, each of which has 800 to 1,000 sheep. Turdubayeva got her own flock. "For years I was the only senior woman shepherd in our area," she says. "Now there are over 200 of us."

She gets an annual yield of 150 to 155 lambs per 100 ewes and manages to raise all of them. Very few shepherds in the country, even the most experienced, can match that record.

Turdubayeva believes that with the will and training others can do as well. And so she spends a great deal of her time and energy sharing her experience with young women shepherds. In Karabulak alone there are 15 of them. They all came to work after graduating from high school. This summer in the village of Aral, where Turdubayeva lives, another 20 women asked to join shepherds teams motivated by her example.

Sheepherding is one of the most important occupations on stock-raising collective and state farms, especially in the mountains. That is why 43 shepherds have been elected deputies to Kirghizia's Supreme Soviet and another six, including Burulbu Turdubayeva, represent their republic in the USSR Supreme Soviet.

Senior shepherd Burulbu Turdubayeva (second from right) is responsible for the creation of 110 women shepherds teams in her republic.

SUPREME SOVIET

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and other collective bodies. All registered nominees must be listed on the ballot.

Nevertheless, the collective bodies and organizations in a district usually ask the electoral commission to register only one nominee. This request is preceded by a meeting of the voters at which representatives of the organizations and collective bodies in the district agree to support one nominee. In the event that several people are being considered, the meeting chooses one of them and the others withdraw, or the groups that have nominated them withdraw their names.

Mikhail Kalinin, former President of the Presidium of the USSR Supreme Soviet, once noted:

"If in a number of places in our country nominees withdraw their names in favor of a single candidate, this is the result of their social kinship and the community of their political aims. After a thorough discussion, tens and hundreds of thousands of electors have agreed on one nomination."

The practice of registering only one nominee is not followed in all socialist states. It depends on the historical conditions. In some socialist countries, like Poland or the German Democratic Republic, several nominees are listed on the ballot because there are several political parties with a socialist platform. There is only one party in the USSR.

Since the interests of the Communist Party are the same as the interests of the people, it forms an election bloc with nonmembers (nominations are made jointly). This bloc is a concrete expression of the sociopolitical and ideological unity of Soviet society.

When they discuss and choose their nominees, the collectives are not engaged in a struggle for power, they are making a businesslike selection of people from their midst who will best represent them.

The nomination meetings are open to all the people working in the particular factory or office. Everyone has a right to speak his or her mind on the nominee and to state objections. Such objections to nominations are not infrequent.

The decision to nominate a candidate at a meeting of this kind is by majority vote. The minutes of the meeting are recorded and signed by the entire presiding committee. If the nominee agrees to run for election in the particular district, his or her written statement and the minutes of the meeting are submitted to the electoral commission for official registration.

The listing of nominees' names on the ballot does not guarantee their election: The voters have the final say. There have been quite a few candidates, particularly in elections to local Soviets, who did not get an absolute majority of the votes and were not elected. This happened, for ex-

In the Kiev district of Moscow, General Secretary of the CPSU Central Committee Leonid Brezhnev voted for Marshal of the Soviet Union Andrei Grechko, USSR Minister of Defense, who was running for the Soviet of the Union, and for Alexei Kosygin, Chairman of the USSR Council of Ministers, who was running for the Soviet of Nationalities. General Secretary Brezhnev himself was elected to the Supreme Soviet by the voters of Moscow's Bauman District.

A few days before the elections Leonid Brezhnev met with his constituents and reported on the progress made by the Soviet Union in the four years since the previous elections and on the outlook for the future. "Our resources," he noted, "are now immeasurably greater, and this makes it possible to do what we were always striving for: to place the emphasis of the party's practical work on increasing the prosperity of the Soviet people."

This summer the Soviet people cast their votes for 1,517 deputies to the USSR Supreme Soviet, with each district nominating its own candidate. The right to nominate candidates belongs to mass organizations and general meetings of industrial and office workers, farmers and servicemen. Several candidates may be nominated for a single office, but as a rule the choice is narrowed to one in the nomination and discussion stage, and the election commission is asked to register a single candidate. This does not mean that when candidates' names appear on the ballot, they will be elected: The final decision is made by the voters.

ample, in 80 cases in the June 1973 elections to the local Soviets. The total number of deputies elected at the time exceeded 2,193,000.

What Did the People Vote For?

Before the elections to the Supreme Soviet of the USSR, all Soviet newspapers carried a statement to the voters by the Central Committee of the Communist Party of the Soviet Union. By Western standards it lacked many of the promises and pledges that competing parties usually make in appeals to voters.

What exactly was missing?

For one thing, there was no promise to put an end to the escalation of prices. In the inflation raging throughout the Western world, a party that did not include such a pledge in its election program would be doomed to failure. But there is no reason for the CPSU to make this kind of promise. The prices of basic foodstuffs, goods and services and apartment rentals have remained stable in the USSR for many years. Apartment rents, for example, have not changed since 1928, and subway fares not since 1935.

Nor was there any pledge to reduce unemployment: The last employment agency in the Soviet Union closed in 1930. Since then, the country has had a constant shortage of manpower, a result of its tremendous program of economic development.

Many election statements in the West promise to end land speculation. Nothing of the kind, of course, was to be found in the statement of the CPSU Central Committee to the Soviet electorate, and no one was bothered by the fact. For 57 years, as long as the Soviet state has been in existence, plots of land to build houses on—individual or cooperative—have been given to people free.

In asking people to support the bloc of party members and nonmembers, the Central Committee was asking them to vote for the continuation of a policy whose aims are higher living standards and world peace.

Have Earlier Promises Been Kept?

The four years since the previous elections to the USSR Supreme Soviet demonstrated once again that the members of the Soviet parliament mean what they say. Five months after they were elected, the deputies approved the Five-Year Plan of Economic Development for 1971-1975. Its intent, as formulated, was to secure within the five years "a considerable rise in the people's material and cultural level on the basis of a high rate of development of socialist production, enhancement of its efficiency, scientific and technical progress and acceleration of the growth of labor productivity."

For almost four years now the rate of progress has been ahead of schedule.

1971. Wages of almost three million tractor drivers, combine operators and other farm machine operators were raised by an average of 20 per cent. Some 2.3 million railroad workers got a 17 per cent raise in monthly pay.

1972. Wages of teachers and doctors were raised by 20 per cent, and those of instructors in children's preschool institutions by one-third. The zonal differentials were increased for 10 million industrial and office workers in remote areas with harsh climates: Western Siberia and some districts in the Turkmen Republic. Stipends to college students were raised by one-fourth and to students of specialized secondary and vocational schools by one-half. This last measure affected some four million young men and women.

1973. Paid maternity leave was increased to 100 per cent of wages, regardless of length of service. The minimum old age and disability pensions were raised by two-thirds for industrial and office workers and by one-half for collective farmers.

1974. Steps are being taken to further increase disability pensions and allowances to families that have lost their breadwinners. As much as one billion rubles (about 1.4 billion dollars) have been allocated for the purpose. Over all, real per capita income will grow by five per cent compared with 1973.

However, the Soviet people's living standards depend not only on their wages but on the various grants and benefits they get from the public consumption funds. Last year such "hidden" income totaled 78 billion rubles, 5 billion more than in 1972.

This money was spent on free medical services and education, preschool institutions, housing. An average of 7,000 families received new apartments each day at nominal rents.

In June 1972 the government took steps to make 10 years of schooling compulsory. A year later, after hearing ministers' reports at a joint session of the Supreme Soviet, the deputies adopted the Fundamentals of Legislation of the USSR on Education. The draft Fundamentals had previously been published in the press for discussion. Thousands of comments and suggestions were taken into consideration in the final text.

Improvement of the quality of life has a special place in the activities of the Supreme Soviet. It includes, among other things, clean air for the cities, noise abatement measures, the protection of rivers, lakes and forests. Some of these matters were discussed by the Supreme Soviet as early as 1970, with the result that another law, the Fundamentals of Water Economy Legislation, was adopted. It laid down basic principles for the use of the country's waters and their protection against pollution and exhaustion.

Slightly more than a year later the Supreme Soviet came back to the problem. The deputies decided to check on the implementation of the laws they had adopted for nature protection. The government was instructed to take prompt action on specific environmental measures, and considerable sums were allocated for the purpose.

These are only some of the actions of the previous Supreme Soviet. The newly elected Soviet parliament will continue the work. One of the guarantees that it will is the continuity of its composition: Approximately half the members of the last parliament have been reelected. The majority of the deputies, 50.7 per cent, are workers and farmers, as compared with 50.3 per cent in 1970. The remainder are engineers, scientists, writers, factory and office heads, cultural and health workers, teachers, party functionaries and public figures.

Addressing the voters in the Bauman District in Moscow, Leonid Brehznev, General Secretary of the CPSU Central Committee, said:

"It is important for each person to know that he has equal rights with other members of society, can always count on a just and respectful attitude toward himself, on the concern of the state, on the help and support of the collective. Everyone is interested in taking an active part in the affairs of his enterprise or institution, in the affairs of the state. Everyone wants to have confidence in the future and in his children's future. We have created conditions for the satisfaction of these social needs. This is one of socialism's tremendous gains."

FROM FARMER TO LEGISLATOR

VASILI GLOBA is a dairyman at the Kirov Collective Farm, not far from Kiev, capital of the Ukraine. He was only eight when he milked his first cow. For a very simple reason—his mother had fallen ill. When she recovered, Vasili went right on helping her.

Alexandra Globa needed her son's help. There were four more boys and a girl in the family, and the war had darkened all their lives: Their father had been killed in action.

Vasili graduated from an eight-year school and started to work full time in the dairy. Soon everyone began to talk about him: he was so much better at the job than many more experienced hands. He was also continuing his education at night and finally completed high school.

The widow's hard-working family is highly thought of by the people at the big and productive collective farm. Everyone agrees the good things that happened to the family recently were well deserved. In the spring Vasili married. In June he was elected deputy to the Supreme Soviet of the USSR.

The entire farm celebrated Vasili's election. This is what Ivan Vovnyanko, a World War II veteran, had to say: "It is no accident that Vasili has become our deputy. He is not only a good worker. He is a person always concerned about everybody's welfare."

Dairyman Vasili Globa is congratulated by his constituents.

Portrait by an eighteenth century artist.

HE WAS THE FIRST TO SAY REVOLUTION

By Arthur Tolstyakov

IN THE SUMMER of 1790 Empress Catherine II was shown an anonymous book, *A Journey from St. Petersburg to Moscow*. She was outraged at the impertinence of the unknown author who dared to protest so boldly against the landowners' oppression of millions of Russian peasants and to appeal for the abolition of serfdom and the overthrow of the tyrannical autocracy. Making notes on the margins of the book, Catherine did not leave a single important idea of the author unnoticed. Thus she wrote:

"Pages 119 and following serve the author's intention of showing the disadvantage of the present rule and its chief faults." . . . "Page 137 is permeated with French poison." (The ideas of the French Revolution had begun less than a year before the publication of the book.) . . . "The writer pins his hopes on a peasant rebellion." . . . About the ode "Freedom" included in the book: "The ode is obviously of a rebellious character, it threatens czars with the executioner's block. The example of Cromwell is cited with great praise." . . . "This praises Mirabeau, who deserves to be hanged a dozen times."

Speaking to her secretary, Catherine described the author of *A Journey* as "a rebel more dangerous than Pugachov," the leader of the biggest peasant uprising in Russia (1773-1775). The writer, she said, at the end of the book "sings the praises of the rebel Franklin and imagines himself to be the same."

Soon afterward the Empress learned that the author of the book was Alexander Radishchev, a high official received at court, director of the St. Petersburg Customs House. He was arrested and imprisoned in the Peter and Paul Fortress in St. Petersburg. Catherine ordered the interrogation to be conducted by Stepan Sheshkovsky, head of her secret police, who had questioned Yemelyan Pugachov. The very name of Sheshkovsky, who personally tortured prisoners, instilled terror. On hearing who was to interrogate him, Radishchev fainted. However he bore up bravely during the examinations, and though he refused to admit that he had called for a revolution, time proved that he did not give up the ideas in his extraordinary book.

The court pronounced the following sentence: "Capital punishment for the writer, and all copies of the book that can be found are to be destroyed." The Senate and the State Council confirmed the sentence. For 42 days Alexander Radishchev waited for his execution.

However, owing to the intercession of Radishchev's chief, Alexander Vorontsov, a

great noble, Catherine commuted the death sentence to ten-year exile in Siberia, in the small town of Ilimsk, which had only 250 residents. The book was banned for more than 100 years.

Alexander Radishchev is a major figure not only in eighteenth century Russian history but in the history of mankind. The eighteenth century was an age of powerful and stormy social transformations, of struggle with the feudal-absolutist system, which was crowned by the Great French Revolution and the War of Independence of the English colonies in North America.

In Russia of the second half of the eighteenth century, a military bureaucratic empire of the landed nobility with serfdom still in effect, radical social thought began to spread too. Alexander Radishchev became a prophet of freedom.

He was one of the most erudite men of his time. His son Pavel wrote in his reminiscences: "He was a man of almost encyclopedic knowledge. He knew law and literature equally well, had read all the classical works written in Latin, French, German, English and Italian in the original and, of course, everything that was written in Russian at the time. In a word, he was a treasury of knowledge combined with a brilliant mind and noble character. Radishchev could have easily passed an examination in medicine for a doctor's degree, was a good physician and practiced medicine successfully in Siberia. For a time he was carried away by chemistry." The reminiscences offer this interesting detail that attests to Radishchev's outstanding abilities and singleness of purpose: "He had a thorough grasp of the Latin, French and German languages but did not speak English. Wishing to be independent of his interpreter, in spite of his post which required much of his attention, he began to study English though he was already past 30. A year later he could speak the language fluently and read the works of Shakespeake and Milton."

But more important than Radishchev's encyclopedic knowledge was the fact that no one else either in Russia or in Europe and America of the time had achieved his grasp of revolutionary ideas. Even the most progressive of his contemporaries, who had left a deep imprint on Russian literature and enlightenment, hoped only for some improvement of the social order based on serfdom, not considering it necessary to abolish that feudal carry-over completely. It was only Radishchev who openly said in his book that serfdom had to be done away with altogether. The conditions of Russian life prompted him to see revolution as the only means of changing the existing system. He became the first ideologist of revolution in Russia, the forerunner of future revolutionary movements, who in many ways determined the trend of development of Russian social thought. His world outlook came as a result of the advanced quests of Russian democratic thought and of the progressive philosophical and political doctrines of the West.

However, Radishchev went further than the mechanistic system of the French Enlightenment and Rousseau in particular. He tried to comprehend history as a process governed by certain laws and to discover these laws.

Map of the highway from Moscow to St. Petersburg. Below: A late eighteenth century water color of the Moscow Gates in St. Petersburg.

Below: Whipping a serf with canes. Early nineteenth century engraving.

This made him more far-sighted in many ways than his French predecessors. As a result, in *A Journey* and in other of his works you find the peculiar philosophic and social-political attitude toward life that developed on Russian soil. Lenin wrote that in no other country of the world had the peasantry suffered such oppression and bad treatment as in Russia. It was the serf bondage of the Russian peasants that allowed Radishchev to see revolution as the only way out far more clearly than any of the French enlighteners, including even Mably.

The central idea of *A Journey from St. Petersburg to Moscow* is the struggle against serfdom, which, according to Radishchev, is the struggle against the oppression of man by man. The author embodies the idea in a number of artistic images that reveal all the injustice, absurdity, horrors and barbarism of serfdom. But he not only acts upon the reader's feelings, he also proves his principal propositions rationally with legal, moral and economic arguments.

Radishchev's legal argument against slavery is based on the theory of natural rights and natural equality of all people and is expounded in the most radical way. The Russian writer denies, as principle, the right of one person to oppress another.

Radishchev's social and ethical arguments demonstrate that serfdom depraves man, morally destroys the slaveowners and can destroy the slave who, by reason of oppression, becomes a slave in spirit as well. It is in the oppressed people, not in their masters, that he finds all the virtues of citizens worthy of freedom.

And, lastly, in his economic argument Radishchev tries to prove that serfdom is unprofitable from the point of view of the economy as a whole, that it reduces the people's material benefits. Forced labor "for the master," he says, is less productive than free labor; people work better for themselves than for an oppressor.

The son of a rich landowner, a former page who completed his education at Leipzig University, Radishchev, on his return from abroad, served for a short time in the Senate and was then appointed military prosecutor in an army division. He was in close touch with the court and a witness to the palace intrigues, the self-seeking, the contempt for the people and the arbitrary lawlessness. He read the ukazes of the Empress, had the opportunity to observe the behavior of the local and central administration, was part of the enormous bureaucratic machine of the autocratic state, all of which provided him with food for thought on the political and economic situation of Russia during the rule of Catherine II. Already serving in the Senate, Radishchev proved himself a convinced republican. Translating the work of the French enlightener Mably entitled *Meditations on Greek History, or the Reasons for the Prosperity and Misfortunes of the Greeks* (published in Russian translation in 1773), Radishchev wrote in one of his notes: "Autocracy is a state most unnatural for man," adding a few lines later that "the

injustice of the sovereign gives the people that is his judge a similar and even greater right over him than the right of the law over the criminal." It was the first time that such sharp criticism of absolute monarchy appeared in print in the Russian language.

Radishchev's service as a military prosecutor coincided in time with the peasant war under the leadership of Yemelyan Pugachov (1773-1775). Some historians believe that in March 1775 Radishchev resigned from his post so as not to take part in the cruel treatment of the rebels who were taken prisoner.

A Journey from St. Petersburg to Moscow is the summit of Alexander Radishchev's creative work and civic courage. The genre of travel notes provided the author with a vehicle to pose problems that agitated the minds of the best men in the country: the terrible situation of the serfs and the monstrous despotism of the landowners, the corruption in the courts and administrative offices, the compulsory military service, the illiteracy and lack of educational opportunities for the people, the immorality of the serf owners, the level of Russian science and culture.

Radishchev threatened the landowners with future revolution, tried to show them how necessary it was to liberate the serfs. He demanded the immediate adoption of radical reforms with regard to the peasants and the state system. But even as he made this demand, he had little faith that the czar, that "villain of villains" who had long forgotten what truth was, would ever make these reforms. There remained only the hope that the "united people" would "bring the czar to the block" and declare the country a republic. Then freedom and the liberated people would triumph. It was this call for the abolition of the autocratic system based on serfdom that made Radishchev a "rebel more dangerous than Pugachov" in the eyes of Catherine II.

Living during the period of the American colonies' War of Independence, Radishchev was well informed about this event. In his evidence during the investigation he wrote that in 1780 or 1781 he had read the many-volume edition of *Philosophical and Political History of the Settlements and Trade of the Europeans in the Two Indies (Histoire philosophique et politique des établissements et du commerce des Européens dans les deux Indes)* by the French enlightener Guillaume Thomas Raynal. Scholars have found that Radishchev read an enlarged edition of the *History* which was published in 1780 and supplemented with 15 new chapters devoted to the American Revolution, the major subject of the day. He could have also learned a great deal from the Russian press, which followed events on the other side of the ocean. And, lastly, proof has recently been discovered that Radishchev was acquainted with Fyodor Karzhavin, a Russian traveler and a man of progressive views who visited America at the beginning of the War of Independence. It is very probable that Karzhavin was the friend well-acquainted with American affairs whom Radishchev mentioned in *A Journey from St. Petersburg*.

The book turns to the subject of the American Republic several times. In his ode "Freedom," included in the book, he contrasts the soldiers of the American Republican Army, who so inspiringly defended the people, with the mercenaries of a hired army. Of Washington he writes:

"Oh, warrior unshakable,
You have always been unvanquishable!
Freedom is thy leader, Washington!"

In the chapter of the book devoted to Mikhail Lomonosov Radishchev pays tribute to Benjamin Franklin, the ideologist of the American Revolution, noting his merits as a scientist and revolutionary who "brought thunder down from heaven and tore the scepter out of the hands of monarchs."

Radishchev's statements on the American Revolution are completely consistent with the political principles he elaborated. But while defending the American Revolution, he denounced the slavery that existed in the "land of freedom." He devoted many a passionate page to this subject in angry attacks against the slaveowners. Though up to the 1790s there were persistent rumors both in the European and Russian press of the coming abolition of slavery in the USA, Radishchev thought it necessary to keep underscoring how important it was to do away with the system of oppression of man by man.

A few words about Radishchev's further career.

He spent five and a half years in Siberia. A talented and active man, he found application for his abilities there too. He studied agronomy, mineralogy and regional ethnography, vaccinated the local population against smallpox, wrote a philosophic treatise and a report in which he suggested that he be asked to head an expedition to find a North Sea route. When Catherine II died, the new emperor Paul I permitted Radishchev to leave Siberia and settle down in the village of Nemtsovo in Kaluga Region. This was still exile, for he was kept under secret surveillance by the police and his mail was opened and read. Only in 1801, when Alexander I came to the throne (the beginning of his rule inspired hopes of constitutional change), were Radishchev's civil rights and rank in the nobility finally restored. He was invited to St. Petersburg to serve in the Commission on Legislation. He seized the opportunity of important governmental activity offered him. However his legislative drafts proved too radical. Count Pyotr Zavadsky, Chairman of the Commission, who had been one of the seven members of the State Council to confirm Radishchev's death sentence in 1790, told him that his overly enthusiastic thinking had brought disaster upon him once and could do it again.

Brought up on the classical examples of the republican heroes of ancient Rome, Radishchev had always believed that in a hopeless struggle against tyranny voluntary death could serve to assert one's moral supremacy. Disappointed in his expectations of social change, he committed suicide on September 11, 1802, by taking a lethal dose of poison.

Radishchev was a lonely sower of freedom, but, according to Lenin, his "selfless devotion to the revolution and revolutionary propaganda among the people were not wasted even if long decades divided the sowing from the harvest." Radishchev's name was mentioned in the very first issue of Lenin's newspaper *Iskra*, which came out in December 1900. Lenin pointed to Radishchev as one of the people who laid the foundation of the revolutionary tradition in Russia that was continued by the Decembrists of 1825, the revolutionary *raznochintsi** of the 1870s and then by Marxists-Bolsheviks.

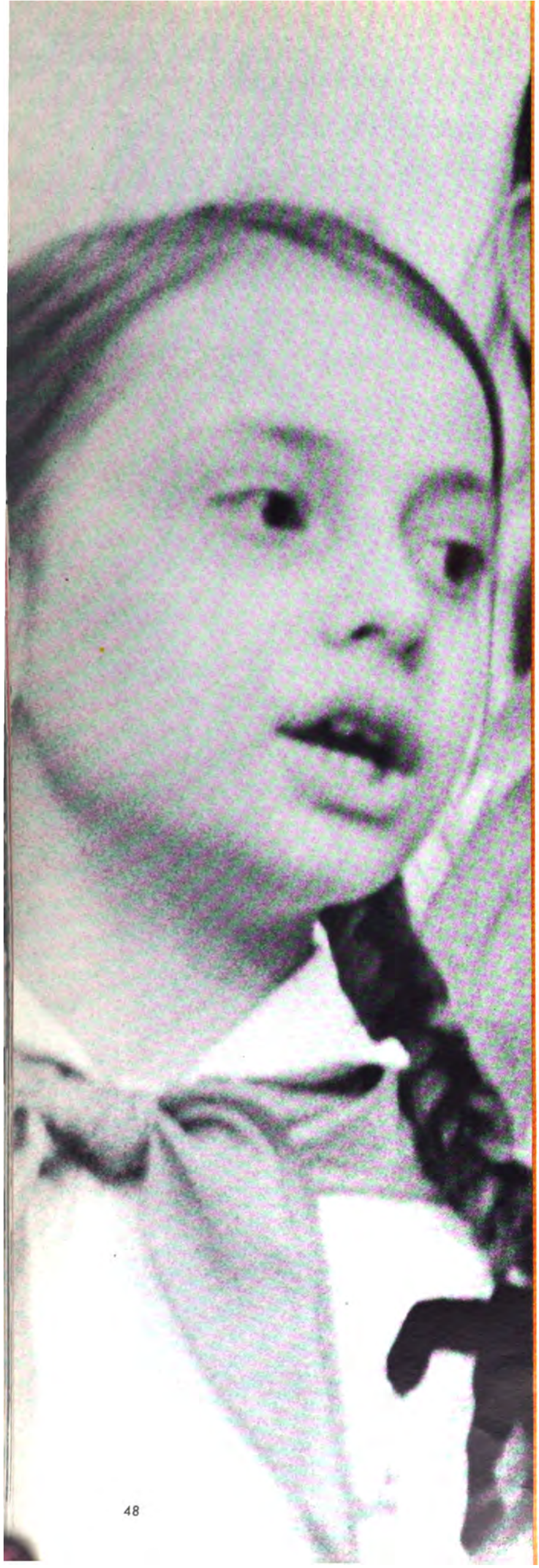
*raznochintsi—intellectuals who came from non-privileged classes.

There are 15 existing copies of the first edition of *A Journey from St. Petersburg to Moscow*. Most of them are in the Soviet Union, a few have found their way abroad. At least two copies of this very rare book are known to be in the United States. One is in the Rare Book Division of the Library of Congress in Washington. It was part of a large collection of books belonging to Gennadi Yudin, a Siberian merchant, and was bought by the library in 1906. The other copy, which belonged to Count Dmitri Troshchinsky who knew Radishchev personally, is in the Houghton collection of rare books and manuscripts of Harvard University (Cambridge).

The United States may have other copies of the first edition of *A Journey*. For example, the copy once owned by Countess Praskovya Uvarova, subsequently in the library of the Moscow Historical Museum, in 1933 was announced for sale in catalogue No. 21 of Mezhdunarodnaya Kniga. This copy was bought by an American university, but unfortunately nobody knows which university.

The writer and the editorial staff would be grateful for any relevant information.

Rebelling serfs kill their landlord. Illustration for a Soviet edition of Radishchev's book.



THIS Moscow high school, in the center of the city, looks like hundreds of others in the capital.

Around the four-story building is a green lawn with a playground close by. At the entrance hangs a sign in blue: High School No. 20.

It's when you get inside that you see what's different here. The usual notices, wall newspapers and posters in the corridors are all in English. And during the recess, bursting out of the usual noise and racing around, it's English that you hear.

This is one of the 52 Moscow schools offering the general high school curriculum, but devoting much more time and attention than usual to the study of a foreign language—in this case English. At the same time the students are given a good background in English and American literature and history. So it is not surprising that about one-fifth of the graduates enter language institutes or major in philology.

Certain extracurricular activities have won for School No. 20 a special reputation. It is a member of the Institute of Soviet-American Relations. The faculty is active in UNESCO conferences devoted to problems of teaching and exchange of information. Students arrange joint evenings with the English-American school, attended by the children of foreigners who work in Moscow.

Of particular interest is the chorus, made up of seventh to tenth grade students, who have a repertoire of English and American songs and others by Soviet composers translated into English.

The head of studies and

ENGLISH SPOKEN— AND SUNG— HERE

By Anna Nikolayeva

Leonid Shturman, assistant principal and head of the English department. His school is one of the 52 in the capital that specialize in the study of a foreign language.

conductor of the chorus is Leonid Shturman, a decorated veteran of World War II. He is a graduate of the Moscow Institute of Foreign Languages and in the fifties began to teach English. Even way back then his work did not end in the classroom. He arranged after-school language parties for the children although his was not a special language-oriented school.

When he came to work at No. 20 in the early sixties, Shturman expanded his extra-curricular activity.

Why not, he suggested to his fellow teachers, organize a Young Pioneer language camp? It worked out well. With almost all the students going to suburban camps anyway for their summer vacations, it was no great problem interesting them in the project. Everything in the language camp—from menu to movies—was in English.

Some years ago Shturman began to translate popular Soviet songs into English. A collection of these was recently published. Many of the songs were worked into the repertoire of the school chorus (one, known to all children from popular animated cartoons, appears on the back cover of this issue of SOVIET LIFE).

At School No. 20 a song becomes part of the chorus repertoire after long rehearsals and animated discussion by the chorus and its conductor. And although the students like and respect their teacher-conductor, they do not always go along with his suggestions. "As the old proverb puts it," says Shturman, half complaining, half approving, "you can lead a horse to water, but you can't make him drink."

YOUTH IN MANAGEMENT

ARE YOU involved in management operations at your place of work?

Soviet sociologists put this question to 9,000 young workers at 20 machine-building plants. The vast majority replied Yes, and many described the form of their participation.

Twenty per cent of the young workers at a large plant in Saratov, on the lower Volga, are members of the Standing Production Conference. This type of organization has been established at all the country's enterprises and shops. It is made up of workers elected at a general meeting of the production and office workers at a given enterprise, as well as representatives of the management, trade union and other mass organizations active in the shop.

The conference meets once a month to discuss organization of production, work quotas and other such matters. Management is duty bound to apply conference recommendations. In 1973, to cite an example, young conference participants at the Saratov plant made a number of proposals to improve the production process, working conditions and the basis for calculating young workers' wages. All their recommendations are now in effect.

At a plant in Ulyanovsk, on the middle Volga, two hundred young people are active in elected trade union committees. Through them the workers have a voice in management and see to it that labor laws are observed.

The country's sanatoriums, vacation resorts, clubs, palaces of culture, sports and tourist centers are run by the trade unions. Social insurance funds are also controlled by the unions. Management cannot dismiss any worker without the approval of the trade union organization at the enterprise. Such matters as improving skills, qualifying for jobs, revising production quotas, distributing bonuses and housing are decided with the direct participation of the trade unions.

Each year the trade union committee of the enterprise or institution negotiates a collective agreement with management. Young people take an active part in drawing up these contracts. At the Ulyanovsk plant they submitted upwards of 80 proposals in 1973 which constitute a special section of the agreement devoted to youth (better working arrangements for young people who study after work, for example).

The plant has a Young Workers Council of 25 members. They keep an eye on both the work and studies of their peers and help newcomers improve their skills. The council makes its proposals and recommendations directly to management.

At a plant in Tbilisi, the capital of the Georgian Republic, a Young Specialists' Council arranges trips of engineers and technicians to appropriate enterprises for exchange of know-how and conducts seminars and conferences on problems of science and engineering.

The activities of young people in the trade union organizations and young workers and specialists councils are coordinated by the plant Komsomol (Young Communist League) Committee. The great majority of young workers and specialists are Komsomol members. Representatives of the Komsomol serve on trade union committees. Before deciding any matter affecting young people, the plant director checks it out with the Komsomol Committee.

RUSH HOUR IN MOSCOW

MOSCOW spreads over an area of 340 square miles and has a population of seven and a half million. Public transportation (Metro, bus, taxi, trolley bus and streetcar) handles over 14 million passengers daily.

Rush hour is a long-standing problem of every big city. Moscow is no exception. An outsider will note, however, that rush-hour lines of people are disposed of very quickly and efficiently.

The capital has 94 miles of Metro (subway) and 96 stations. Trolley buses service 68 lines, buses 238 and streetcars 50. Taxis number 15,000. Minibuses, so-called fixed-route taxis, run through the central districts. Every day the Metro carries over five million people, trolley buses over two million, buses four million, streetcars 1.5 million and taxis 700,000.

All public transportation in the USSR belongs to and is run by the state. That's why the problems that normally attend getting people around can be solved comprehensively by means of master city-development plans.

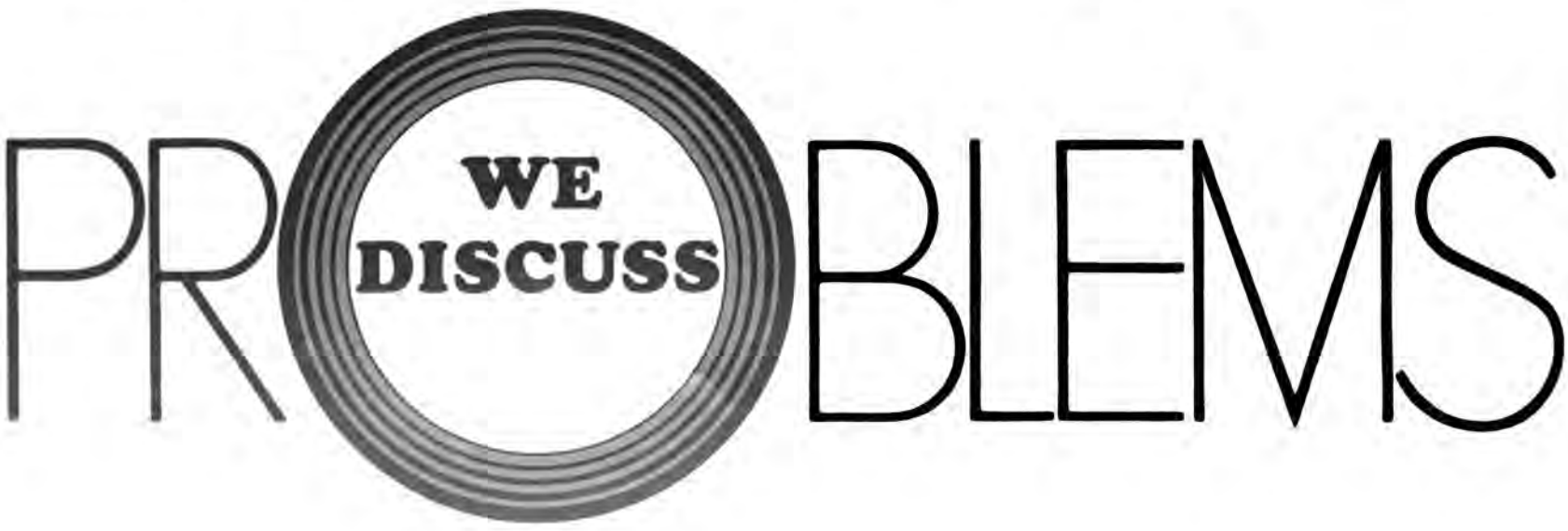
In very specific terms, how does Moscow handle its rush hour? First, the beginning and end of the working day is staggered at enterprises and institutions so that morning and evening rush hours are broken up into several waves of traffic.

Then, operation of the different types of transport is coordinated so that they interconnect, each one operating on a strict schedule.

Also, during rush hours transport units are kept coming thick and fast. The time interval in the Metro is 60 seconds. Buses, streetcars and trolley buses run at two- to five-minute intervals. But since several different bus, trolley bus and streetcar lines all service the most congested districts, intervals are actually even less. And every year service is being improved by the addition of more lines and more routes.

None of this passenger transportation runs at a profit. Annual budget subsidies top the 20-million-ruble mark. But the Moscow Soviet (Moscow Soviet of Working People's Deputies) has no plans to raise fares. Present rates (a flat fare, no matter what the distance) will stay unchanged: Bus fare is five kopecks, trolley bus four, streetcar three and Metro five. The number of private passenger cars is increasing, but Muscovites prefer public transportation for intracity travel.

Much is being done to cut down air pollution caused by all this transport. Among other things, plans provide that by 1976 35,000 trucks, passenger cars and buses will switch to condensed gas. Planting of trees, shrubbery and the like within and around the capital is important for keeping the city's air basin clean. Moscow leads all the world's large capitals in total areas of trees, shrubbery and flowers—they cover a sixth of the city.



MATCH OF THE TITANS

By Alexei Srebnitsky
Novosti Sports Commentator

BEFORE SOVIET sportsmen made their presence felt in the international arena, American athletes had no serious rivals to speak of. Only in certain individual events did the U.S. representatives come up against foreign competition. The USA national squad was considered virtually unbeatable.

A different picture began to emerge, however, after the 1952 Olympics, at which Soviet sportsmen made their debut. They competed against the champion runners, jumpers and hurlers of the New World as equals and left no doubt of their quality at the next Olympics as well, in Melbourne, in 1956.

Naturally the Americans were eager to prove, in face-to-face trials, that they were still the best. Soviet athletes, always interested in expanding sports contacts, were just as determined to disprove this traditional judgment. As a consequence USSR-USA track and field competitions were arranged which the world press immediately dubbed "Match of the Titans."

The tough nature of these contests, which won an audience right off, is evident in the following tabular account covering 1958 to 1974 (each team, which can enter only two contenders in each event, gets five points for top place, three for second, two for third and one for fourth).

Year	Place	Teams: Men USSR	Men USA	Women USSR	Women USA	Score USSR	Score USA
1958	Moscow	109	126	63	44	172	170
1959	Philadelphia	108	127	67	40	175	167
1961	Moscow	111	124	63	39	174	163
1962	Palo Alto	107	128	66	41	173	169
1963	Moscow	114	119	75	28	189	147
1964	Los Angeles	97	139	59	48	156	187
1965	Kiev	118	112	63.5	43.5	181.5	155.5
1969	Los Angeles	110	125	67	70	177	195
1970	Leningrad	122	114	78	59	200	173
1971	Berkeley	110	126	76	60	186	186
1973	Minsk	121	112	95	51	216	163
1974	Durham	102	117	90	67	192	184

These were battles for prestige, hard fought, and with the laurels shifting from one country to the other. Note how convincingly the Americans took vengeance in 1964 after suffering a smashing defeat in Moscow and with what determination the Soviet squad, in turn, avenged the setback with a brilliant performance in Kiev the following year.

The whole sports world watches events in which the two principal leaders in athletics are pitted against each other; they top the international calendar. New names, new records and new surprises; every Match of the Titans has brought them forth. Nor is the significance of these encounters limited to pure competition. What comes with them, as a rule, is the exchange of training experience, the newest developments in the science of sports and new training methods. Finally, the bilateral meets have unquestionably aroused in athletes an interest in the country with whose men and women they are experiencing a continuity of relationships. They have a healthy curiosity about its life, customs, achievements and people. Igor Ter-Ovanesyan and Valeri Brumel, for example, told me that they had begun a serious study of English so they could talk to people like Ralph Boston and John Thomas without an interpreter. Meeting Soviet athletes after each of their overseas trips, I invariably heard them giving accounts of their experiences in the United States.

Now about the highlights of the matches. There have been plenty, but all along you could see a definite trend. Take the very first encounter. Among the traditionally popular athletic events in the USA, and one basic for Americans, is the men's high jump. It was the outstanding event at the time. In Soviet athletics the high jump had not developed such importance. True enough, shortly before the match in Moscow Yuri Stepanov set a world record of 2.16 meters, but Western sports writers were almost unanimous in casting doubt on this achievement. I recall that there was even some talk about Stepanov's resilient shoe sole. And then the holder of the world record, in a duel with the 1956 Olympic champion Charles Dumas, scored an easy confident victory (2.12 m.). Also at that time the American was outstripped by yet another Soviet jumper, Igor Kashkarov.

It goes without saying that after all this, talk about tricky soles died down. Everybody in sports recognized that the Soviet high-jump school was coming into its own. No more proof was needed than Robert Shavlakadze's victory at the Rome Olympics, Valeri Brumel's world records and gold medal at the 1964 Olympics and the successes of Valeri Skvortsov, Valentin Gavrilov and Kestutius Sapka at European championships.

In recent years American high jumpers have won more frequently in the USSR-USA matches. Patrick Matzdorf, for example, smashed Brumel's world record by a jump of 2.29, and Reynaldo Brown was victorious in the last two meets. But nobody would have been surprised if Soviet jumpers had won. Their strength is generally recognized today, and their place in sports is no longer debatable.

The victory of Earlene Brown strikes me as a logical development of the matches. Brown managed to beat both Galina Zybina and Tamara Press, two Olympic champions, in a Soviet star event, the shot-put. True enough, the USA women's squad did not come up to Earlene's achievements. Even so, the USSR-USA competitions have forced top American sports people to pay more attention to women's athletics and, in particular, those events that were not too popular with Americans.

This change in attitude naturally operated in both countries. In the 15 years since the first Match of Titans, Soviet athletes have concentrated on many of the events they had lagged behind in not long ago. The first victories of Soviet middle-distance runners and sprinters were regarded as sensational, but since then they have found their natural place in the sports scheme of things.

Until the 1970 match the Americans did not lose to their rivals in the sprints. But in Leningrad it was Valeri Borzov who crossed the finish line of the 100 meters first. Unwilling to accept the incredible, one of the commentators rushed to report that Borzov had made a false start the judges had not caught. However, a careful examination of the official film showed that Borzov had even made a somewhat slow start, but during the fastest pacing of the race he caught up and overtook the famous overseas runners. A year later in Berkeley Borzov again outran the Americans, and the following summer he grabbed the Olympics titles in both of the sprints.

The point to emphasize is this: It was not a sportsman of unique talent who had emerged in Soviet track and field. After Borzov, the world's top sprint elite was joined by Alexander Kornelyuk and then by Yuri Silov. The new methods used by Soviet coaches, headed by Valentin Petrovsky, Candidate of Science (Biology), are based on the latest findings of the science of sports. As a matter of fact, Petrovsky is of the opinion that sports are becoming more and more a competition, not only of sportsmen but also of research laboratories.

Almost the same thing happened in the middle distances. The Soviet trackmen lost to foreign stars, including the Americans, for a long time. They kept bringing up the rear, but they also learned from the winners. Finally, Yevgeni Arzhanov in 1970 beat the great Mark Winzenreid in Leningrad and then twice more won the 800-meter events in the Match of the Titans. This past summer in Durham Arzhanov did not compete in the 800-meter because of an injury and Rick Wohlhuter came in first. But Soviet trackmen took revenge in the other middle-distance event, the 1,500 meters; Vladimir Ponomaryov and Vladimir Pantelei beat Thomas Byers and Michael Slack. I don't see this double win as particularly extraordinary, however, the middle distances in Soviet athletics are no longer the way-behind events they were not too long ago.

But there are also reverse examples. Soviet track women rarely suffered defeat in the 800 meters, while in the matches with the Americans they did not lose even once until 1970. But then in Leningrad Cheryl Toussaint came in ahead of USSR champion Nijolė Sabaite. And in 1973 Sabaite, an Olympic silver medalist by that time, found a new rival, 14-year-old American Mary Decker. This girl, who won the hearts of Minsk fans, outdistanced Sabaite with as much ease as if she had been running for years and was familiar with the most refined techniques of the two-lap distance. In the last match Decker again left Sabaite behind. But this time she was not just expected to provide a sensational run, she was the favorite.

In 1970 Bill Skinner's javelin flew slightly more than 83 meters, enough to beat Janis Lusis. A real surprise? Unquestionably. Not only Lusis but most Soviet javelin men enjoy considerably higher standing in the international arena than the Americans. But then Lusis lost again in the Minsk match—this time to Feldman; at the Durham meet the Soviet champion ceded the palm to Sam Colson. This reversal no longer raised any talk: The American javelin men were out front.

To sum it all up, the many years of competition between the two athletic squads have been marked by quite natural processes: The weak, reluctant to lose, keep on improving, and the strong put everything they have into holding on to their leadership. At the same time there are still events in which one or the other side can justifiably count on winning. So when Valeri Voikin won the shot-put in Durham, we said: "Sensational!" When Vladimir Lyakhov placed first in the discus at the Leningrad meet, we said: "That was a surprise." Both these events have been and so far remain American territory. The reaction was exactly the same when experts shrugged their shoulders and didn't know what to say the day Jim Johnson was the first in Durham to cross the line in the 3,000-meter steeplechase and Joni Huntley easily cleared the bar at a height of 183 cm. Such surprises happen every year, adding fascination and drama to the now traditional competition between Soviet and American athletes.

A MERRY GROUP of clowns run onto the stage, pick up pieces of colored cloth and . . . lo and behold! there's the sea into which the old fisherman cast his net, and there's the little golden fish shimmering on the crest of a wave. Magic changes follow one another in rapid succession. The old woman turns into a noblewoman, and then into the empress, and then back again into the old woman with the broken washtub. The clowns are the moving force behind the action. Full of energy and mischief, they dance in a ring and sing. The actors are transformed into children playing at being the characters of a story. Their imaginations run away with them, and they become Forest, Sun, Moon, Wind.

The story comes to life on the stage, and the spectators are impelled to express their feelings. You hear exclamations of wonder, alarm and warning to characters threatened with danger.

This theater stages many stories, but the perennial favorites are the stories by Pushkin. There were many arguments about what to show at the theater festival in Albany, New York, in 1972. The majority decided in favor of Pushkin's stories, and their choice was a good one. Even the unfamiliar language was no barrier to comprehension. The American youngsters understood everything that took place on the stage. They laughed or sat stock-still, just like children in Moscow. The stage performance was filmed and later shown on American TV.

There are three silhouettes on the theater's posters: a child, an adolescent and a youth. These are our spectators, who range in age from seven to seventeen, and for them the theater stages a great variety of plays: stories for the youngest, plays about their peers for adolescents, and

By Nikolai Putintsev
Head of the Literary Section of
the Central Theater for Children

Scene from *No Sweet Without Sweat*. When the company was founded 50 years ago, the idea was completely new. Now there are some 150 children's theaters in the Soviet Union.

Photographs by Alexander Nevezhin and Yuri Somov

Top left:
Tales by Pushkin playbill
designed by Edward Zmoiro.
Center left:
Set for *Tales by Pushkin*,
designed by Edward Zmoiro.
Bottom left:
Scene from *No Sweet Without Sweat*.

Costume sketch of an old Russian warrior for *Tales by Pushkin*

Left:
Costume sketch for the Jester, a favorite fairy tale character

for growing young men and women plays with such serious themes as love, friendship and calling in life. Very often they see familiar characters from Russian and foreign literary classics. The repertoire includes *Oliver Twist* by Charles Dickens, *Peter Pan* by Sir James M. Barrie, *King Matthias I*, based on the story by Janusz Korczak, and *Uncle Tom's Cabin* by Harriet Beecher Stowe.

All told the repertoire includes some 30 plays in various genres.

Our theater, the product of half a century of research, was not always what it is today—a team of 400 people, with an orchestra, a permanent company of actors, specially equipped rehearsal halls and various production shops. It all started with "stage games," when the spectators themselves joined the action on the stage. They would help the hero or heroine hide from a pursuing enemy, sing along with the actors, and very often decide the outcome of the play. The theater tried to produce a synthesized presentation of music, ballet, pantomime, circus and variety show elements.

Little by little we set ourselves new tasks. We tried to keep in closer touch with the times and delve deeper into the emotional world of the young, a world often hidden even from parents and teachers.

But that was easier said than done. We began by exploring the possibilities of adult literature and dramaturgy. And the Soviet classics began to appear on our stage: works by Alexei Tolstoy, Valentin Kataev, Yevgeni Shvarts, Konstantin Paustovsky.

Plays by Victor Rozov marked a new stage. He addresses himself to high school seniors. That is the time of life when a person's character is more or less shaped, when young people have to begin to make their own decisions and each new day brings new questions. Rozov does not give any cut-and-dried answers. "Think, search, decide for yourself," he says. He speaks plainly to his audience, he makes no allowance for its youth.

The plays of Alexander Khmelik and other young playwrights have brought the fresh breath of life to the stage.

Our theater has always believed that children should get the best of what art has to offer. Everything that is staged, even the shows for the very young, shapes the artistic taste and the ability to appreciate the beautiful. That is why we always enlist the cooperation of recognized masters in preparing a presentation. We try to get the best composers, artists and ballet masters. Many of the plays are staged by the best directors.

The company of actors, with their traditions of many decades, is the pride of our theater. It is constantly acquiring fresh new talents—that is one of the requisites of genuine creativity. The nucleus of young actors is mostly made up of students of the theater's studio, which is now 30 years old.

It is very important that young actors grow up in the theater and absorb its creative program. It is all the more important in our theater, where artistic aims are inseparable from educational aims. Very often we invite teachers to discuss our repertoire and the merits of a play in rehearsal. And sometimes we invite the children for a heart-to-heart talk. After all, they are our best and severest critics. There is even an Arts Club for schoolchildren at the theater, in existence for more than 16 years now. We get hundreds of letters from youngsters. Some even send us reviews and drawings. At school the pupils arrange discussions in which playwrights, directors and actors participate.

Here is what some of our correspondents write:

"Thank you, Theater, for teaching us to love life and believe in goodness."

"Perhaps if I hadn't visited your theater I would never have understood so fully the greatest of man's possessions—Art!"

"Dear Children's Theater! I wish you eternal youth!"

And here are some of the impressions of visitors from abroad:

From France—"We were charmed by the reception and the play. We felt like children once again."

From Denmark—"It is a wonderful experience to feel the remarkable creative atmosphere of the theater and its dedication to the great cause of bringing up youth."

From Britain—"There's no doubt these performances have a great impact on the minds of small Soviet spectators. . . . I am full of admiration for the work of the directors and actors."

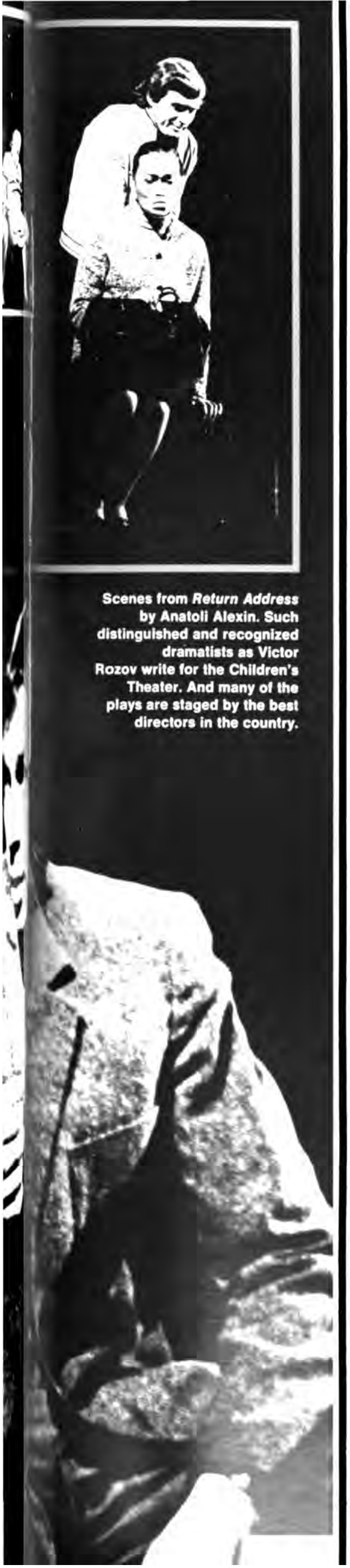
From India—"What I saw here pulls down the walls between our cultures. . . . My heart is filled with joy. . . . I cannot find words to express my feelings. . . . Please accept my deepest appreciation."

When our company was founded half a century ago, a theater for children was a completely new idea. Now there are some 50 children's theaters and over a hundred puppet theaters scattered around the country. All of them have their own permanent premises and companies of actors and are generously financed by the government. Young spectators in the Baltic republics, in the Caucasus and Central Asia can watch performances in their native languages.

Many colleagues from other countries visit our theater. Our performances in Bulgaria, the German Democratic Republic, the Federal Republic of Germany, Canada and the United States were greeted warmly.

Children's theater's are making a truly significant contribution to molding the people of the future. The performances one sees in childhood are never forgotten and are cherished along with other precious memories.

MOSCOW
CENTRAL
THEATRE
FOR
CHILDREN



Scenes from *Return Address* by Anatoli Alexin. Such distinguished and recognized dramatists as Victor Rozov write for the Children's Theater. And many of the plays are staged by the best directors in the country.

QUERIES FROM READERS

QUESTION: Are there school dropouts in the USSR? (A group of high school students)

ANSWER: There are practically none. Secondary education in our country is universal and compulsory, and while until recently only eight years of schooling was required, the country is now shifting to 10 years.

What do we mean by "compulsory education?" We mean that the schools, boards of education, local Soviets, the public and the family are all responsible for the child's progress. The teenager who drops out of school is the extraordinary case. The teachers find out why (conflicts in the family, the influence of the street, and so on) and take what steps are necessary. There are no ready-made solutions, of course, each case requires an individual approach.

But these are details. The important thing is that our compulsory schooling is available to everyone. First, it is free at all levels, including university graduate work. Second, there are schools everywhere, the number is strictly proportional to the population in each locality. Every new housing start also means the construction of new schools. Children living in small remote villages attend boarding schools opened especially for them in larger towns. Incidentally, the rural schools now get particular attention, so that their facilities have improved greatly in recent years.

What other difficulties might interfere with studies? Language problems? Even these are ruled out. In all the national republics the teaching is in the language of the native population, with Russian one of the subjects. There are also Russian schools, but the choice depends on the parents.

Poor retention? The school curriculum (the same for the whole country) is intended for the average pupil, so that academic difficulties are not usually the cause for dropouts. There are mentally retarded children, of course, but they go to special schools. The overwhelming majority of children can pursue their studies without serious difficulties. Poor progress does not result from mental handicaps, but from lack of interest.

Earlier, pupils who fell behind were kept in the same grade for a second year. Practice, however, shows that it is boring for children to go through the same material twice, not to speak of the damage to their pride. That is why many teachers prefer to give additional time to pupils who need it and to make the classwork easier for them until they can catch up with the rest. There are no guaranteed solutions here either, but the result is that practically nobody drops out of school.

Until the eighth grade teenagers cannot leave school if only because no one will hire them. By law, only 16-year-olds are permitted to work, and very rarely—with the approval of a trade union—15-year-olds. Fifteen is the average age of the eight-year school graduate.

Most children stay on in the same school until the tenth grade. But some go to technical schools, which offer students a combined technical and general secondary education, or to vocational schools, which teach a trade. Some vocational schools also offer a general secondary education; the number of such schools is growing, and in the near future they will be the only kind of vocational schools.

Thus, every child gets a secondary education. Even youngsters who already have jobs but have not finished the tenth grade attend evening schools for working youth.

QUESTION: We have many small or "home" gardens. Perhaps you have also. A feature on small gardens in Russia would be most interesting. (Richard N. Allen, Spencerville, Maryland)

ANSWER: Gardening is very popular in our country. All rural residents have small plots attached to their homes, usually one-third of an acre. Collective farmers have larger plots, as much as an acre. City dwellers who have a summer bungalow in the suburbs also have garden areas where they plant apple and cherry trees, raspberry, currant and gooseberry bushes, strawberries and, of course, flowers.

The land is provided free since it is national property and cannot be bought or sold.

Summer cottages are normally built as a cooperative project. Plots of land are assigned to a factory or an office as a whole. Cooperative construction costs its members less, because part of the expenses are covered and some of the work (building roads, installing water mains, and so on) is done by the state or the trade union.

There are gardens in towns and cities, too, and not only near individually owned houses. Apartment tenants also plant greenery in their front and back yards. There are more than enough people happy to tend the trees and flowers.

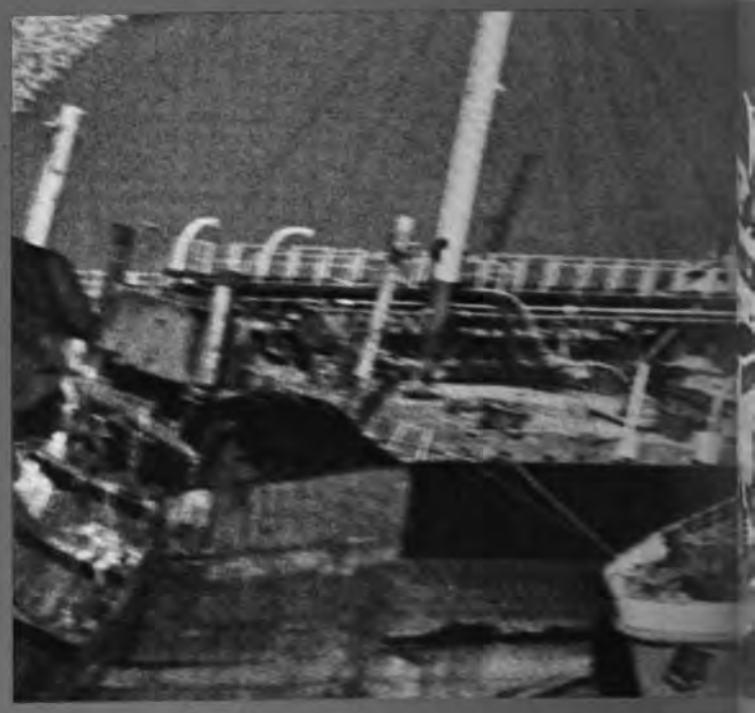
Special literature is published for amateur horticulturists. For example, the capital's newspaper *Vechernyaya Moskva (Evening Moscow)* regularly carries advice for gardeners.

Many gardeners are members of the society for nature protection, which does a good deal of research. Incidentally, there are talented nonprofessional breeders of new varieties of roses, apples and other plants.

Lilac growers all over the world are familiar with the varieties produced by the late Soviet selectionist Leonid Kolesnikov, an auto mechanic by trade. Recently Kolesnikov's daughter accepted on his behalf a posthumous award of the International Lilac Society, whose headquarters are in Boston, Massachusetts.

Experts talked of the impossible, but the Soviet team did it. Rear Admiral Sergei Zuyenko (right) directed the operation.

A Soviet salvage expedition spent 26 hard and dangerous months lifting ships sunk in the major port of the state of Bangladesh. The divers cleared 24 ships from the bottom.



Chittagong harbor is cleared, a monument to the Soviet Union's good will.

Soviet Salvage Team

By Leonid Yevtuchov
Special Correspondent for the Newspaper *Krasnaya Zvezda*

A FAST IL-18 pierced the woolly gray clouds and began its descent. The passengers —most of them divers of a Soviet salvage expedition—looked down upon the terrain of the People's Republic of Bangladesh spreading out under the wings of the plane. The small squares of rice paddies blended into a vast emerald blanket seamed with a tangle of rivers.

Without this network of waters there is just no Bangladesh. The Bengalis speak of their rivers with poetic tenderness, calling them the River of Desire, God's Child, Honey, Lotus, Old Ganges. That is understandable—in no other state in Asia or Africa, or anywhere else in the world for that matter, is life more closely associated with rivers than in Bangladesh. After all, rivers are the country's primary arteries of transportation, linking all its different parts together. Chittagong is Bangladesh's main port and marine gateway. Prior to the war for liberation it handled over five million tons of shipping.

The republic paid a high price for freedom, its economy was completely disrupted. Chittagong shipping came to a halt. Torn and jagged hulls of sunken ships and minefields on the approaches to the port blocked the movement of foodstuffs, medicines and clothing. Thousands of starving and emaciated dockers hung about the empty warehouses waiting for work.

The Soviet Union responded to the young republic's call for help and sent this salvage expedition to Chittagong, whose efforts the local press wrote of as the "Heroic Acts of Soviet Seamen."

By no stretch of the imagination could you describe Bangladesh rivers as blue waterways. Chittagong is at the mouth of the Karnaphuli River, which held some surprises for the Soviet seamen. I had a revealing talk with Captain Yuri Senatsky, assistant chief of the expedition, on the bridge of his ship the *Atlas*.

"Everyone knows what bad weather for flying means," he said wearily, rolling a cigarette between his fingers. "But few people have any idea what's bad for diving. That is what our divers had to contend with: Zero visibility in the water. Put your hand out, and you don't see it. At a distance of 18 inches, an electric welding arc glimmers pale yellow like dried-up lemon rind. The current flow velocity is about 15 feet a second. Drop a cable in the water, in a second it's carried out to sea. Air-supply tubes can also be easily damaged. The temperature of the water is 86 to 89.6 degrees. Four times a day the tidal ebb and flow changes the current. Divers have to work with their eyes shut, by touch. They'll say 'I see a hole' or 'I'm examining a hold' (in our latitudes the visibility is good at 75 to 250 feet). But what they're saying is just habit —they see nothing. Like a blind man passing his fingers over braille dots, they examine vast

areas of sunken ships, inch by inch, with their fingers.

"On board the *Atlas,* the loudspeakers transmit their breathing. It sounds like a blacksmith's bellows. The underwater watch runs from 10 to 12 hours, and ships are being lifted per schedule."

The day I was there the *Surma* was being hoisted. Five hundred sixty-five thousand cubic feet of silt had compressed itself in the hold. To lift the ship, they had to get rid of this load. How did all that silt get into the hold in the first place? "Scoop up a glass of water from the river," said Senatsky, "and in a few minutes you'll have a good three-quarters of an inch of sediment at the bottom. That's how sunken ships end up with a cargo of silt."

The 425-foot-long *Surma* had to be cut up into 15 pieces and lifted section by section.

Rear Admiral Sergei Zuyenko, commander of the expedition, told me about the calamitous verdict of experts who had been consulted on lifting the ships in Chittagong: Inflatable pontoons won't do the job, blasting is dangerous, diving operations would have to be reduced to a minimum and so on and so forth. Many of their conclusions were disproved by the salvage expedition.

brows and continuing down his neck. Obviously worn-out, he sits down on the reserves bench and stretches out his legs.

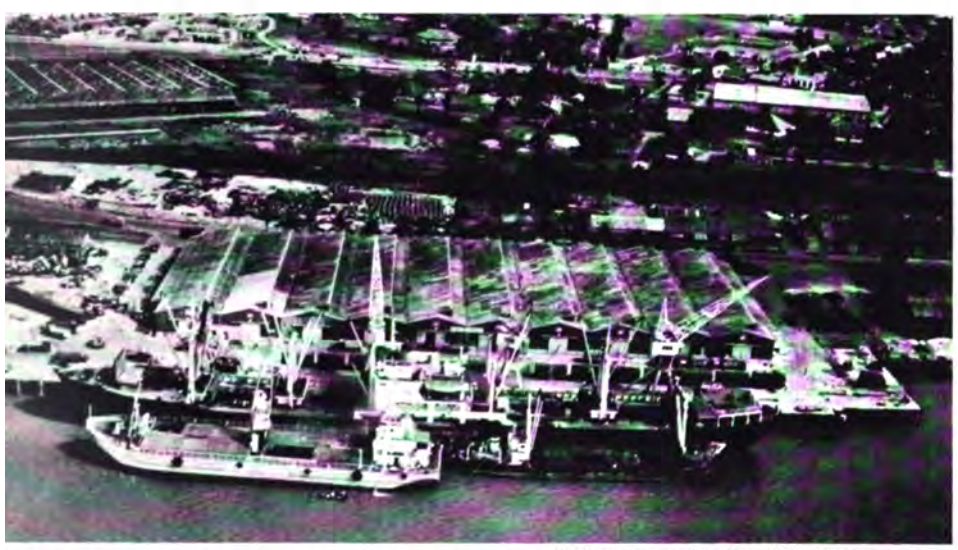
"Did you work standing up?"

"Oh, every which way: on my back, on my knees, lying, sitting and standing. The main thing is to adjust the dredge pump in whatever way you can. You work at the bottom of a hole. When there's no more liquid silt, you start cutting up the solid mass with a high-pressure water jet. The lumps float upward, and if you're not careful, they'll come down and bury you."

His thin jersey shirt under the diving suit is soaked with sweat. At first they thought the suits leaked. The doctors checked and found that a diver here sweated four to five quarts a day. Many lost weight. Their diving records show up to 1,000 hours of work underwater.

A no less difficult part of the operation was to demine the approaches to the port. By the time the Soviet expedition arrived in Chittagong, a minesweeper squadron of India's navy had made a tremendous effort to assure an opening. A narrow fairway, one mile wide and 33 miles long, had been cleared of a large number of mines. But the situation was still very hazardous because of the

Bangladesh paid heavily for its independence. Chittagong shipping came to a complete halt. Sunken ships and mine fields prevented food, medicine and clothing from reaching the war-ravaged republic.



Chittagong harbor back to normal. **Before Bangladesh's war for independence, the port handled some five million tons of shipping.**

The tanker *Mahtar Javed II* lay right opposite the grain moorage. To lift it meant blocking all approaches to the moorage, but this would have interrupted the regular supply of food to the people. The Soviet seamen did the impossible. The tanker was lifted without interfering with the moorage operations.

A diver is coming out of the water. It is Petty Officer First-Class Nikolai Denisov. Through the goggles of his helmet I see rivulets of sweat running from his forehead around his eye-

strong currents, shallow waters and irregular bottom terrain; mines—and their anchors—kept floating about. An Indian ship and a Bangladesh tanker were blown up. Some shipping companies used this incident as an excuse to hold up the delivery of cargo to the young republic.

More than 1,000 square miles of the Bay of Bengal were combed foot by foot. Twenty-six months of dangerous watches and exhausting work are over. Twenty-four vessels have been lifted from the sea bottom.

NEXT ISSUE

The Russian nonchernozem zone is a vast and densely populated region in the heart of the European part of the Soviet Union, where about half the population of the Russian Federation lives. Industrial and agrarian areas alternate throughout it, and you barely leave the city before fields, woods, meadows, swamps and ravines appear. The soil is often infertile, water-logged or overgrown with unproductive vegetation. Reclamation is the key to solving this problem, but it is only part of the vast program of agricultural development for which 35 billion rubles have been allocated in the 1976-1980 period. The well-illustrated lead article presents the vast project verbally and visually.

In 1905, for the first time in history, the proletariat, led by a Marxist party, became the main force on the political scene. A great deal has been written about the First Russian Revolution, but the accounts of Western writers often distort the events leading to and surrounding it. In a special article for SOVIET LIFE historian Fyodor Voloshin presents documentary evidence disproving their misrepresentations of the revolution that deeply affected Russia's subsequent history. Lev Kruglov, Chairman of the Executive Committee of the Ivanovo City Soviet (Mayor), tells about the first Soviets of Workers' Deputies set up by the weavers of Ivanovo-Voznesensk in 1905. The city has changed immeasurably since then, but the deputies of its present Soviet consider themselves the successors of those who represented the workers in 1905.

International Tchaikovsky competitions are among the most interesting and representative contests of young musicians. But there is more to it than the competitions themselves or the prizes. New names of talented artists discovered in Moscow are added to the rostrum of the world's great musicians. This was true of the Fifth Tchaikovsky Competition in which 281 musicians from 37 countries participated last summer. An article in January introduces some of the outstanding contestants.

It is usual to evaluate family income on the basis of its members' earnings. However, in the Soviet Union this method would produce a far from complete picture. A considerable part of family income is derived from what we call public consumption funds. They account for pensions, free health services, accommodations in sanatoriums and vacation resorts free or at reduced rates, free education through graduate school and student allowances, among other benefits. Economist Nikolai Buzlyakov discusses how these public consumption funds affect the lives of ordinary people.

More than two and a half million cataract operations are performed in the world every year, but they only partially restore eyesight—by a mere three to four per cent. An article about Professor Vyacheslav Fyodorov, the Soviet ophthalmologist who has been able to effect 70 to 100 per cent cures by replacing the defective crystalline lens with an artificial one.

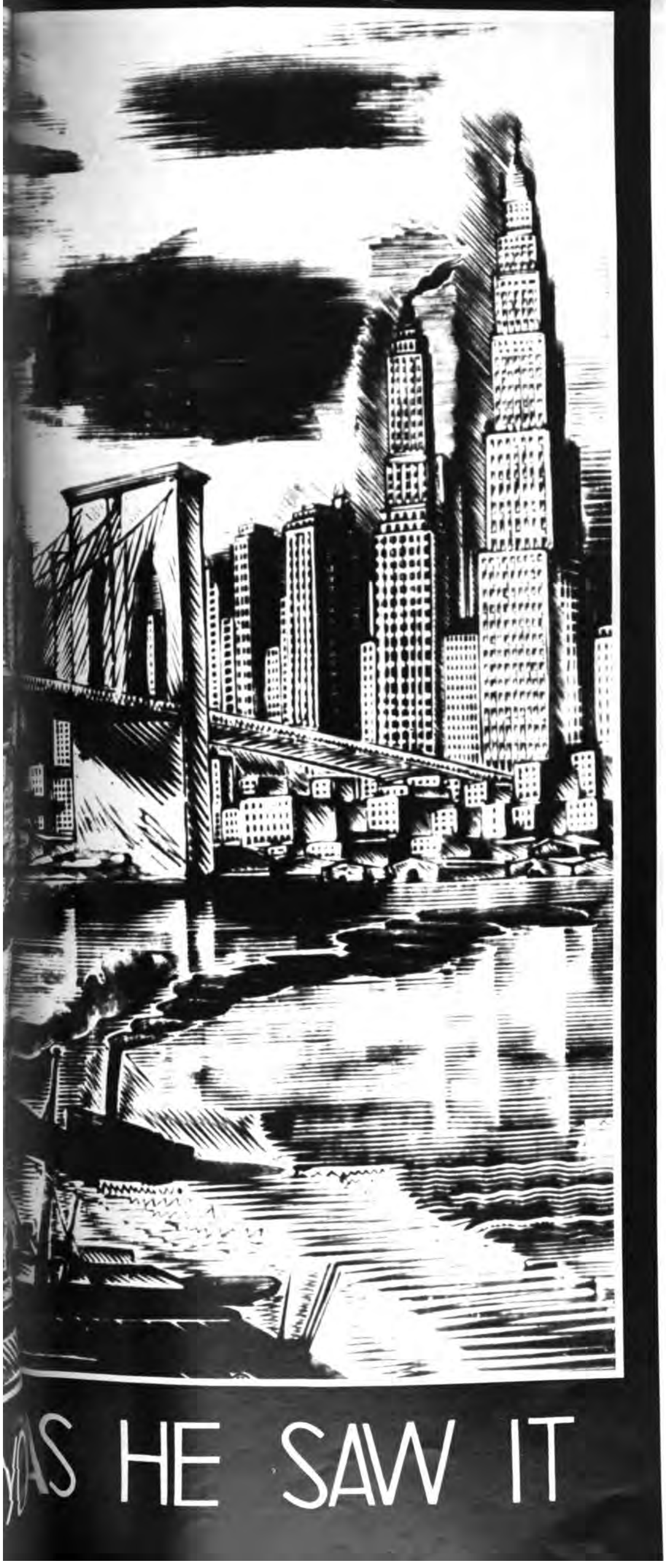
The U.S. ship *Termini*, helplessly drifting in the Pacific during a storm last May, did not expect that aid would come soon in answer to its distress signal. The vessel needed towing, and ships passing nearby could take only the crew. The Americans did not know that the Soviet diesel electric ship *Marshal Rokossovsky* was already speeding toward them. The rescue operation is described by our Far East correspondent.

COMING SOON

How the problem of urbanization is tackled in the Soviet Union.

The power and joy of labor, the creativity of human intellect were an endless source of inspiration to Alexei Kravchenko.

NEW YORK



Brooklyn Bridge. *1929*

Alexei Kravchenko

By Ivan Kuptsov
Art Critic

ONE of the passengers on the *Ile de France* sailing from Le Havre to New York at the end of January 1929 was a rather seasoned traveler who had visited India and Ceylon and had wandered far and wide through Europe. His name was Alexei Kravchenko, one of the best known Soviet artists of the period. His black-and-white illustrations, pencil, India ink, charcoal and sepia drawings, lithographs and etchings, his oil and tempera paintings and water colors were admired by viewers and collectors. Kravchenko had come to arrange the sale of pictures by Soviet artists in New York, where a Soviet exhibition had opened shortly before his arrival.

Though he was preoccupied with his business, the sight of New York made a profound impression on him. The letters his widow Ksenia Kravchenko, a well-known art critic, showed me attested to that. "I am absolutely amazed and overwhelmed and at the same time fascinated by the grandeur of the city," he had written.

The giant city and its dramatic contrasts amplified the feelings that possessed him. Thoughts of the family he had left in Moscow intensified the poignant loneliness of a man lost among the huge skyscrapers. His style had always been the authentic portrayal of human life, society and nature in the great versatility of their interrelations.

In Kravchenko's letters the lines of expressive narrative that read like an essay alternate with business notes that tell us how his work at the exhibition was going. Fifty paintings and 100 black and whites by Soviet artists were sold. American connoisseurs and critics liked Kravchenko's own work too. "I am a great success here, Americans say. My etching was bought for the New York Public Library, for its Black-and-White Picture Room, which is said to be quite an honor."

His talent was most fully manifest in his woodcuts. He used the woodcutting technique to create the illustrations and decorative elements for the works of Pushkin, Gogol, Hoffmann, France, Zweig, Dickens and many other writers. In that medium he did portraits, urban and country landscapes and genre scenes. His vision of the world was romantic, and he therefore had an affinity for the works of literature with tangible romantic tendencies.

During his stay in the United States he gave three talks: "Soviet Fine Arts," "The Artist and Children's Books in the Soviet Union," and "The Artist and the Consumer of Art."

In an outline of the report he was going to make on his return to the Soviet Union he wrote: "America is the country where the art of architecture will live through its renaissance." The emotional impact produced by the New York skyscrapers was as important to him as the engineering and architecture. In the United States he became interested in the relation between decorative art and modern architecture.

Although Kravchenko's stay in America was short, he managed to make a number of expressive sketches in pencil, India ink and water color. He used these sketches for his big etchings and woodcuts, first displayed at a one-man show in Kiev in 1930. The museum bought them, and they were shown subsequently at the retrospective of Kravchenko's work at the Moscow Academy of Arts in 1973.

The very names of Kravchenko's pictures show what attracted his attention—*The Brooklyn Bridge, Edison's Factory, Gasholders*. He was moved by the power of labor and the human intellect.

But he also paid tribute to nature and man's unity with it. While in New York he poetically depicted Central Park, a spot of nature preserved by man. He believed that lakes and ponds, fresh air and green grass and modern industry must coexist somehow and complement each other.

In his numerous sketches of the city Kravchenko does not impose his impressions on the viewer, but seems to be looking at it all from a distance, pondering and reminiscing. That was typical of Kravchenko's work in general.

His trip to America must certainly have stimulated his further creative quest.

When he returned to the Soviet Union, he visited the construction site of the Dnieper hydroelectric station dam. It was the time of the first five-year plan periods, and Kravchenko created works of art devoted to the country's industrialization. His pictures of the Dnieper project, his sketches and later etchings under the general title *Azovstal*, and his drawings of the new Moscow have a spiritual kinship with Mayakovsky's poetry. The world of industry in his etchings, woodcuts and drawings is humane, bright, harmonious. His pictures portraying the country's industrialization are inspired images of the construction of a new world. He conveyed the very spirit of that time, the vigorous rhythms of the epoch, the energy and joy of labor.

Alexei Kravchenko (1889-1940) was one of the first Soviet artists to visit the United States. He told the eloquent, sincere and honest story of his trip overseas. The best Soviet artists continue that tradition.

New York Stock Exchange. *1929*

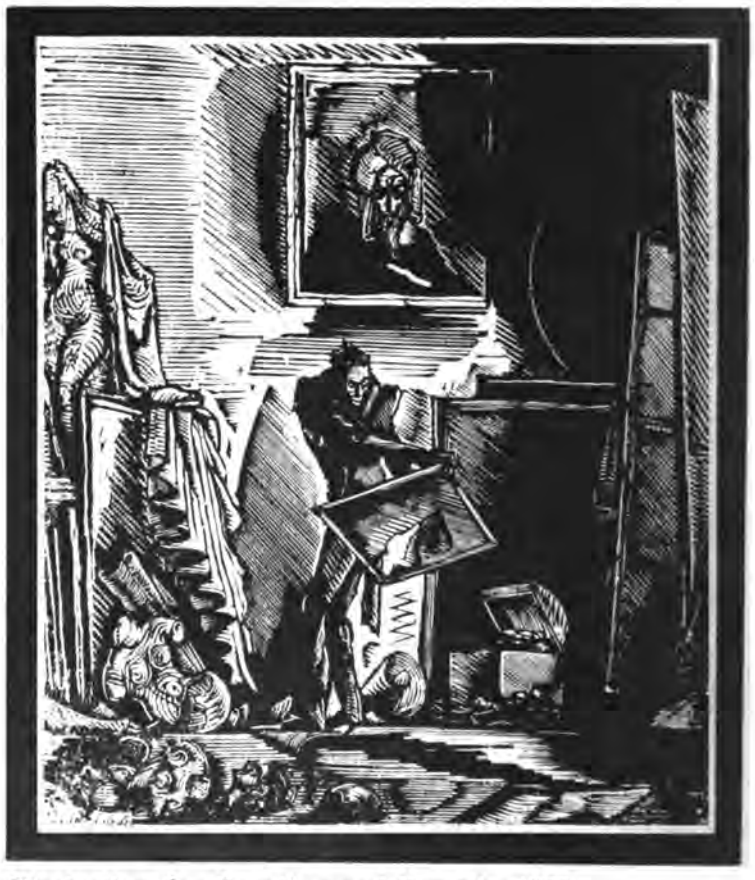
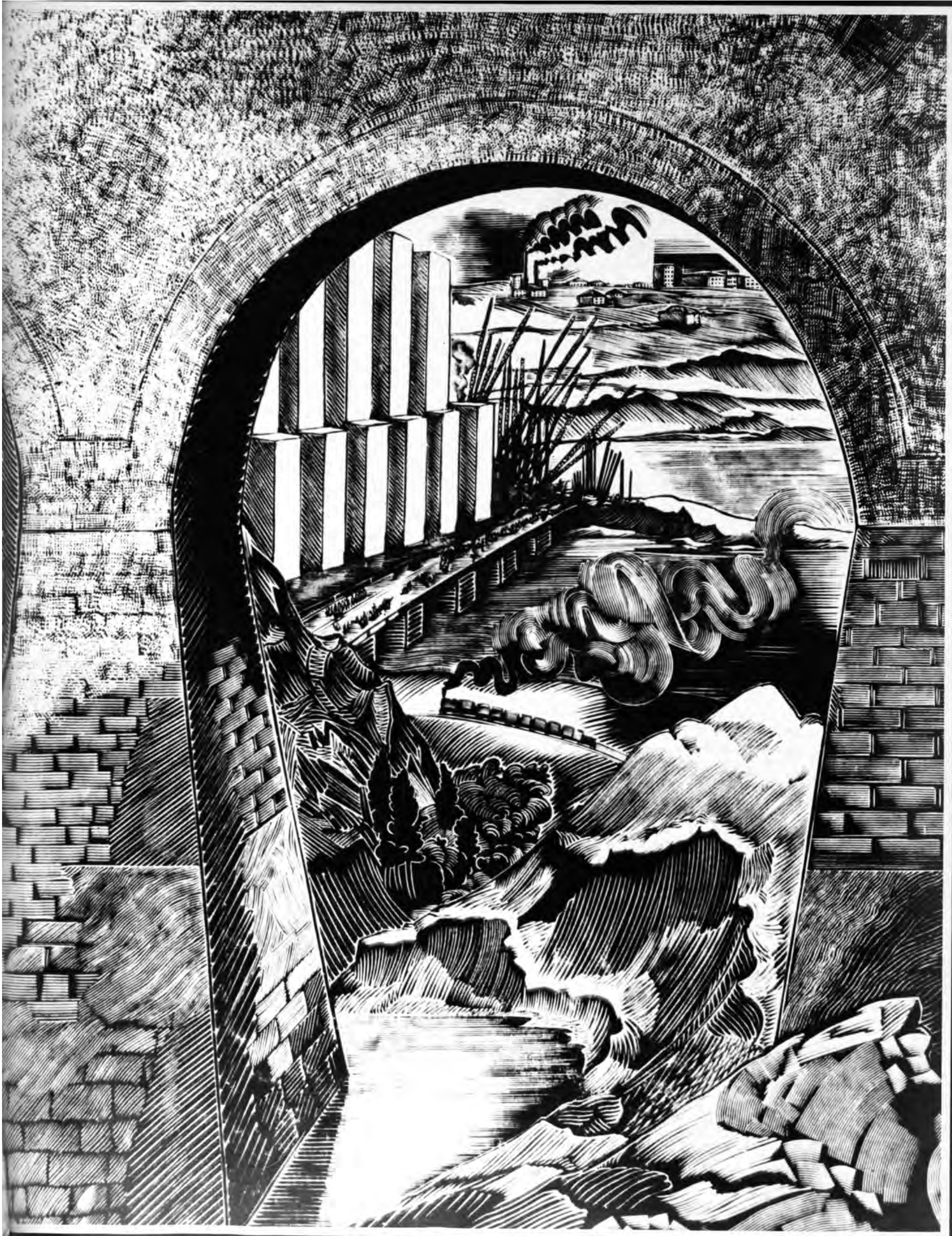


Illustration for Gogol's novel **Portrait.** *1923.*

Arch of the Dnieper Hydroelectric Power Station Dam. *1931.*



His pictures of the country's industrialization convey the vigorous rhythms of the epoch.

The Song Of Crocodile Gena

Let pedestrians hurry
Down the street full of rain pools,
Let them awkwardly look for the way.

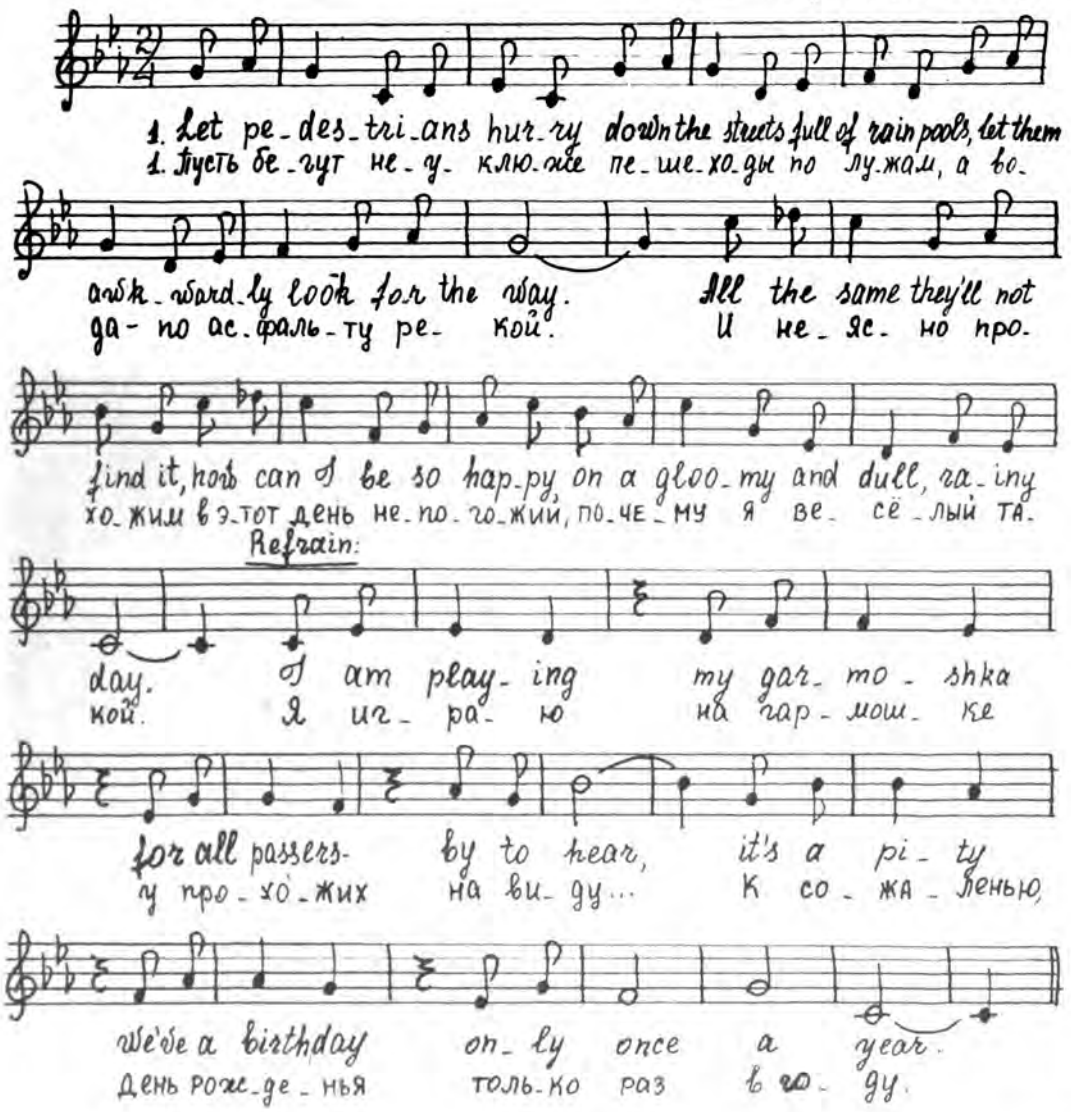
All the same they'll not find it.
How can I be so happy
On a gloomy and dull, rainy day?

I am playing my garmoshka
For all passers-by to hear.
It's a pity we've a birthday
Only once a year.

Then a wizard'll come flying
In a blue helicopter.
He will show me a film, near me stay.

Half a thousand ice-cream cones
He will give me and wish me
Many happy returns of the day.

I am playing my garmoshka
For all passers-by to hear.
How I wish we could have birthdays
More than once a year!

Music by V. Shainsky
Text by A. Timofeevsky
Translated by Leonid Shturman

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