SOVIET LIFE

SPACE PROJECTS: YESTERDAY, TODAY AND TOMORROW

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SOVIET LIFE

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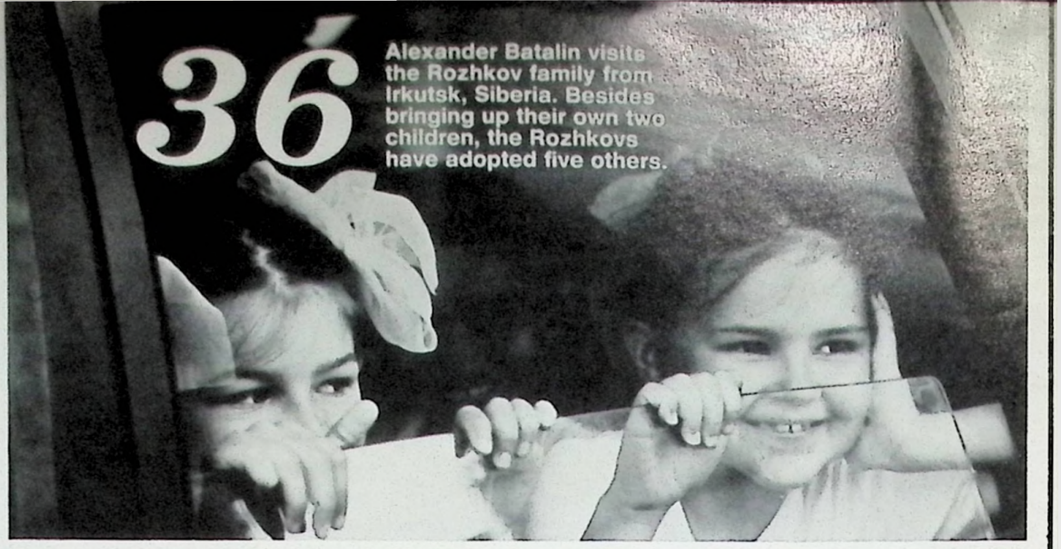

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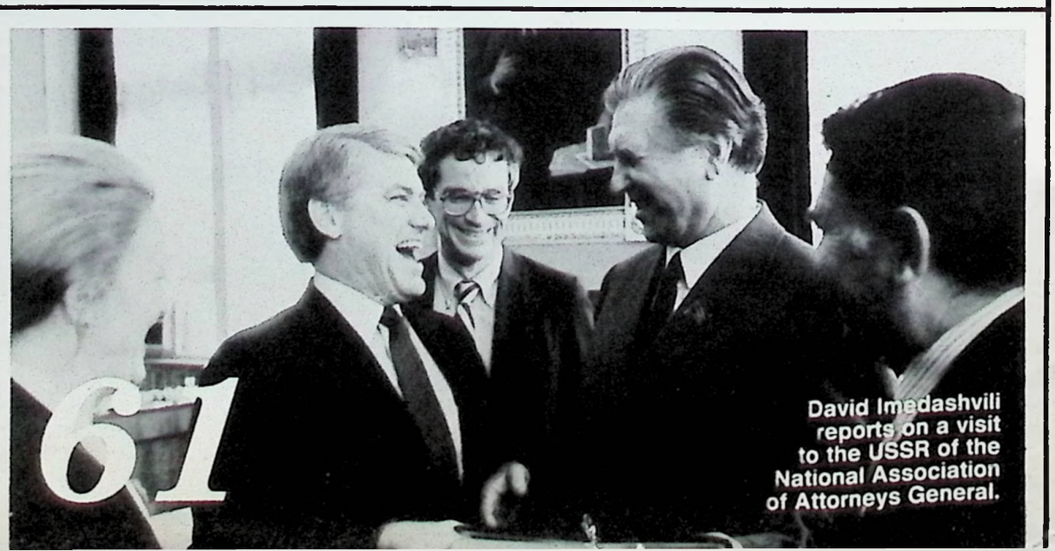

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EDITOR'S NOTES

I READ in *Newsweek* not long ago an interesting hypothesis of American scientists. From genetic data, the authors claim that we all had a common ancestor some 200,000 years ago. Symbolically, they called our common 10,000th great-grandmother Eve.

It's up to the experts to decide whether this hypothesis is correct. From the viewpoint of a journalist, it is certainly very appealing and very timely.

Fortunately, the events of the last few months have inspired us with optimism. The forthcoming Gorbachev-Reagan meeting in Moscow is to become the next important stage. It is important not only because it can lead to a reduction in nuclear arsenals, but as Minister of Foreign Affairs Eduard Shevardnadze put it during a recent press conference, "Summit meetings predetermine a new quality of our relations, which can determine a new character of international relations in general."

Shevardnadze went on to say that both the USSR and the United States should give up reciprocal accusations and "exposures." It is necessary to take notice of the positive tendencies in the life of both our countries.

Things have already started to change. The Soviet media have noticeably altered the tone and stress of their descriptions of the United States. The American media, too, have started to describe us more objectively. Public opinion polls show that many Americans are following with interest the changes that are taking place in the Soviet Union. We, the editors of SOVIET LIFE, see this interest in the letters we are receiving from readers.

The vistas for Soviet-American cooperation are boundless. And the effect of such cooperation is invaluable both in terms of building trust and mutual understanding and from the point of view of practical results. Thus, a recent five-year agreement between the USSR Academy of Sciences and the National Academy of Sciences of the United States provides for joint research in such vital areas as the protection of the planet's ozone layer and the struggle against AIDS.

Although we have a host of problems to solve jointly on Earth, our two countries are discussing plans for a joint venture to Mars too. Only a dream? I don't think so. Remember, there was a time when the Soyuz-Apollo flight seemed only a fantasy. To put everything in perspective, we've included in this issue a special pull-out poster, Space Pioneers, which is another joint venture between the *Air & Space/Smithsonian* and SOVIET LIFE magazines.

Robert Tsfasman

LETTERS TO THE EDITOR

In the era of *glasnost*, is it not time that you cease distorting history by refusing to mention Stalin, Trotsky and others? In the words of Mikhail Gorbachev: "Let us speak loud and clear about the October Revolution and socialism, our past and present, and the results of the Revolution and socialist development . . . you cannot speak derisively or with malice about the history of a nation." (SOVIET LIFE Supplement, Page IV, October 1987.) However, it is noted that even Gorbachev failed to name Stalin when he mentioned the events of 1937 and 1938.

Nelson Berman
Carpinteria, California

As a subscriber to SOVIET LIFE, I particularly enjoyed the December 1987 issue.

I particularly like the features about the peoples of the 15 Soviet republics, such as this month's story on some interesting citizens of Baku, Azerbaijan, and their tradition of the *chaikhana* (which I first learned about in Langston Hughes's travel memoirs *I Wonder as I Wander*).

It is also fascinating to discover the cooperation of Soviet and U.S. doctors through Orbis and to read about your arrangements for the destruction of chemical weapons (which, I have to accept on trust, will go forward as you describe it).

One type of article I look forward to is the story spotlighting an individual or a family where we visit an active Soviet citizen at home and at work. In the December 1987 issue I was glad to become acquainted with Dr. Yelena Avrorova and with the husband-and-wife students Irina and Arsen Kurban-Galiyev, and their little boy.

As an employee of a business office, I like to follow the progress of your reorganization. In this sense, the views of Soviet citizens toward your bureaucracy were enlightening in the *Izvestia* Public Opinion Poll. I also found Mr. Gurevich's commentary on the function of the market to be a very practical analysis.

The Estonian art was truly breathtaking, rather evocative of surrealism but reflecting Estonian culture and ethnicity. The varied and beautiful images from "A Day in the Life of the Soviet Union" were quite moving and created a feeling of entering into the lives of the Soviet people. As a Jewish American, I hope that the elderly man shown praying at the Tbilisi synagogue will not be the last of our people to pursue the Jewish faith in the Soviet Union.

I have one criticism of your editorial policy. Your prominent coverage of the Soviet-American peace walk implies between the lines that the U.S. Government is not working as hard to promote peace as is the Government of the USSR. We may not have a lot of official peace marches, but President Reagan has taken a very important step in agreeing with General Secretary Gorbachev to eliminate certain shorter- and medium-range nuclear weapons.

Since I like the movies very much, I found your feature on the 15th International Film Festival in Moscow quite exciting. There has been a lot of notice here for Mr. Abuladze's daring, politically symbolic *Repentance*. It is also encouraging to note that *The Journey of Natty Gann* from the U.S. was so well received in your country.

Harriet M. Wilder
Brooklyn, New York

As a new subscriber (July 1987) to your magazine, I would like to take this opportunity to compliment you on the fine quality of your articles and pictures. They have both given me a rare glimpse of life, both past and present, in the Soviet Union.

There is one suggestion that I would like to make and that is the inclusion, with certain articles, of a small map showing the locales referred to in the accompanying article. I am sure that many of your readers, like myself, do not have a working knowledge of the geography of the country, and such a map would add to the enjoyment and understanding of the Soviets.

In any event, I am well pleased with the magazine and have, in fact, ordered two holiday subscriptions.

Eugene J. Schiller
Upland, California

My husband and I spent seven weeks last summer in the Soviet Union.

Before we left, we read as much as we could about the USSR, including your magazine and books and articles written by such people as Hedrick Smith. We thought that SOVIET LIFE magazine was all propaganda and that all the photos were staged. We believed that the American books and articles told us how life really was in the Soviet Union—somber, depressed and inefficient.

We traveled on our own for two weeks—by train from Brest through Minsk to Moscow to Irkutsk and back to Moscow. We then took an Intourist trip to Uzbekistan, Georgia and Leningrad, and the last three weeks were spent with an Intourist tour in the Ukraine. Often we would skip the scheduled daily activities and go on our own by foot, bus or Metro to wander the streets or to see particular parks or monuments in which we were interested.

Now that we are back, we especially enjoy looking at SOVIET LIFE magazine because the pictures show life just as we saw it. The people are happy and friendly, the children are polite and well cared for, clothing is colorful and stylish, architecture is magnificent, the transportation systems are fast and efficient. I could go on for pages describing all the good things we found in your country.

We now know that monuments to the Great Patriotic War are built to preserve the peace, not promote war. We admire your efforts to house and employ all the people, and your devotion to all your children. We know that many things can be improved greatly in both our countries. When it comes to improving the quality of life, we somehow feel that you are the most likely to succeed.

Marjorie D. Tetlak
Queen Charlotte
British Columbia, Canada

I have subscribed to SOVIET LIFE for nearly a year now, and for a year before that, I occasionally purchased it at the newsstand. I have greatly enjoyed the magnificent oversized format and the plentiful, artistic photographs. More important, I value the opportunity for a window onto the culture and life of the people of the Soviet Union. I am at the same time both comforted and a little frightened that there seem to be so many similarities between us as people. Certainly improved relationships between our nations will come when we see those similarities.

For the time that I have been acquainted with your esteemed publication, I have had an undefined discomfort about it, some small submerged dissatisfaction. I have just now determined the source of my dissatisfaction, and I wanted to write to you to share that realization and offer it as a suggestion for improvement.

There are almost no maps! Your great magazine presents and describes many (to me) new and picturesque places, yet fails to give much perspective of location on the globe. I suggest that my apprehensions-of-the-unknown about the Soviet Union (and perhaps those of other Americans, as well) would diminish with a good dose of geography and topography (where *is* Uzbekistan anyway?). I know your land is impressively large. Where are all these wonderful places? How big are they? What are they near? Are there mountains and rivers and roads?

Robert Snow
West Richland, Washington

CONCERN FOR CHILDREN

Vladimir Lenin among children in Moscow's Red Square during the Revolution Day celebrations on November 7, 1919. The Soviet Children's Foundation, which was recently set up, was first thought of by Lenin. Articles about the foundation and its work begin on page 31.

INTERNATIONAL ASPECTS OF HUMAN RIGHTS

The current radical changes in the Soviet Union for more democracy and openness and an active Soviet peace policy in the international sphere are adding extra meaning to the issue of human rights. It is important to trace the present approaches to the issue and to discuss the prospects for international cooperation in this area. SOVIET LIFE correspondent Yuri Kudryavtsev talked with a group of leading Soviet experts on human rights.

Yuri Kudryavtsev: *Perestroika* implies that priority be given to the social, economic and political rights and freedoms of Soviet citizens. What problems does this involve, and how can they be resolved?

Yelena Lukasheva, Doctor of Laws: Human rights are not a gift from a generous state. We must provide each Soviet citizen with dependable guarantees for creative activities. I think that we must focus on three main things in this area.

First, fuller use must be made of the political rights and freedoms embodied in the Constitution of the USSR and other laws. I am speaking of the right to take part in the management of state and public affairs, including the right to submit proposals to state agencies and mass organizations for improving their work and the right to criticize their shortcomings.

Citizens must have the right to freely express their opinion on any social issue. Openness is an essential condition for exercising these political freedoms. It is ensured by the Law on Nationwide Discussion of State Affairs, which was adopted last summer.

A special law on *glasnost* should be adopted that will effectively combat red tape and formalism and will ensure more information about state institutions so that the public can monitor them.

Second, there is the social area. We scored big successes in terms of economic rights. Yet they suffered in the stagnant seventies and early eighties. For all the great achievements made in Soviet public health, the standard of medical care, unfortunately, has lagged behind.

Individual enterprise, one of the forms of exercising the right to work, has recently been sealed in a special law. Still, the system of wages and salaries remains imperfect, and there are discrepancies in fixing pensions.

Third, the juridical mechanisms for the exercise of rights and freedoms must be improved. The Law on the Procedure for Legal Appeal Against Unlawful Acts of Officials that Infringe on Civil Rights has been adopted, and a precise system of political and legal guarantees of these rights is being evolved.

Kudryavtsev: The pattern of development of Soviet society has influenced many spheres of international life, including the humanitarian one. What contribution has been made to the international human rights campaign?

Anatoli Movchan, member of the United Nations Human Rights Committee : The fundamental ideas and principles of democracy for workers were formulated by Vladimir Lenin and embodied in the first documents of the Soviet Government. The documents proclaimed and guaranteed the nations' right to self-determination and the choice of state and social system, and the workers' social, economic and cultural rights.

All these rights have eventually won international recognition and were expressed in the UN Charter, the Universal Declaration of Human Rights (1948) and the International Covenant on Economic, Social and Cultural Rights (1966). The United Nations agrees with the most important provisions proposed by the Soviet Union—that a person without economic, social or cultural rights is not free. Thus, the legal nature of social, economic and cultural rights was acknowledged.

The USSR made a substantial contribution to drafting the UN Charter. It was the Soviet delegation that proposed linking the aim of safeguarding international peace and security with the aim of promoting and encouraging respect for human rights, particularly the right to work and education, and with fundamental freedoms for all without distinction on the basis of race, gender, language or religion.

The socialist countries actively helped to develop and adopt UN international declarations, pacts, covenants and other acts on basic rights and freedoms. The conclusions drawn in them are regarded today as international standards based on agreements between different states—socialist and capitalist, industrialized and developing, monarchies and republics.

Kudryavtsev: The reaction to the current changes in the USSR is not the same everywhere. Some people continue to accept the Western concept of democracy unconditionally and try to prove that human rights are underrated in the Soviet Union. What's your opinion?

Vladimir Kartashkin, Doctor of Laws: Advocates of détente and cooperation welcome the processes under way in the Soviet Union. But there are also people who try to play down the significance of these changes and stir up the ideological battle over human rights. This battle is inevitable and will continue in the future. The Soviet Union, however, proceeds from the premise that ideological disagreements must not be allowed to spread to relations between states, to undermine their stability or to prevent mutually acceptable agreements.

Under international law, at the present time, the exercise of human rights and freedoms is within the jurisdiction of each particular country. The law and the administrative rules of countries must at the same time conform to international obligations.

Unfortunately, there may be violations of human rights in any society due to, among other things, erroneous decisions by a court or administrative body and abuse of position. Countries with a developed political system have special juridical mechanisms capable of restoring justice. Any outside interference in their domestic affairs is therefore unnecessary and contradicts the UN Charter, the human rights pacts, the Helsinki Final Act and other international agreements. Only when such violations are gross or on a mass scale, or when some state embarks on a policy of genocide, apartheid and racism can the UN and other international organizations apply mandatory sanctions against it.

Some Western powers propose a permanent mechanism to consider complaints from individuals. We don't think it will be effective.

Kudryavtsev: Though ideological disagreements must not hinder cooperation, efforts are being made to heighten tensions. Is that so?

Vladimir Lomeiko, Soviet representative on the UN Human Rights Commission: The only alternative to cooperation is confrontation, and the philosophy and policy of the latter are fraught with dangerous consequences for civilization.

Explaining its position at the sessions of the

Continued on page 10

A VERY SUCCESSFUL VISIT

A delegation from the American Federation of Government Employees recently visited the USSR. Members of the group traveled to Moscow, Leningrad and Kiev. They met with trade union and government officials and toured schools and state farms. Workers welcomed them in their homes.

By Vladimir Dergun, Nikolai Ikoyev and Sergei Nenashev

Photographs by Vasili Litosh and Alexei Varfolomeyev

Contacts between Soviet and American trade unions cannot be described as extensive. That's why the arrival in the USSR of a delegation from the American Federation of Government Employees was welcomed as a good sign of the changing times.

Among the places the delegation visited on its trip was the Teplichny State Farm, 20 kilometers from Kiev, the capital of the Ukraine. The farm specializes in growing cucumbers and tomatoes.

The visitors spent a whole day there, viewing farm operations and talking with farm hands. When the time came for the delegation to leave to attend a gala show and dine in one of the best restaurants in the capital, the group declined, preferring to stay and have dinner with their new friends, sharing stories and learning about each other's life, working conditions and earnings, among other things.

In the farm's cultural center the American visitors were welcomed by local schoolchildren, who presented them with souvenirs that they had made. The children told the group about their pen pals in Chicago and expressed the desire to visit the United States someday.

On parting, as if summing up the results of the visit, the Ukrainians and Americans unanimously agreed that they had known more about the main problems of Soviet-American relations than about the diversified everyday life of the Soviet and American people. They said that the gaps can be filled by broadening personal contacts through visits like this one.

Back in Kiev, the delegates went to the Council of Ministers of the Ukraine, where they heard about the social, economic and cultural progress made in the republic. They also visited the Ukrainian Republic's Council of Trade Unions, where they were given a detailed report of the housing construction program in the republic. Under this program, every Ukrainian family is expected to be living in its own apartment or house by the year 2000. The American guests also toured new residential areas of Kiev.

Another highlight of the American delegation's trip to the USSR was a tour of Leningrad, where the group met with Vladislav Korzhov, chairman of the Leningrad Regional Council of Trade Unions. He told the group about the practice of the retraining and placing of workers who are let go due to staff trimming, which has begun in the Soviet Union recently.

"Why is there surplus labor when the Soviet Union has always said that it has a shortage of workers?" a member of the American delegation asked.

"The surplus is the result of the new economic reform policy, which led to a dramatic reduction in the number of unskilled and arduous manual jobs," Korzhov explained. "Last year in Leningrad alone intensification of production led to the reduction of 14,000 jobs, and this year the figure is expected to reach 40,000. Though the situation is outwardly similar to the situation in the United States, it is fundamentally different."

When Soviet workers are to be let go, the plant's management must either give them other jobs (after retraining, which is free) at the same enterprise or find them new jobs through the local employment service. Many new jobs are appearing in the fast-growing service and trade sector, which has gotten a new lease on life, so to speak.

"Unemployment is a terrible thing," said the head of the American delegation, Allen Kaplan. "You must do everything to avoid it. As a matter of fact, our labor unions can help one another and exchange experience. That's why we are planning to promote the contacts we have established with the Soviet side."

The American delegation also spent half a day touring a cardiac rehabilitation center on the shore of the Gulf of Finland near Leningrad. The center can accommodate 1,100 patients.

Vouchers to the center are distributed by industrial trade union committees. One-fifth of the vouchers are distributed free of charge, while the remainder—at a 70 per cent discount (the difference is covered by the trade unions).

"Why do you have to distribute vouchers?" the Americans asked.

Lidia Novak, chairwoman of the Central Committee of the Medical Workers Union, who accompanied the delegation, answered that demand for accommodation at sana-

In Leningrad the delegation was received by Vladislav Korzhov, chairman of the Leningrad Regional Council of Trade Unions. Below: Allen Kaplan (center) meets Grigori Grossman, chairman of the Leningrad Jewish congregation (left), and Rabbi Yefim Levitis.

Facing page, far left: The traditional bread and salt welcome greeted the group in Kiev. Above: A program of Ukrainian folk music and dance followed a working session. Right: Valentina Kalashnik, a worker at the Teplichny State Farm, entertained the group in her home.

toriums and resorts exceeds supply. Therefore, the trade union must decide which workers are in most need of vouchers. Among those in the priority category are labor veterans, persons who are sick and people with low incomes. Vouchers to sanatoriums and resorts are also given to top workers as a reward for good work. In short, the main principle here is social justice.

The American delegation was also given the opportunity to visit a synagogue. Grigori Grossman, the leader of the Leningrad Jewish congregation, and Rabbi Yefim Levitis were bombarded with questions. The traditional question was: "Why do some Jews wish to leave the Soviet Union?"

"Emigration from the Soviet Union has nothing to do with one's nationality," Rabbi Levitis said. "The migration of the population is typical of all countries. There are Italians who live outside Italy and Americans living outside the United States. Not only Jews emigrate from the Soviet Union but also Germans, Ukrainians, Armenians and Russians. As far as my congregation is concerned, all who wished to leave have left during the last two years. There were not many, anyway. And it's not the most important thing in life, is it? Wouldn't you rather know how the people who do not want to go anywhere live?"

For some reason, that question went unanswered.

Before leaving for home, the American Federation of Government Employees held a press conference. I asked Allen Kaplan, the federation's national secretary-treasurer, for his impression of the visit.

He told me that the visit was a success and that the program was interesting and diversified. The delegates visited Moscow, Leningrad and Kiev, met with trade union leaders and government workers and toured schools and state farms. They were also welcomed by workers in their homes, met with the chairman of the Soviet of the Union of the USSR Supreme Soviet, Lev Tolkunov, and discussed various problems with the chairman of the All-Union Central Council of Trade Unions, Stepan Shalayev.

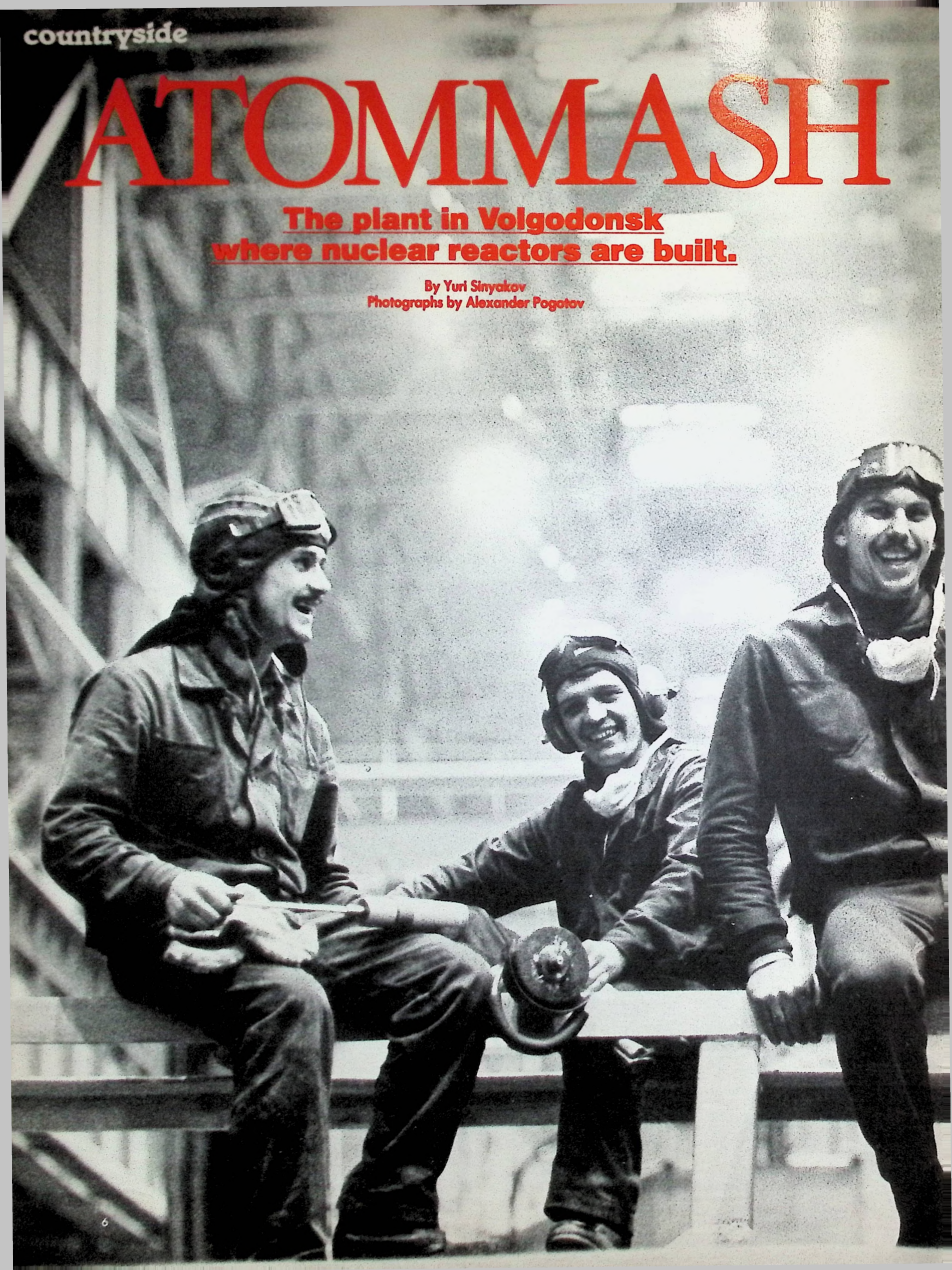
"Although we belong to different social systems," Kaplan said, "the American and Soviet trade unions have one important thing in common: They are concerned with the problem of human survival. I hope this visit is one more step toward solving this problem because in the nuclear age it is cooperation and not confrontation that promotes progress."

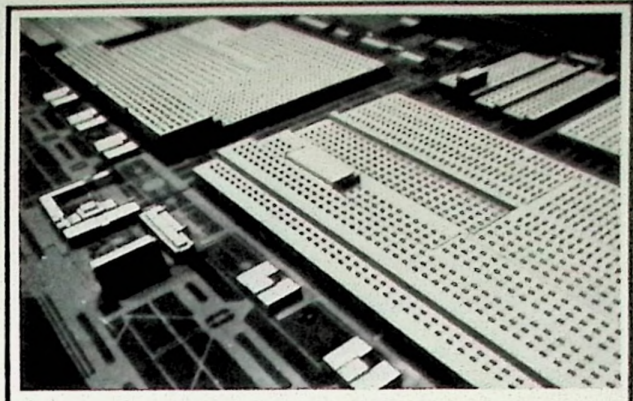
Touching upon the prospects for Soviet-American trade union contacts, Kaplan went on to say that, at present, the contacts are not what they should be. He believes that the main reason for this is the unfavorable political situation, which is changing, however. This can be judged from the recent signing of the INF Treaty. He also said that he hopes the visit will help to broaden Soviet-American contacts, as trade unions represent the interests of millions of working people and, in so doing, bear an enormous responsibility.

ATOMMASH

The plant in Volgodonsk where nuclear reactors are built.

By Yuri Sinyakov
Photographs by Alexander Pogotov





Atommash's size is truly impressive. Its buildings stretch for several kilometers. Workers came from all parts of the country to take part in its construction. Shown here is a bird's-eye view of a scale model of the big plant.

A team on a break. These men assemble steam generators for nuclear power plants.

Atommash is the world's first industrial plant to begin producing complete sets of components for nuclear power stations. The plant was built seven years ago on the steppes of southern Russia, near the city of Volgodonsk. The city derives its name from the navigable canal linking the Volga and Don rivers. It was dug in the years after the Second World War.

What makes Atommash a factory of the twenty-first century? Several things.

First, one of the key directions of the long-term development of the Soviet power industry rests with nuclear power, an industry which Atommash serves. Second, the plant incorporates the latest advances in science and technology. Third, it has been built and equipped with an eye toward the future: It is capable of turning out reactors that are not even on the drawing board.

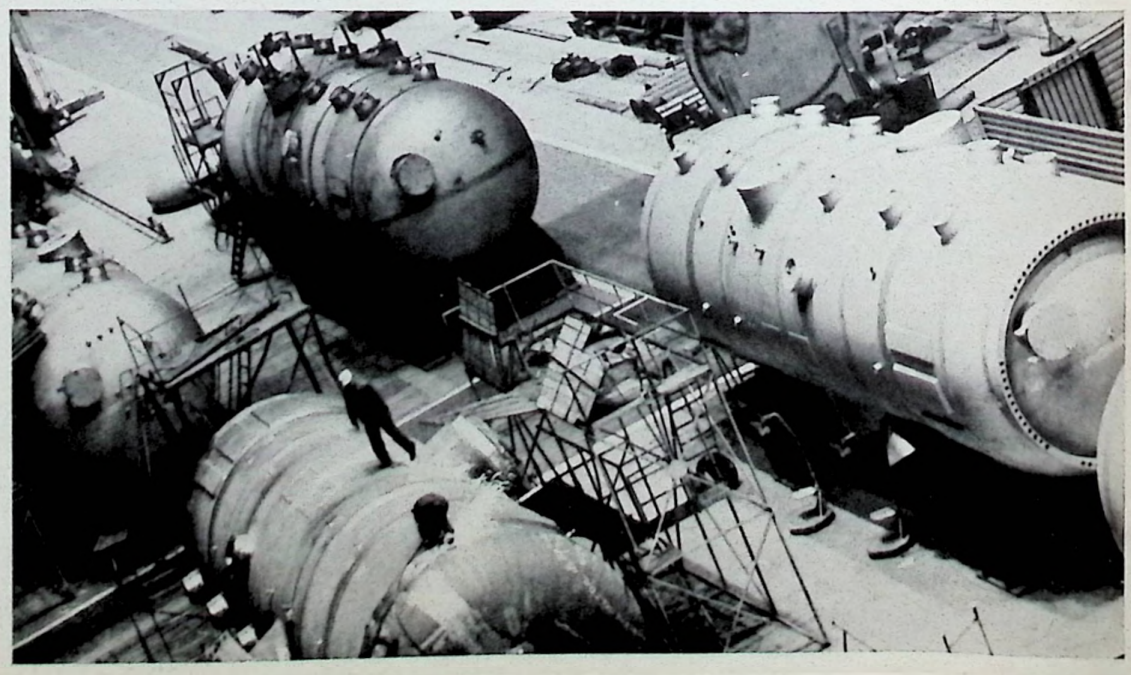
It is exactly its scale, technical standard and importance for our economy that make Atommash so special. About 25,000 people representing 40 nationalities came from across the country to take part in the plant's construction, and their work is truly impressive. Take the first block of Atommash, which occupies an area of 60 standard soccer fields.

Like ocean-going vessels turned out from dry dock, superpowerful reactors come off the assembly line. Of course, as applied to Atommash, the words "assembly line" are used symbolically. It's not an auto plant where new vehicles roll off the belt every few seconds. At Atommash, annual production amounts to a "mere" eight rigs, each weighing about a thousand metric tons. Though the plant turns out only eight reactors, their combined capacity is equivalent to that of all Soviet power stations in 1937.

Even so, the telltale signs of assembly-line production are manifest at Atommash too. Production operations are arranged in a consecutive order, parts are standardized and manufacture follows a full-cycle pattern. The technological chain of production is arranged in a single line, so that no component returns to a spot on the line it has passed.

A wrought-iron ring spins on a lathe. The part spins so easily that you can hardly believe it weighs nearly a hundred metric tons. While it spins, a computer-operated cutter shaves off an endless fine ribbon of metal.

The steel hull of the reactor, which must operate in the extreme conditions of superhigh tem-



Above: Reactors for future nuclear power plants must be resistant to corrosion. This installation applies a powerful anticorrosive layer to the reactor's hull.

perature and pressure, cannot have any lateral seams. Otherwise, it would simply burst. That's why the hull is welded from wrought-iron rings.

The Volgodonsk plant's welding requirements are stringent. The metal "sewn with fire" must be free of any defects. Each metal seam passes through seven stages of detailed inspection. It is examined by a magnetic field, probed with ultrasound and scanned with X-rays.

Before being finally cleared for commercial use, each reactor travels the entire technological chain, which takes three full years. One whole year is spent on testing the reliability of the parts and inspecting the joints of the entire reactor.

Unsurprisingly, these high standards raise the over-all production costs, but they are unavoidable when safety of people and the environment is at stake. Quality and safety are two sides of the same coin involving accident-free operation of the nuclear power station. A reactor must be in operation for at least 30 years without repairs. After the experience of Chernobyl, safety requirements have become much more rigid.

The technical standards attained at Atommash are capable of meeting the requirements of the third millennium. Take, for example, the plant's X-ray chambers that stand 15 meters high, or the laser units.

The one-of-a-kind machine tools used at the plant were ordered from Soviet and foreign factories especially for Atommash. The newest item at the plant is a unique rotary-table lathe. This 24-meter giant can machine, with a high degree of accuracy, reactor hulls and lids weighing up to 600 metric tons and with diameters of up to 22 meters. Engineers from the city of Kolomna near Moscow incorporated many original ideas and concepts in the design of this machine.

Operation control is facilitated by the plant's computers. They help to accurately maintain the parameters of the technological process. A great deal, however, depends on the operator's knowledge and skill. Here, too, Atommash is an industry leader. Approximately 50 per cent of its workers have top qualifications.

The standard required in reactor building is so high that no industrialized country can supply all of its new nuclear stations with all necessary equipment on its own. Therefore, cooperation among enterprises in different countries is unavoidable. In the field of nuclear power engineering, the Soviet Union has broad ties with member countries of the Council of Mutual Economic Assistance. But even with this multinational cooperation, Atommash plays first fiddle in world reactor building.

Far left: Equipment for nuclear power and heating plants in production. Left: Atommash's programming center develops new models for numerically controlled machine tools.

HUMAN RIGHTS

Continued from page 3

UN Human Rights Commission, the Soviet delegation emphasizes that constructive cooperation must be expressed in each nation's efforts to create the best possible conditions for upholding the rights of its citizens, which are proclaimed in relevant international pacts; that different states must cooperate in exercising human rights according to these and other agreements; that states must exchange positive experience in this area.

Though social and state systems and political and philosophical doctrines differ, the world community has a solid foundation for international cooperation in this area, namely, the Universal Declaration and other international pacts and agreements.

The representatives of socialist countries call on all nations to cooperate in a constructive way. If they are all genuinely concerned about the situation of the homeless, why shouldn't they ask the countries that have resolved this problem to share their experience with them? Or there are nations that are still facing racial discrimination and illiteracy. They would certainly benefit from the positive experience of other states. This would be an example of constructive international cooperation.

Unfortunately, some people in the West try to reduce this discussion to two or three sensational examples and to avoid discussing other aspects of the problem. The insolvency of this approach is particularly clear now that the Soviet Union has proposed a representative humanitarian forum in Moscow to discuss a wide range of issues seriously and in a businesslike manner.

Kudryavtsev: The idea of cooperation is winning more and more support from public organizations. What's the outlook for this cooperation?

Konstantin Shakhmuradov, executive secretary of the Association of Soviet Jurists: Today more and more lawyers won't accept human rights being used to pressure and confront the Soviet Union and other socialist countries. We, on our part, are convinced that a constructive dialogue is essential and possible, given a serious and balanced approach. Take bilateral and multilateral meetings regularly organized in the USSR and abroad by the Association of Soviet Jurists and other public organizations. Mistrust, prejudices and stereotypes make cooperation in this particular field rather difficult.

The growing interest in *perestroika* among lawyers abroad creates new, favorable conditions for a constructive dialogue. And we have already begun it. Leading experts from 20 countries attended the Madrid meeting of delegations from the Association of Soviet Jurists and the International Commission of Jurists in October 1986. The exchange of opinions on freedom of information and the press and of contacts between people pointed out the interconnection of social, economic and political rights. The final documents agreed upon were the result of the understanding reached among the delegates at the meeting.

Fruitful cooperation in combating crime is developing among law scholars of various countries. The differences in their political views and legal systems do not prevent them from formulating specific recommendations on this timely social issue.

There are still untapped reserves for international cooperation in human rights, but, speaking objectively, this cooperation is bound to develop. A public commission on humanitarian cooperation and on human rights has been set up in the USSR on the initiative of a group of Soviet scientists and artists. There will be neither payment nor privileges for its members. So far there are 30 dedicated enthusiasts, but the doors are open to all who want to contribute to the cause of human rights. ■

SIBERIAN ADVENTURE

Rafting Down the Katun

By Vladimir Nyrko and Lyudmila Shaverdova
Photographs by Sergei Nikolayev and Mikhail Kolchevnikov

People residing in a remote little village in Altai Region, southern Siberia, were somewhat surprised to see strangers in yellow helmets and blue suits on the banks of their river. Here, amid the green taiga, the newcomers looked as if they had come from another planet, and the language they spoke was also unfamiliar. The first contacts revealed that the visitors spoke English and came from the far-off United States. The villagers cordially greeted the guests, offering them honey and fresh milk, and a welcome hot bath.

Who were the strangers? Had they lost their way? And why were they outfitted in such odd-looking clothing? The village buzzed with excitement. The answer was really quite simple. The 15 Americans had reached the village by floating down the rapids of the Katun River on inflatable rafts.

Crew-racing fans know how much the outcome of a race depends on the concerted effort of the rowers. As for white-water rafting down a swift mountain river, life itself can depend on that. In fact, all members of the crew must merge into one unified team.

The American organizers of the rafting trip had that particular requirement in mind when they invited Soviet sportsmen to join the American teams. The organizers were motivated by the idea of establishing stable contacts between the people of the two nations, or by what is now being called "people's diplomacy." The unusual venture was named Project RAFT (Russians and Americans for Teamwork), which very aptly conveyed the concept and character of the project.

Project RAFT received broad support and good wishes, for instance, from members of the U.S. Congress like Les AuCoin from Oregon and Barbara Boxer from California.

Informal, people-to-people contacts *are* important. A joint Soviet-American expedition to Mars is still in the future. Rafting down a seething mountain river requires as much mutual understanding and trust as any space flight would.

Our planet can be compared to a large boat in which all of us are floating. Last summer the American and Soviet participants of Project RAFT were indeed floating in one boat, rafting down the rapid mountain river. Along their route they made many discoveries.

American Ken Streater said that the Soviet people he met were hospitable and wonderful, and much happier than he had thought. "The Soviet people as well as Americans," he said, "must learn from each other. How nice it would be if the politicians of the two countries followed in our footsteps. It would be useful for them to learn as much about each other as we rafters learned. Rafting the river provided a wonderful opportunity for learning."

The other members of the group shared Streater's view.

"I spent most of my life in the mountains," said aquatic sports instructor Earl Alderson. "I've seen beautiful mountains and rivers, but I can say for sure that the Altai Mountains are unique. And, most important, I knew very little about Russians before this trip. They are excellent people, and nothing can prevent us from living in harmony on our planet."

During the journey the sportsmen had many adventures, and, of course, there were humorous episodes too. Anxious about the group's diet, the camp cook procured the freshest possible meat—live sheep, which were flown into camp by helicopter from the nearest state farm. Traumatized by the flight, the sheep ran away the moment their feet touched the ground. The next moment the camp residents witnessed an unusual rodeo. Dan Grant, demonstrating amazing dexterity, lassoed one of the sheep. The fate of the other remained a mystery. Perhaps it fell prey to mountain wolves.

Besides roast fresh mutton, the Americans were treated to various Russian dishes. Borsch, a hearty beet soup, was particularly popular, and many of the visitors asked for copies of the recipe to take home with them.

Language practice was also useful. To make rafting easier, Russian-English commands were devised.

Soviet members of the project noted how reliable and brave their American counterparts were. Once when the sportsmen were sitting on the bank of the river drinking tea, they suddenly heard cries for help: A canoe had overturned in the dangerous rapids. Everyone immediately jumped to his feet, putting on a life jacket on the run.

The men quickly got into their raft and paddled energetically toward the middle of the river to lend a hand to the Soviet canoeist who was in trouble.

Last summer's raft trip down the Katun was the first Soviet-American venture of its kind, but according to the organizers of the project, more trips are planned for the future, perhaps in the United States. Obviously, people's diplomacy is gaining more and more "ambassadors." ■

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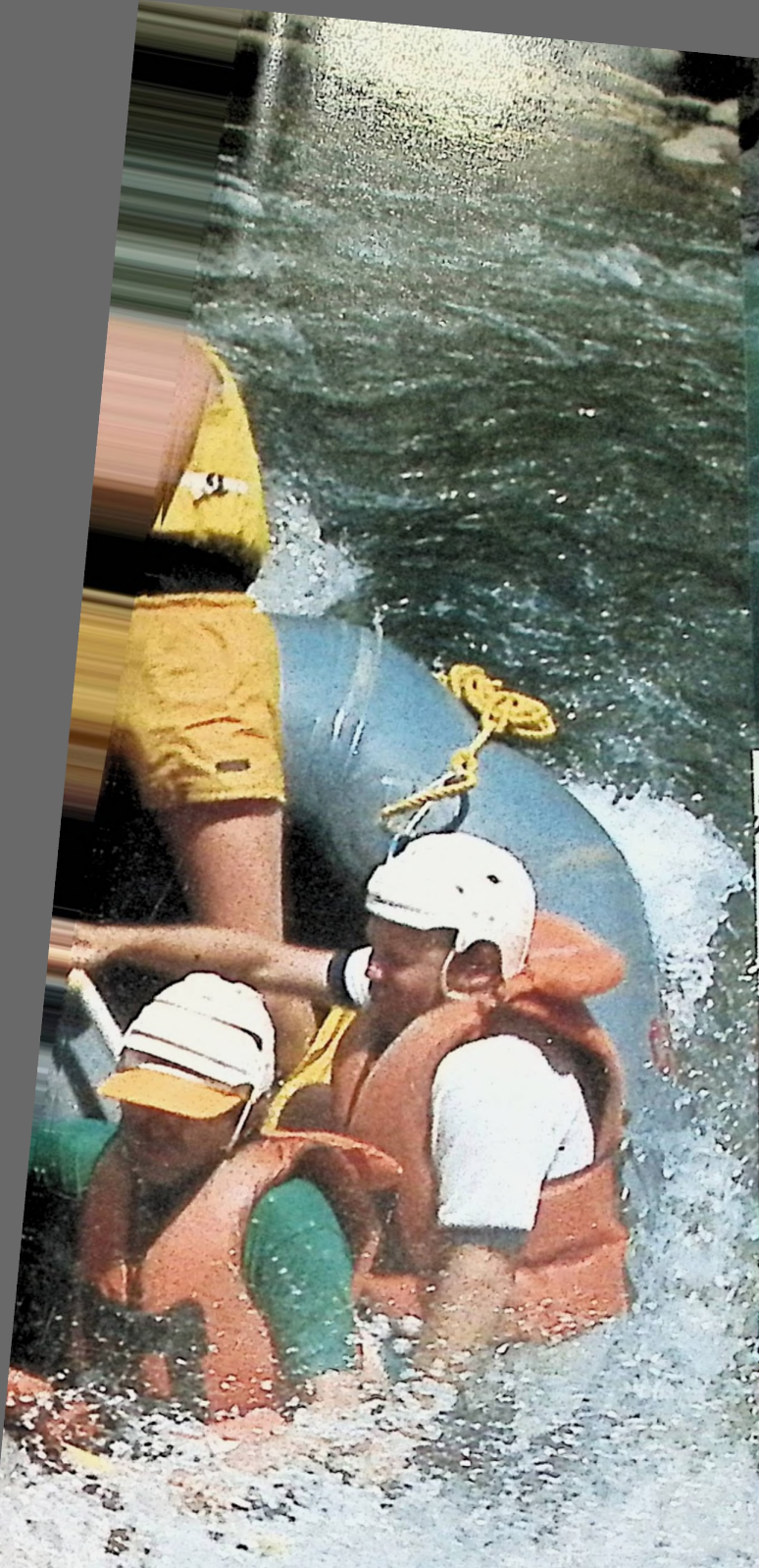
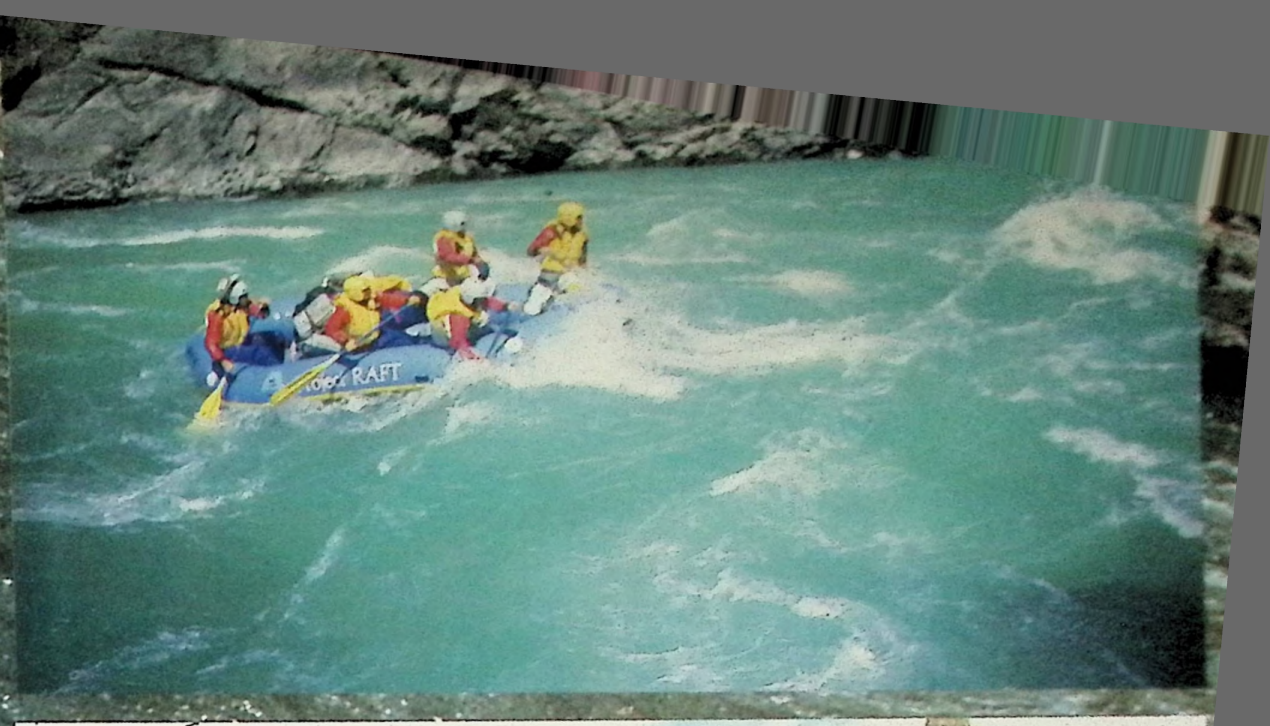
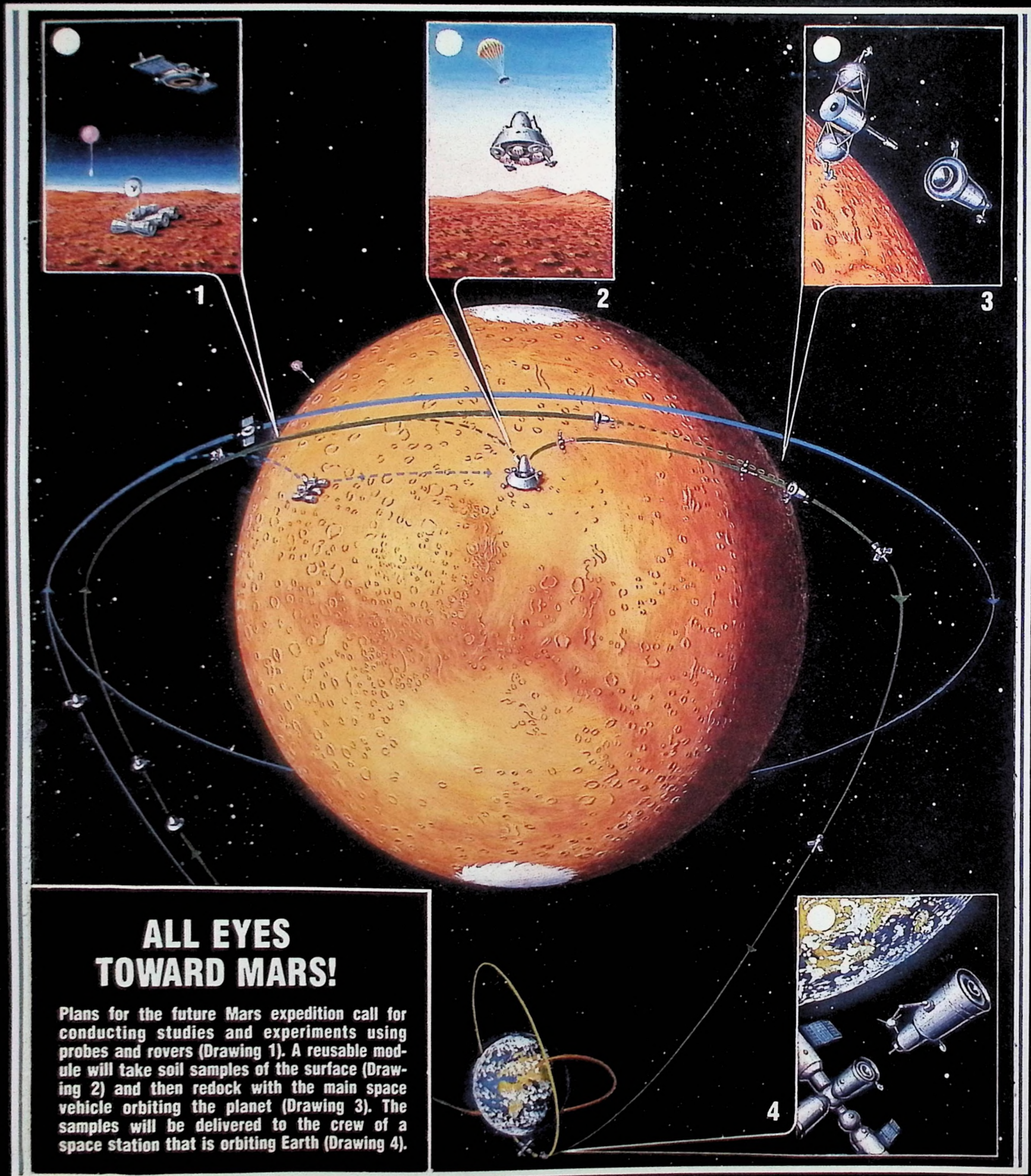




Above (top to bottom): The Katun River is very fickle: calm one moment, raging the next. A souvenir snapshot in Moscow's Red Square. Rafting demands that the crew interact as a "well-oiled machine."

MARS

Our celestial neighbor was once very much like the Earth and its atmosphere could have sustained life.



ALL EYES TOWARD MARS!

Plans for the future Mars expedition call for conducting studies and experiments using probes and rovers (Drawing 1). A reusable module will take soil samples of the surface (Drawing 2) and then redock with the main space vehicle orbiting the planet (Drawing 3). The samples will be delivered to the crew of a space station that is orbiting Earth (Drawing 4).

JOINT EXPEDITION

The Soviet linkup for the TV spacebridge "Together to Mars?" was telecast from the Space Pavilion of the USSR Exhibition of Economic Achievements in Moscow.

By Vladimir Vozchikov
Photographs by Sergei Andreyeshchev and V. Andreyeshchev

CAN WE AFFORD IT?

Is a study of Mars really worthwhile? Should humans be sent there or only robots? What about a joint Soviet-American expedition? The televised spacebridge "Together to Mars?" linking scientists, science-fiction writers, cosmonauts and astronauts, doctors and journalists in both countries, addressed these and other related questions. Moderating the program were, in Moscow, Professor Sergei Kapitsa, the originator and host of the popular Soviet television program "The Obvious and the Incredible," and in Boulder, Colorado, Dr. Carl Sagan, the famous American astronomer.

CARL SAGAN: The first sputnik, or artificial Earth satellite, was launched 30 years ago. Then there was Yuri Gagarin, the first man in space. Later Neal Armstrong and Buzz Aldrin were the first men to set foot on the hard-rock Moon. One of them, Buzz Aldrin, is here with us now.

Everybody remembers the first Soviet-American space flight—two of its participants are meeting again during our linkup.

This TV linkup has brought together space explorers—those who have designed the craft as well as those who have seen exotic pictures of other worlds. Here are astronauts, cosmonauts, experts and directors of space programs of both our countries. Some of them are very young. And maybe someday, they'll fly to Mars.

Let's discuss why Mars interests us so much, what we know about the planet, what we would like to know about it and how we can obtain this information.

Should we send men to Mars—or only robots? And can we afford to send manned flights to Mars?

ARKADI STRUGATSKY, Soviet science-fiction writer: Well, I'm a pessimist in this regard. I think it's too early to seriously discuss such a monstrously expensive project. Mankind is not yet prepared for this, economically or socially. Moreover, technologically, mankind is not yet ready for a comprehensive, sustained exploration of Mars or Venus, let alone planets of the nonterrestrial type.

VALERI KUBASOV, Pilot-Cosmonaut of the USSR: I've always imagined that first there was the dream—the vision—and only after that, the real project. And the visionaries always provided us with a direction for thought.

I heard what writer Strugatsky has said, but I can remember being concerned with manned flights to Mars over 20 years ago. ►

A billion years ago Mars had a much denser atmosphere than its present one, and just possibly life may once have existed there. Perhaps the Red Planet awaits the arrival of the human intellect to help it revive.

I was then working as an engineer with Sergei Korolyov, the chief designer of Soviet rocketry. He focused a great deal of attention on Mars-bound manned flight. He took the idea very seriously then, in the early sixties.

Sure, the mission might take 10 or perhaps 15 years, but we've got to get started on it right away. Yes, the cost looks prohibitive! But it'll only be a fraction of what our two nations spend on arms.

SAGAN: Whatever the price tag on a manned flight to Mars—it's just about the cost of one arms system, which annually swallows up tens and even hundreds of billions of dollars or rubles. So the argument that for financial reasons it's unaffordable is not valid.

SERGEI KAPITSA: We must remember that Venus, the Earth and Mars are in fact on the same evolutionary line, with Venus possibly resembling the early stages of our Earth's development, and Mars, the later ones. People's understanding of why it's important to fly to Mars depends greatly on this.

VALERI BARSUKOV, corresponding member of the USSR Academy of Sciences and director of the Vernadsky Institute of Geochemistry and Analytical Chemistry: Studies of the Moon, Venus and partly Mars have led us to regard Mars as a key to our understanding of the common evolutionary successiveness of Earth-type planetary bodies. Specialists are thrilled by this fact, as well as by the still-lingering hope of discovering biological activity there.

The development of Mars's atmosphere and climate intrigues us. We know rivers flowed on Mars earlier, but it's all permafrost there now.

The history of volcanism and the magmatic processes on Mars intrigues us too. So far we know nothing about the inner structure of Mars. And we know even less about the planet's heat map, which could give us clues to signs of life there.

All these questions urge a close study of Mars in the near future.

THOMAS PAINE, former director of the National Aeronautics and Space Administration (NASA): Mars undoubtedly is man's next target in the solar system. If the twenty-first century really becomes a space age, we shall witness human settlements and research stations on the Moon and Soviet cosmonauts and American astronauts working together on Mars.

STRUGATSKY: Yet, I believe, for all their apparent strength, our craft remain too weak. Chemical fuel, I'm absolutely sure, won't carry us far.

Should we draw up this program—I would say, a mad program—and send men to Mars on such craft? Why? To plod all those 200 million kilometers back—that makes no sense.

SERGEI KAPITSA hosts the popular program "The Obvious and the Incredible" on Soviet television.

LEONID GORSHKOV heads a department of the USSR Space Agency.

VALERI BARSUKOV is the director of the Vernadsky Institute of Geochemistry and Analytical Chemistry.

ARKADI STRUGATSKY, with his brother Boris, is the author of sci-fi books popular in the USSR as well as abroad.

VALERI KUBASOV was a member of the crew for the Soyuz-Apollo flight in 1975.

Sporadic robot missions to Venus and Mars—that's good, that's tolerable.

BUZZ ALDRIN, American astronaut: We sometimes tend to be overpessimistic. Look at what was done in the sixties, and how far technology has advanced since then! Soviet crews have been in orbit for over six months. I think 12 months is now in order.

Of course, a Martian trip requires the human desire for it. I think it can be done before the end of the century, with both the Soviets and us able to accomplish it.

JOSEPH KERWIN, American astronaut: I agree with Buzz. A flight to Mars will take place. I'm confident it's feasible, but I wonder how to go about it. We know that during *Salyut* and *Mir* flights you obtained scientific results the likes of which the United States does not know. Yet we also might have an idea or two. I would be very grateful if I were included in the first crew.

SVETLANA SAVITSKAYA, Pilot-Cosmonaut of the USSR: From the point of view of the people who will take part in the flight, I don't think that cosmonauts or astronauts can be of two opinions here.

Of course, all of us believe that the flight will occur! Well, maybe someone thinks he or she won't make it because the program is so very long. Still, someone hopes to make it. But that has to be addressed right now!

CHUCK KLEIN, NASA: Svetlana's thought raises no doubts in us. But how? Is a human expedition to be trained for it, or do we only send man-controlled probes so far?

MIKHAIL IVANOV, Institute of Biomedical Problems and a corresponding member of the USSR Academy of Sciences: I don't think sending man to ascertain the presence of life on Mars would be expedient.

It's already been suggested that the sending of man should not be the first stage in the exploration of Mars. Yet one of the program's top priorities would be to discover the presence of life forms there.

I regard it as an omission of the otherwise highly important U.S. Viking Program to search for living organisms only on the very surface of Mars. The program failed to recognize that ecological conditions on the surface of Mars are minimal for sustaining living organisms.

GENRIKH AVANESOV, Institute of Space Research of the USSR Academy of Sciences and a Doctor of Science (Technology): I also believe in using space probes as Mars pioneers. It's their job to find promising areas for various studies—biological, physical, and others.

The program's next step is landing craft or Marsokhods [rovers], which must confirm or reverse our interest in one area or another.

KONSTANTIN SUKHANOV, Glavkosmos (the Soviet space agency): We're now working on several Marsokhod versions. Obviously, the rover doesn't need to be very large. Its chief function will be to reconnoiter terrain and possibly learn how to travel on Mars.

JIM FRENCH, Jet Propulsion Laboratory, Pasadena, California: There's the opinion in American scientific circles that we must wait a while—say, a couple of years. Maybe a breakthrough in technology will then ease the task of a Martian expedition.

Yet, I believe that if Columbus had waited for new technologies, waited for them to build him the ocean liner the *QE II* so he could explore the world in full comfort and according to the latest fashion, he'd still be sitting on the coast, looking in the direction of the New World.

I know that the Soviet Union is successfully developing its space program, and if we use the technology already available to us in the best way and if we pool each other's scientific achievements, we'll rapidly advance and have all we need to set out for Mars. That's my opinion. I'd be happy to hear what others think.

GARRI ROGOVSKY, Glavkosmos: Our Mars exploration program is really gathering momentum. At present we are actively preparing for the launch of the space probe *Phobos*, and in July 1988 the probe will be sent toward Mars.

Our next goal is to launch a polar sputnik to Mars. Its launch is planned for 1992. The task of this probe is a global mapping of Mars.

Besides that, with the aid of this vehicle we hope to place a balloon-borne sounder and possibly a landing platform into the Mars atmosphere. In this regard, I'd like to appeal to our American colleagues. Once we've started talking about the exploration of Mars, it's probably time

We should direct our efforts primarily in creating a so-called model of Mars.

RON KAHL, the United States: I support this idea. It's high time to take up the creation of an international data bank on atmospheric and surface characteristics of Mars.

DR. PAUL RAMBAUT, National Institutes of Health, Bethesda, Maryland: Please, do we know everything about the long-term impact of zero gravity on a Mars flight?

Experts both here and in the USSR understand that the major problems that will arise in a trip to Mars will be tied to the fact that the long flight will cause a loss of bone mass in crew members and that this will, in turn, exert a dangerous influence on the skeleton.

ARKADI USHAKOV, Institute of Biomedical Problems of the USSR Academy of Sciences: This question is just to the point. Man quite easily adapts to zero gravity. But the problem is how to prevent a full adaptation so that man returns to the Earth the same way he left it.

Based on the experience of space flights, especially long-duration flights in manned spacecraft, we in the Soviet Union have arrived at the conclusion that we've got the radical means to counter the effects of zero gravity and to prevent man from becoming fully adapted to it.

This applies to both the bone system and calcium metabolism—that's what Dr. Rambaut is asking about.

Obviously, I can also speak with some certainty of the readiness of our crews for a flight up to one year long. And one year, as far as I know, is what you in America presume will be the length of time required for a manned flight to Mars, that is, a flight to the planet and a return to the Earth.

VASILI MOROZ, Institute of Space Research of the USSR Academy of Sciences: I'd like to raise an almost fantastic question. We already know that the atmosphere of Mars is pretty fickle. Could we so influence it in some directional way that in the future it would become significantly more dense and generally fit for habitation? This could take 100,000 or even 1,000,000 years. What do you think about the remote possibility of transforming the atmosphere of Mars in the distant future?

PAINE: If there are no oases on Mars, we can create them there. Perhaps mankind's role in the solar system is to be the means for spreading terrestrial life further, and the human intellect is just the force that will revive or create anew life on Mars, and then on stars too.

SAGAN: That is a breathtaking prospect. Imagine American, Soviet and other scientists flying over the dried-up riverbeds or the valleys of Mars and looking for any traces of life. And people on Earth will be able to see all this! We believe that the United States and the Soviet Union can reduce their nuclear arsenals in order to mark the advent of the twenty-first century in a worthy manner.

KAPITSA: Thank you, Carl. Really, I think we've had a very useful discussion today. Many interesting thoughts have been expressed. I listened attentively to the statements of the experts gathered here, scientists who have given much thought to the tasks of a forthcoming Soviet-American expedition to Mars.

We've raised many very curious questions. However, I think there's one that's more important than all the rest of them. It was already mentioned that the mission to Mars would be an expression of good will and cooperation between the two great powers. This is true. But we must also search for other ways and other fields of activity for our cooperation that are sited not so far away from the Earth as Mars. While thinking of a flight to Mars and how to make it together, we again and again ought to consider our own terrestrial affairs and the space home in which we all live.

Only given order, peace and prosperity in this home will mankind be able to afford such an expedition to other worlds and to arrive there as emissaries of peace and good will. ■

NOT JUST NUMBERS

The process of ratifying the Intermediate-Range Nuclear Forces (INF) Treaty, eliminating medium- and shorter-range missiles, is taking place against different backgrounds in the Soviet Union and the United States. In the USSR the treaty has met with almost unanimous support (a very small percentage of Soviet people reject it out of hand), whereas in the United States the situation is difficult. Opposition to it comes from rather influential circles. However, one shouldn't think that the treaty has not provoked some sharp questions in the Soviet Union either. The main question is whether we have gone too far in making concessions and whether these concessions may harm our security. The usual argument here is that the Soviet Union is to destroy a great deal more missiles and warheads than the United States. Prominent arms expert Lev Semeiko, deputy chairman of the Soviet Peace Committee's Disarmament Commission, examines the doubts concerning the treaty.

THE IDEA of equal security, which, incidentally, was put forward by the Soviet Union, has become firmly implanted in our minds. Yet many people still associate it mainly with figures: They think that we should have (or reduce) just as many weapons, especially nuclear delivery vehicles, as the other side has (or reduces). This is not accidental. All of us know that we must never allow the other side to achieve superiority. And then, all of a sudden, in the INF Treaty we make a major concession in numbers. Why? What does it mean?

It should be recalled that under the treaty the Soviet Union is to destroy 1,752 missiles (826 medium-range missiles and 926 shorter-range missiles) and the United States, 859 missiles (689 medium- and 170 shorter-range missiles). The difference in warheads is even greater, since the Soviet SS-20 missiles carry three warheads, whereas the American missiles carry one. So the first impression is that the balance of nuclear armaments has shifted in America's favor. Consequently, we have not strengthened either our own security or international security.

However, the quantitative analysis is incomplete. Since security is a political rather than a military problem today, one should use more than one criterion in dealing with it. Nevertheless, let's begin with the military aspect to explain the apparent discrepancy in the number of missiles to be reduced. Do these reductions harm the interest of our security? The answer is *no* and here's *why*.

First, military-strategic stability in Europe and the world as a whole is of decisive importance here. There is a cut-and-dried rule for strengthening stability: the smaller the number of nuclear weapons, the better the chances for stability. Any reduction in nuclear arsenals helps to improve the political climate in the world and to lessen the risk of an accidental outbreak of a nuclear war as a result of human error or technical failure.

Stability will also increase because medium- and shorter-range missiles play a special role in it. They are an intermediate link in the chain of nuclear weapons, from tactical weapons with a range up to 500 kilometers to strategic weapons with a range of more than 5,500 kilometers. By removing this link, we may reduce the risk of the automatic escalation of a nuclear conflict if it were to break out in spite of everything. It would be difficult even for a nuclear maniac to pass from using nuclear artillery to launching intercontinental missiles. So all this shows that, in the final analysis, the treaty strengthens not only our own security but also international security.

Furthermore, the treaty eliminates a major destabilizing factor resulting from the fact that even now a hundred American Pershing II missiles can reach Soviet targets in a matter of 10 minutes.

Second, one should bear in mind that the strategic value of the missiles that are to be scrapped is different. The American Euromissiles can reach Soviet territory, whereas the Soviet medium- and shorter-range missiles cannot reach the United States. This is a very important factor that should be taken into account in evaluating the merits of the treaty: It sharply reduces the scale of the nuclear threat to Soviet territory. I repeat: It sharply reduces this threat, even though a very small percentage of the U.S. nuclear arsenal is destroyed.

Calculations show that the over-all yield of the American Euromissiles that are to be scrapped under the treaty is equal to that of nearly 10,000 Hiroshima bombs. The yield of the atomic bomb dropped on Hiroshima was 13 kilotons, whereas a cruise missile is capable of delivering 200 kilotons to a target and most of the Pershing IA missiles have a yield of 400 kilotons. The treaty removes this threat. The elimination of a part of the Soviet nuclear arsenal removes the threat to many targets in European and Asian countries.

Third, paradoxical as it might seem, the nuclear forces will remain approximately balanced despite their unequal cuts. The point is that purely arithmetic estimates of the balance of nuclear forces are becoming a thing of the past, while the qualitative factor—the retaliation capability of nuclear weapons in the event of nuclear aggression—is coming to the fore. It doesn't take a strict numerical balance to deal a crushing nuclear response blow. For that reason, and in view of the fact that more

Continued on page 63

HALLEY'S COMET IN PROFILE AND FULL FACE

The Main Results of the International Vega Project

By Tamara Breus
Institute of Space Research in Moscow

SOVIET LIFE has previously covered the flights of the USSR's *Vega 1* and *Vega 2* space probes, which passed near Halley's Comet in March 1986. It was the first time scientists had a chance to observe the comet up close and to examine many of its parameters. With the help of devices onboard the probes, researchers were able to gather vast amounts of data and then to analyze them.

What does the enigmatic comet look like? Flying close to Halley's nucleus, *Vega 1* and *Vega 2* photographed different sides of the comet. A comparison of the pictures made it possible to construct a three-dimensional model of the nucleus—an irregularly shaped, monolithic mass of porous ice about 8×8×16 kilometers (5×5×10 miles) in diameter. Its volume exceeds 500 cubic kilometers (250 cubic miles), much larger than had originally been assumed. Scientists have established that the nucleus rotates, performing a clockwise revolution every 53 to 56 hours, and its reflectivity is very low, making it one of the darkest bodies in the solar system.

The surface of the nucleus is very rough, with many round or elliptical formations that resemble impact craters. Clearly visible in the processed photographs were ringed craters, one measuring about a kilometer (slightly more than half a mile) across. The curved shadow cast by a crater's wall is depicted in one photo, while a large number of small craters are seen in another.

The infrared spectrometer carried aboard *Vega 1* measured the thermal radiation of Halley's nucleus. This data permitted scientists to determine the temperature of the comet's surface—300 degrees Kelvin—twice as high as previously believed. The high temperature can be accounted for by the black porous crust covering the ice nucleus. Though it's not very thick—just a few millimeters, or even less than a millimeter, wide—the black crust, scientists assume, absorbs solar radiation. A portion of the radiation is then re-emitted into space but in the infrared range, while a portion is taken into the interior of the nucleus by thermal conductivity.

A temperature of 380 degrees Kelvin was recorded at the warmest point on the surface of the nucleus. This point lies on the day side of Halley's equator. On the night side, the surface crust is much colder. Scientists estimate that temperatures on that side range from 180 to 200 degrees Kelvin, while the temperature of the interior of the nucleus is below 150 degrees Kelvin.

Scientists also determined that Halley's nucleus is shrinking at the rate of a centimeter per day. Sections of the crust shift and are carried into space with the gas emanating from its center. Scientists believe that on each approach to the Sun, the comet loses about 40 tons of mass per second. Perhaps there's a mechanism for regulating the depth of its crust because the crust becomes thicker during periods of solar activity.

From time to time the comet's surface layer breaks, and a portion of the interior ice is affected by solar radiation, resulting in an intensification of activity and increased brightness. Analyses of the dust and gas ejected from the nucleus have provided substantial data on cometary matter. Water vapor accounts for the greater part of the gas leaving the comet. Next comes carbon dioxide. Most probably, the water vapor and carbon dioxide exist in the nucleus as a clathrate—ordinary aqueous ice in which molecules of one substance are embedded in the crystal lattice of another substance.

Dust-impact mass spectrometers provided new data on the chemical composition of cometary solid particles, and the spectra of about 2,000 particles were obtained. The particles were part of the nucleus at one time but were ejected with a gas outflow.

All spectra fall into three main categories: those with a predominance of light elements, of carbon or of metals. Analysis of the spectra demonstrates that the comet's nucleus includes complex organic molecules.

The average density of the nucleus has been determined to range from 0.1 to 0.4 grams per cubic centimeter. Knowing the mass of the nucleus and the rate of its loss, scientists estimate the comet's life expectancy at 20,000 years; however, it could be longer, since Halley's activity appears to decrease from one 76-year revolution around the Sun to another.

Before the flights of the Vega probes, several models of Halley's cometary nucleus had been proposed. In 1953 British scientist R. Lyttleton concluded that the cometary nucleus was a swarm of loosely linked blocks. Somewhat earlier (in 1950), American astronomer Fred Whipple advanced the hypothesis that the comet's nucleus was a space snowball—a monolithic body of irregular shape, consisting of frozen volatile substances mixed with meteoric matter.

Dutch astrophysicist J. Grinberg's model is to a great extent similar to Whipple's model, but Grinberg included complex organic substances, believing the comet's nucleus to be a snowdrift rather than a snowball. His thinking was that the snowdrift consisted of not ordinary snowflakes, but of interstellar ones with a complex structure. Soviet astronomer Boris Vorontsov-Velyaminov believed that the bulk of the comet's nucleus consisted of refractory substances (silicates and metals) and that a layer of frozen gases existed only on the surface. Which model corresponds to reality? Examination of the isotopic composition of the cometary matter could be decisive in proving one hypothesis or another. The most direct proof would be to deliver a sample of cometary material to Earth. There are no insurmountable technical difficulties here, and scientists are already seriously discussing such a project. It's possible not only to approach comets at a very close distance, but also to land on the surface of their nuclei. Halley's Comet, however, is the exception. Unlike the planets and other objects in the solar system, Halley's is turned toward the opposite side when it circles the Sun. This makes launching a spacecraft to the comet from Earth quite difficult, while landing on its surface is twice as complex because of the comet's enormous speed.

The exploration of comets is a new field in space research. Comets are the solar systems' minor bodies, which include satellites of planets, asteroids and meteoric bodies, ranging in size from submicron particles to chunks hundreds of meters across.

Material from meteorites and asteroids that have landed on Earth is under study, but so far too little is known about them. Therefore, scientists propose to study the minor bodies with spacecraft. Project Phobos, scheduled for this year, will be the first attempt in this direction. The Soviet probes will begin their exploration of Phobos, a moon of Mars, from a distance of tens of kilometers, and then they will approach to a distance of 50 meters. "Hedge-hopping" over the surface of Phobos, the spacecraft will survey it with laser and ion beams and radio waves. After that, descent modules sent from the probes will land on Phobos and begin transmitting data from the surface back to Earth.

The future flight of spacecraft to the asteroid belt lying between the orbits of Mars and Jupiter promises to be a breathtaking project too. In principle, a space vehicle could land on a minor planet and then, upon concluding its research program, take off from the planet without a significant expenditure of energy. However, inexact knowledge of the orbits of asteroids may reduce this ambitious project to nothing. That's why it may be more expedient to send descent modules to one or two asteroids as a first step.

A number of serious projects under consideration call for using asteroids as natural spaceships during the journey from one part of the solar system to another. For example, the famous asteroid Icarus could serve as such a spaceship. Its orbit extends from the Sun to Jupiter, and its mass is large enough to protect the spacecraft on the asteroid from solar heat and the cold of interplanetary space. At the same time, the asteroid is not so massive that it could not be controlled by jet engines.

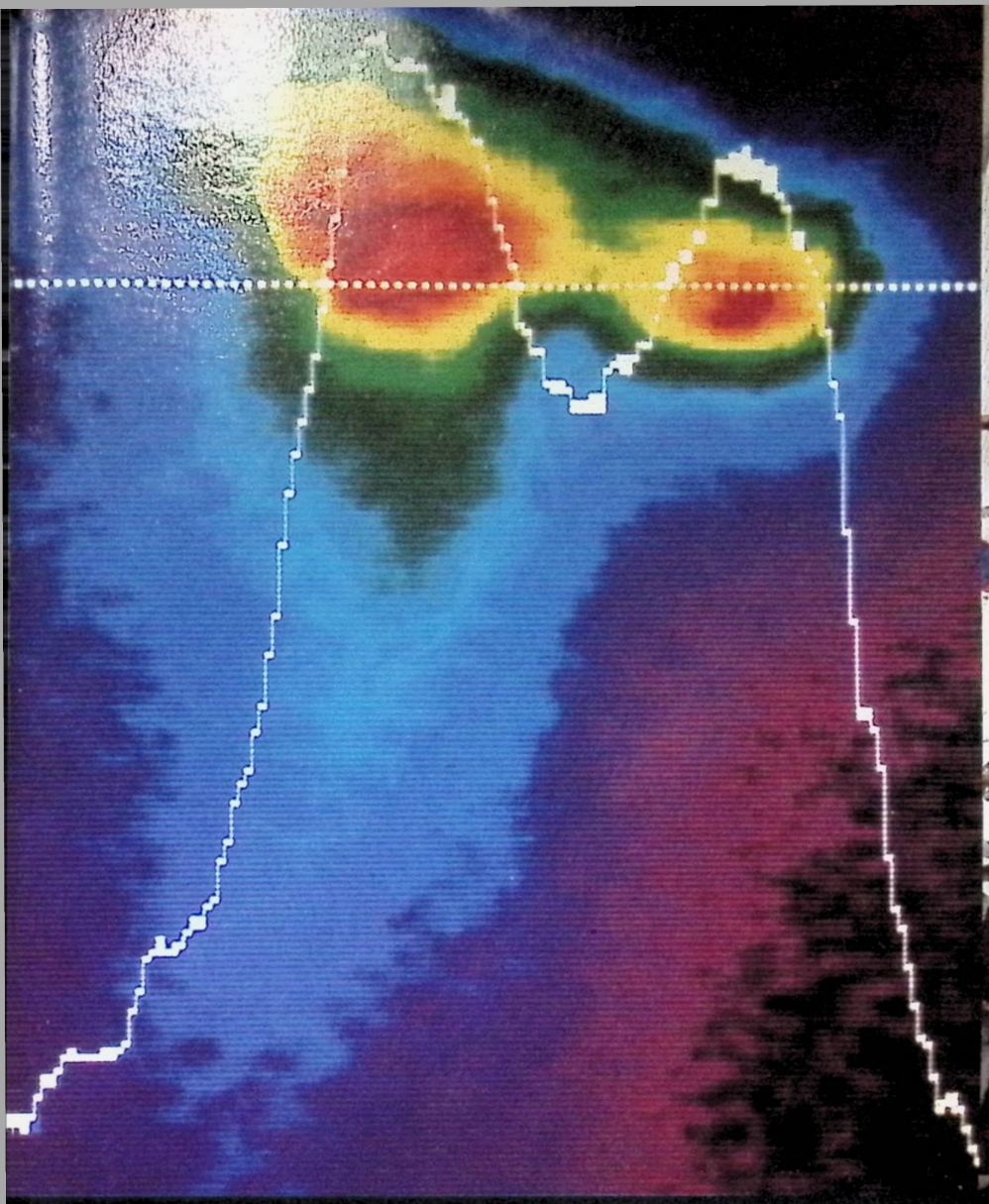
Some scientists have proposed various versions of transporting asteroids to a near-Earth orbit with rockets and using them as sources of metal and other valuable raw materials.

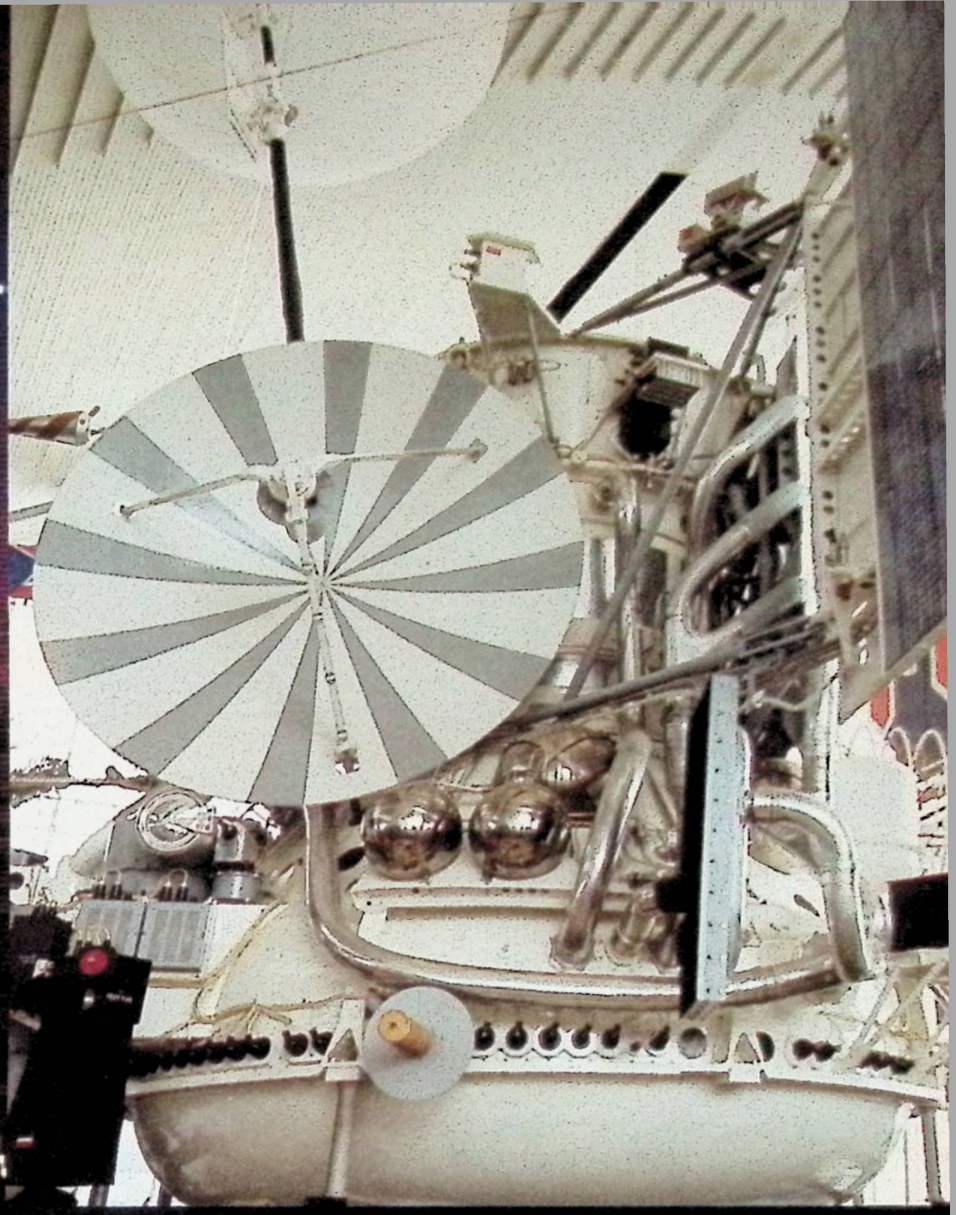
Some asteroids consist almost entirely of very scarce materials. The iron content of an asteroid can be up to 90 per cent, and it is very high-quality iron at that. Nickel content comes to nine per cent and mainly noble metals constitute one per cent.

If solar batteries were installed on such a mass containing millions of tons of very valuable ore, they would provide enough energy to operate an electrojet engine, which would gradually accelerate the asteroid in the required direction. Asteroid towing could last from a few months to a few years, depending on the size of the asteroid and the parameters of its orbit.

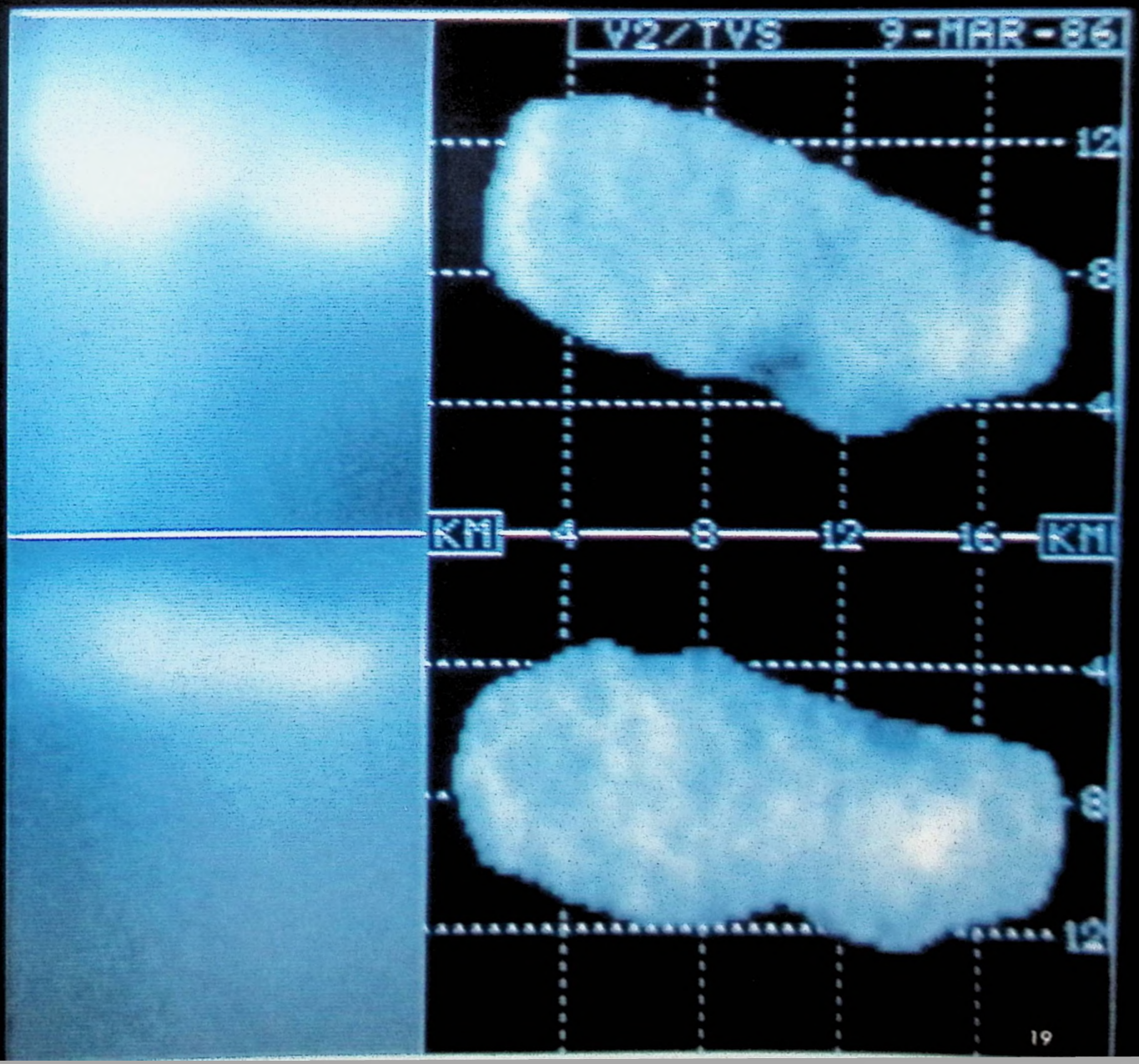
This idea is technically quite feasible even now, and it could be implemented at the beginning of the next century. A cubic kilometer of asteroidal material is enough to provide the Earth with iron for 15 years and with nickel for 1,250 years.

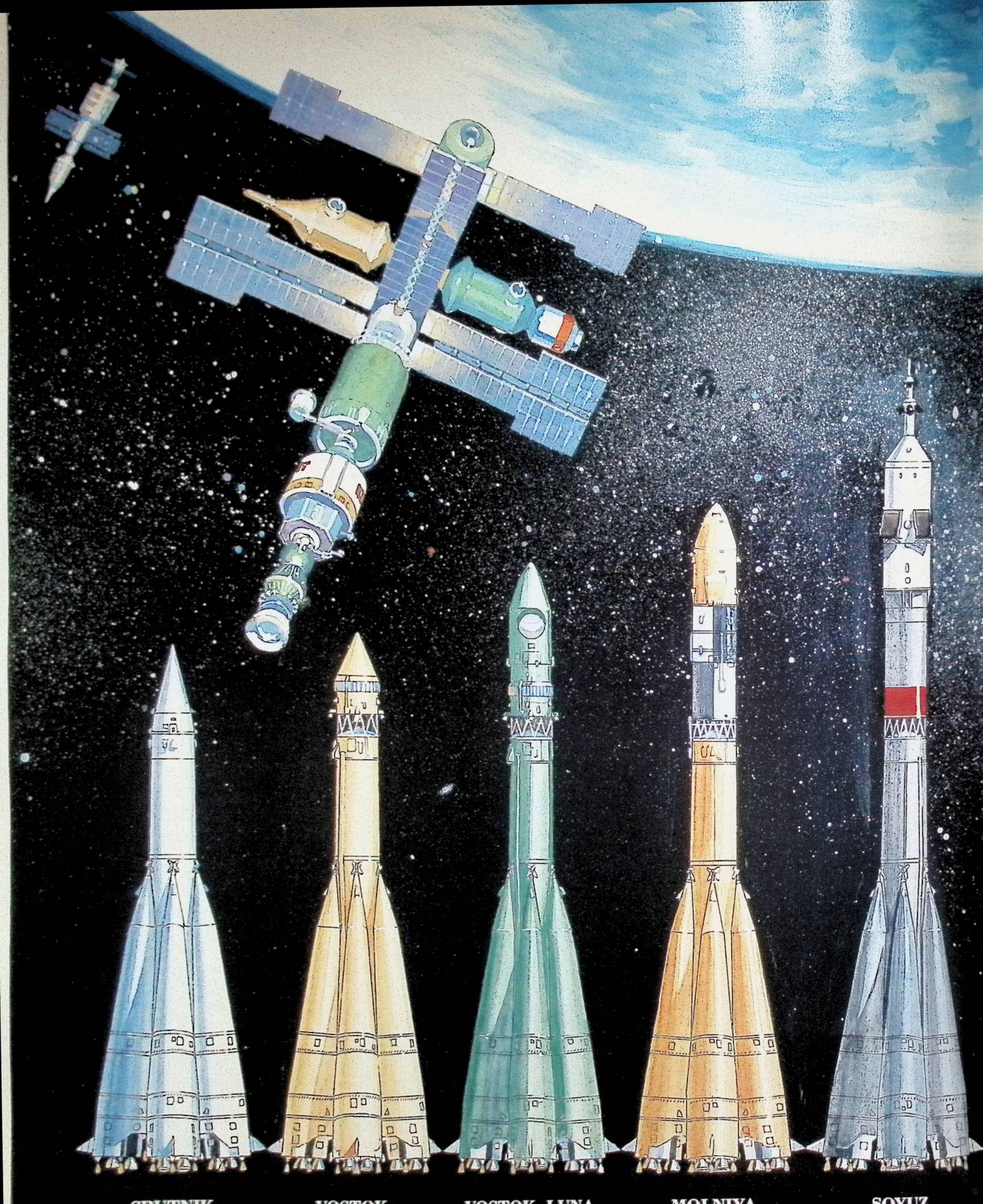
What about an asteroid falling onto Earth? The planet's surface contains a number of scars left by objects that have come from outer space. An example is a crater in Arizona that is more than a kilometer in diameter. It's also believed that the 440-kilometer arc of the Hudson Bay is part of the rim of a giant crater formed by a rather small asteroid that hit the Earth. ■

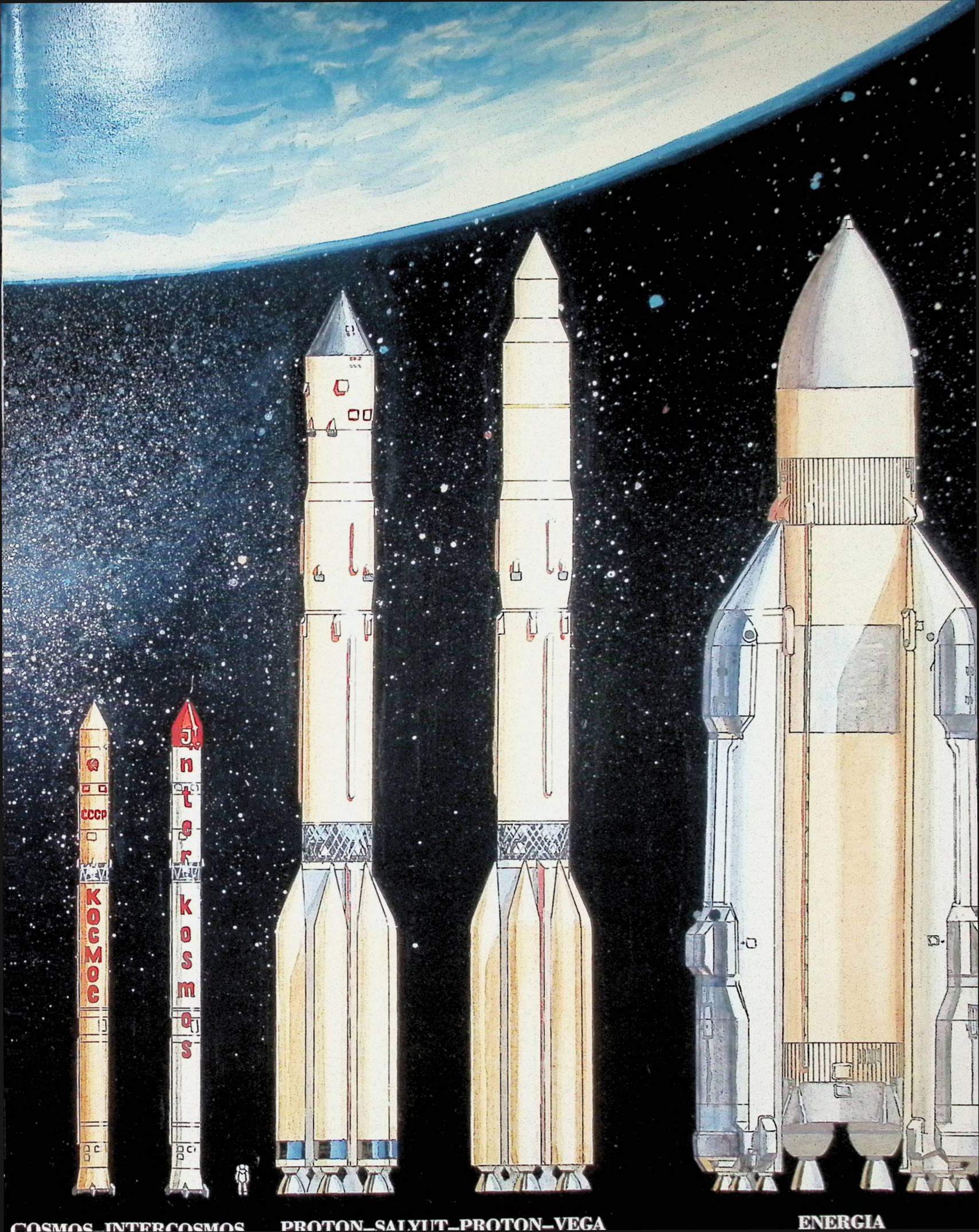




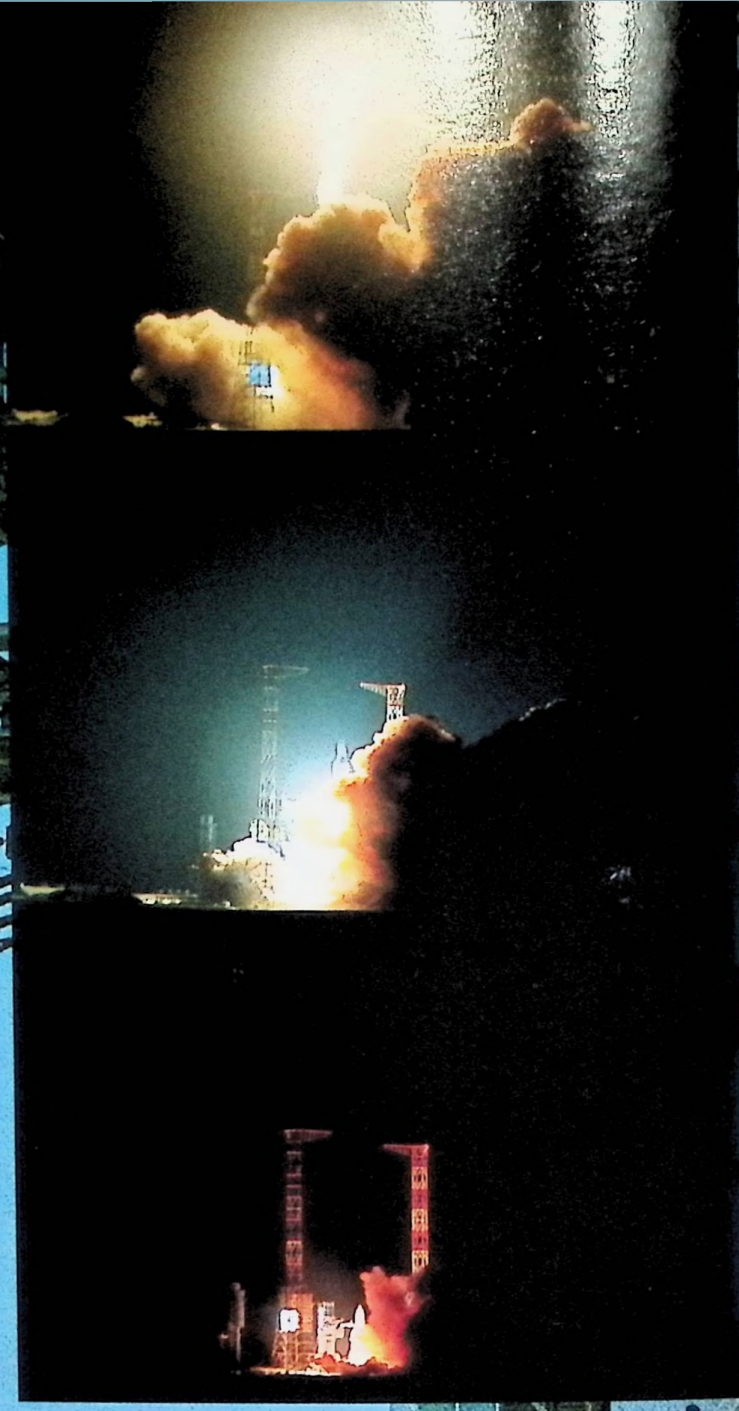
Clockwise from above: The structure and activity of the nucleus of Halley's Comet as captured by the *Vega 2* probe on March 2, 1986. The *Vega 1* probe carried out the first closeup study of the comet. A detailed photometric analysis of the comet's nucleus obtained from pictures taken by the probes and transmitted back to Earth.




SPUTNIK
VOSTOK
VOSTOK - LUNA
MOLNIYA
SOYUZ



COSMOS–INTERCOSMOS PROTON–SALYUT–PROTON–VEGA ENERGIA



ENERGIA — NEW GENERATION BOOSTER

Energia, a new Soviet booster rocket, marks a major breakthrough in the development of powerful boosters capable of putting any size craft into orbit.

By Alexander Dunayev

Head of Glavkosmos, Soviet Space Agency

For many years our rocket-building industry has ensured us, the USSR, a leading position in space exploration. The payload capacity of our boosters has steadily increased, and their characteristics have improved with the growing requirements and challenges of space research.

Today the fundamental use of near-Earth space calls for its industrialization, that is, for establishing a space industry based on solar energy, weightlessness and high-vacuum and production processes that cannot be performed in terrestrial conditions. Within the next few decades, the expanding scale of human activity in near-Earth space will create the need for large orbital complexes. This will result in a noticeable jump in the number of cargo runs between the Earth and low orbits, as well as between low and high orbits. Structural elements, modules and units of orbital craft, scientific equipment, fuel and materials for space production and research will be sent from the Earth. In turn, crews, products made in space, research results, and unique onboard and scientific instruments needing repair will be periodically returned to the Earth.

The expected growth in Earth-to-space cargo shipments raises the question of setting up a special space transport system. This system will have to incorporate new, more powerful booster rockets and reusable and interorbital transport vehicles. One of the main requirements for such a system will be economic efficiency. This can be achieved by partially or fully reusable booster rockets having a larger payload capacity than that of existing single-use boosters. Reusable spacecraft are also more reasonable for transport operations. All this will call for the creation and use of interorbital transport vehicles—so-called space tugs.

An important step toward fulfilling these complex requirements took place on May 15, 1987, when a new generation of booster rocket, the Energia, blasted off from the Baikonur Space Center on its first test flight. The Energia rocket has been designed to place in orbit reusable craft and large-sized space vehicles for scientific and economic experiments, including modules for long-term stations. With a launching mass in excess of 2,000 tons, the booster can lift into orbit payloads weighing 100-plus metric tons. The Energia is a two-stage booster with parallel rocket engines and a payload fixed to its side. It has an over-all length of 60 meters and a maximum diameter of about 20 meters; its second stage is eight meters in diameter.

Since fuel makes up 90 per cent of the weight of a launched rocket, it's easy to see what large amounts of liquid hydrogen and oxygen, as well as kerosene, must be available at the launch site in order to fuel the Energia. The cryogenic components—oxygen and hydrogen—are stored in spherical vessels. Groups of these vessels (for each component) are housed at the site and are connected to the launch installation by pipes. Both the spheres and the pipes are coated with screen-vacuum thermal insulation.

At the start of rocket preparation, two things are necessary: accessibility to detachable joints linking the rocket with ground equipment—fueling, draining, electrical and other equipment—and inspection of the thermal insulation covering the oxygen and hydrogen tanks of the second stage. For these purposes, a mobile service tower is used. The tower is rolled away to a safe distance before launch. This is analogous to the facilities at Proton-type rocket complexes. The Energia's service tower has several levels, or stories, made up of platforms that completely surround the rocket on all sides, affording easy accessibility to practically any point on the rocket's surface. Rocket design has also been updated.

The main feature of the Energia's launch complex is its high degree of automation. There are three systems of automatic controls. The first is the system that controls preparation and launch. It masterminds the other systems, and it alone can issue commands to the rocket. The second system provides the first with all necessary data on the rocket's condition. It monitors the temperature of all of the booster's structural elements, liquids and gases, and their pressure. It also registers the temperature of all instruments and compartments, the pressure in the engines, the levels of the liquids, and so on. All this data is fed into the master system, which processes it and produces the required commands. The third automatic system controls the delivery of components and gases from storage to the rocket and ensures safe operation at the ground installations of the launch complex. All equipment used in the automated control systems is built around Soviet-made computers—serially manufactured as well as those that have been tailor-made for the complex.

The first stage of the Energia's four-unified blocks is equipped with the world's most powerful liquid-propellant rocket engines, which are fueled by a mixture of oxygen and hydrogen and have a unit thrust of 800 metric tons. The monoblock-type second stage uses highly efficient 200-metric-ton engines, which are fired by the same mixture. Sustainer engines have a longer service life and are outfitted with a built-in, trouble-shooting system that enhances flight safety standards. Every rocket pod has been subjected to rig-and-firing tests prior to installation on the booster.

With the payload fixed on its side, Energia can project into orbit a spacecraft of any type, including space probes of any size and streamlined, aerodynamic manned spaceships.

The Soviet Union has consistently advocated broad international cooperation in the implementation of large-scale space programs. At the Fortieth UN General Assembly in 1985, the USSR put forth a comprehensive program for international cooperation in the peaceful exploration of space. Ever since, it has complemented its proposal with matching concrete deeds. Several international expeditions to the *Mir* station in cooperation with Bulgaria and France are planned for 1988. Over the next few years, several research modules packed with instruments designed in foreign countries will be launched.

Under Project Phobos, scheduled for sometime this year, the Soviet Union will launch two space probes to study the planet Mars. The project involves scientists from 10 other countries as well as the European Space Agency.

The launch of the Energia booster, the ultimate expression of scientific, design and engineering effort, is a landmark event in our national rocket technology. Its successful flight tests showed it could further promote international cooperation in the peaceful uses of outer space in the interests of humankind. ■

Courtesy of the newspaper *Pravda*

UP . . . UP . . . AND AWAY! SOVIET BOOSTERS

SPUTNIK

The Sputnik was the first Soviet two-stage booster rocket. More than 30 years ago, on October 4, 1957, it placed the first artificial Earth satellite into orbit, heralding the dawn of the space age. Chief designer of Soviet rocketry Sergei Korolyov's idea of adding new stages to the rocket ensured its development for years to come.

VOSTOK

Before carrying Yuri Gagarin into space on April 12, 1961, two-stage and three-stage variants of the Vostok made many flights into space, including orbital flights of four spacecraft with animals aboard. Later the booster was widely used for launching automatic artificial Earth satellites of the Elektron, Meteor, Polyot and Cosmos series.

VOSTOK–LUNA

This two-stage booster made its maiden flight on January 21, 1959, placing the *Luna 1* automatic interplanetary station into orbit around the Sun. In the same year it photographed the dark side of the Moon.

MOLNIYA

The four-stage Molniya, the sister rocket of the Soyuz type, was first launched into space on February 4, 1961, placing an artificial satellite with a record mass of 6,483 kilograms into orbit around the Earth. A few days later a Molniya boosted the *Venera* interplanetary station into orbit. Later the Molniya was used for launching six Veneras, three Zonds, 10 Lunas and one Mars and a few dozen Molniya 1 communications satellites.

SOYUZ

The three-stage, medium-class Soyuz rocket made its first flight on November 16, 1963, placing in orbit the Cosmos 22 heavy automatic Earth satellite. On April 24, 1967, a Soyuz carrying Pilot-Cosmonaut of the USSR Vladimir Komarov was launched; however, this mission ended tragically. Since then, the Soyuz has carried 40 Soyuz-T spaceships and 4 transport vehicles, 12 Progress cargo ships and several dozen different artificial Earth satellites.

COSMOS–INTERCOSMOS

On March 16, 1962, the Cosmos boosted a satellite into near-Earth orbit, paving the way for the world's largest family of automatic satellites. This reliable and economical booster rocket was also used in the large-scale Intercosmos program. Now a whole series of two-, three- and four-stage carrier rockets with different payload capacities has been built under the Cosmos program.

PROTON–SALYUT–PROTON–VEGA

The Proton heavy booster, with a payload of more than 20 metric tons, was developed in 1965. The design of the rocket, its engines at all stages and all onboard systems incorporating achievements of Soviet technology, make the Proton superior to boosters of a similar class developed by other countries. The first stage of the Proton booster has been equipped with several single-chamber, liquid-propellant rocket engines capable of firing high-temperature, self-ignited fuel under pressure in a combustion chamber that exceeds by three times analogous indicators in the first stage of the Vostok booster.

A two-stage variant of the Proton placed in orbit around the Earth heavy Proton research satellites with a mass of more than 12 metric tons. Its three-stage variant carried Proton satellites weighing more than 17 tons, all orbital stations, Cosmos heavy transport spaceship satellites and the *Kvant* astrophysical module. Four-stage Protons helped deliver lunar vehicles to the Moon, bring back samples of lunar soil to the Earth and make tests of the soil of Venus. Recently the Proton took part in Project Vega, the study of Halley's Comet. The *Mir* and *Salyut* space stations as well as the Gorizont, Raduga and Ekran stationary satellites have all been placed in orbit by Proton boosters. Its use in the study of Phobos, a satellite of Mars, is next.

ENERGIA

The flight test of the new Energia rocket was conducted on May 15, 1987. With parallel rocket engines and the side placement of its payload, the rocket is of a multipurpose design. It can carry both reusable manned spacecraft and heavy research satellites. According to experts, the Energia, which can carry into orbit more than 100 metric tons of payload, will become the workhorse of the peaceful exploration of space. They believe that the Energia will transport the first international crew to Mars. ■

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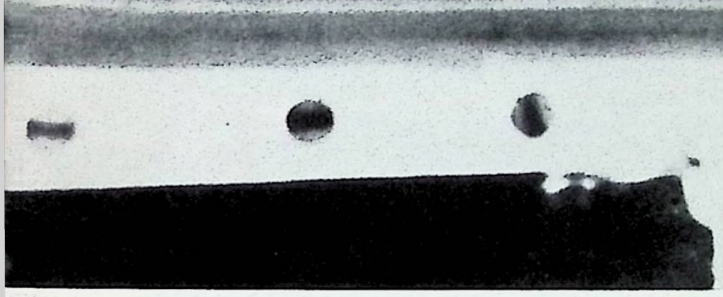
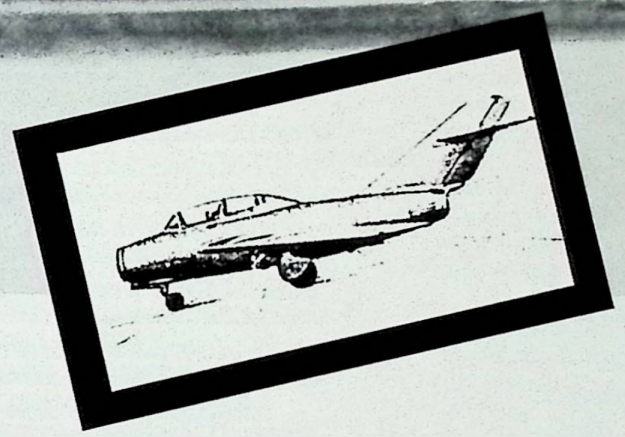




A 1967 photograph of Yuri Gagarin. Left: A drawing of the MIG-15 training plane in which Gagarin and flight instructor Vladimir Seryogin made their last flight.

YURI GAGARIN'S LAST FLIGHT

March 27, 1988, marked the twentieth anniversary of Soviet space pioneer Yuri Gagarin's death piloting a MIG aircraft. Cosmonaut Alexei Leonov and Professor Sergei Belotserkovsky review the circumstances surrounding that tragedy.

Yuri Gagarin defended his diploma thesis at the Zhukovsky Air Force Academy on February 17, 1968, and soon after resumed training flights. From March 13 through March 22 he made 18 flights in a two-seat MIG-15 trainer. Altogether, over seven hours were spent in the air.

His flight with instructor Vladimir Seryogin was to be the last in a series of training missions before switching to single-seat jets.

The UTI MIG-15 is a two-seat, subsonic basic jet trainer. The cockpit consists of two sealed compartments. The pilot sits in the front compartment, while the instructor occupies the rear one. Both compartments are covered by canopies and equipped with ejectable seats. In an emergency, the canopies can be blasted off automatically. If the automatic system fails, the canopy locks can be removed manually. With the canopies removed, the crew is then able to eject themselves from the craft.

Flight controls on the trainer are arranged in such a way that the instructor can monitor all of the pilot's maneuvers and make corrections if necessary.

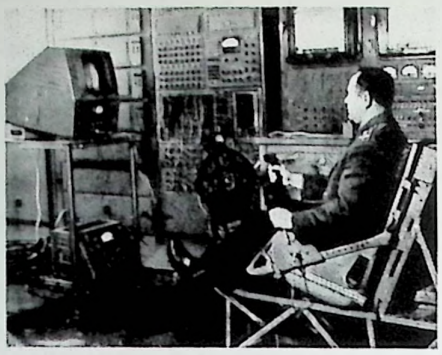
The Last 12 Minutes

On that fatal day of March 27, pilot Yuri Gagarin and flight instructor Vladimir Seryogin arrived at an airfield near Moscow precisely on time. They were to make two circle flights in the MIG-15, lasting 30 minutes each.

Both men climbed into the cockpit—Gagarin in the front seat; Seryogin behind him. In a routine radio exchange with the control tower, Gagarin was ordered to start his engine and to taxi the plane to the runway. At 10:19 A.M. he received permission to take off. Radioing back that he understood the command, Gagarin lifted the craft into the air.

At 10:30, after completing a series of preplanned exercises, he reported back to the control tower, asking for permission to alter his course and return to the airfield. Suddenly, radio contact between the aircraft and the tower broke. Questions radioed from the tower remained unanswered. According to later investigations, about a minute later the plane went down in the ▶

Left: A wartime photograph of Vladimir Seryogin (left). Even then he was an experienced pilot. For his courage and heroism in the Second World War, he was awarded the title of Hero of the Soviet Union. Below: Gagarin perfects his landing technique on a flight simulator. Right: Seryogin (right) and Valentina Tereshkova, the world's first woman cosmonaut, prepare for a training flight.



woods outside the village of Novosyolovo, near Moscow.

The Investigation

Two commissions were immediately set up to investigate the crash. They were authorized to call on any experts, research institutions or competent organizations that would help them discover what had happened. The results of the commissions' work were summed up and published in a 30-volume final report. The report presented a detailed description of the events of the crash. The in-depth report included computations, opinions, interviews with witnesses and conclusions approved by prominent scientists, military commanders, pilots, cosmonauts, engineers, physicians and experts.

The investigation of the crash was so thorough and the amount of evidence collected so abundant that any attempt to use dubious materials or unchecked reports was doomed.

The questions to be answered by the investigation were roughly divided into three groups. The first group concerned the aircraft, the flight equipment in general and everything that directly or indirectly related to its operating condition.

The second group involved the pilots' preparedness for the flight, the organization of the flight and the possibility of any violations of flight-safety regulations.

The third group of questions were the most difficult to answer. The questions concerned the state of the aircraft, its engine and its equipment during the flight and until impact with the ground.

Advanced methods of investigation helped the commissions to discover what seemed almost impossible to find. By reconstructing the instrument readings, investigators proved that all the craft's onboard systems were functioning properly until the last moment. One of the methods used to reconstruct the readings involved analyzing the imprints of instrument needles on dial plates left by the impact of the crash. From the cockpit clock and Gagarin's wristwatch, investigators were able to determine the exact time of the crash—10:31 A.M. Also, from other readings they could establish altitude, the number of engine revolutions per minute, angles, and so on.

The commissions' findings showed no evidence of irregularities, and investigators concluded that preparations for the flight on March 27, 1968, had been carried out in keeping with existing rules and technical regulations.

What Really Happened?

The crash investigators conducted what amounted to vast scientific research in order to provide the commissions with sufficient information on which to base their final conclusions. The final report stated that the equipment on the plane was functioning normally. The craft was destroyed upon impact with the ground. There was no fire while the aircraft was airborne, since the fire-extinguishing system had not been activated. The engine was still running when the plane hit the ground, and neither of the pilots had attempted to eject from the craft.

Both commissions used all possible sources of information on which to base their conclusions. Here are a few examples. Immediately after the disaster, measures were instituted to leave the crash site untouched. Pictures and measurements were taken, and the remains of the plane were collected and scrupulously registered.

An inspection of the tops of nearby birch trees, which the aircraft had sheared off shortly before impact, allowed investigators to determine the angle of the plane's trajectory seconds before the crash. The size of the indention formed on impact was a key factor in estimating the aircraft's velocity, which was later corroborated by instrument readings.

Earlier explanations for the crash had the plane colliding in midair with another aircraft, a weather balloon or a flock of birds. Those scenarios were later dismissed.

Medical experts provided some crucial pieces of evidence on the condition of the pilots immediately before the crash. The experts analyzed the tape recording of Gagarin's radio exchange with the control tower one minute before the catastrophe. From fingerprints and casts of their footwear, the positions of both pilots at the moment of impact with the ground was established. A thorough examination of the crew's remains was made, including a blood test for alcohol, no matter how implausible that might have seemed.

The experts were able to conclude that 60 seconds before the crash Gagarin was in perfect condition. His voice on the radio was calm and without agitation. Neither man showed any signs of ill health, and both had been in working position until the last moment.

Flight control operations and crew preparations for the flight had been conducted in strict compliance with established procedure and instructions. Neither man had ever been reprimanded for breach of discipline or order. They had always done things precisely and efficiently. "Everything according to the book," Gagarin once said. Men like Gagarin and Seryogin could not have done otherwise, or they wouldn't have become test pilots.

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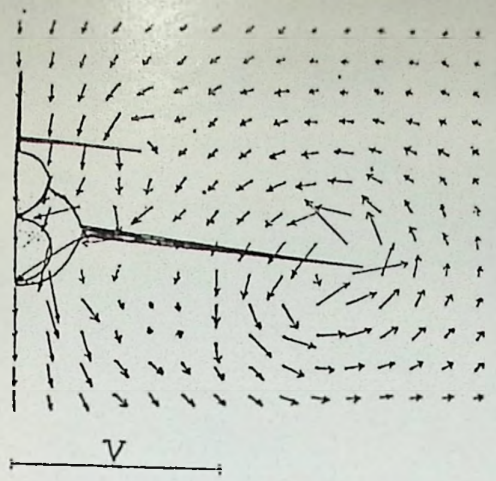
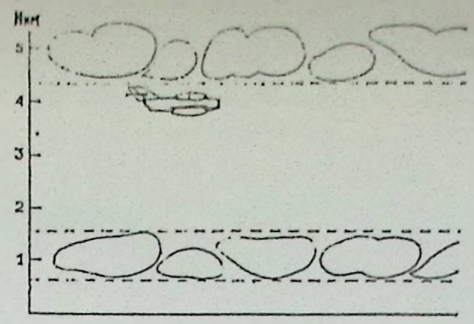
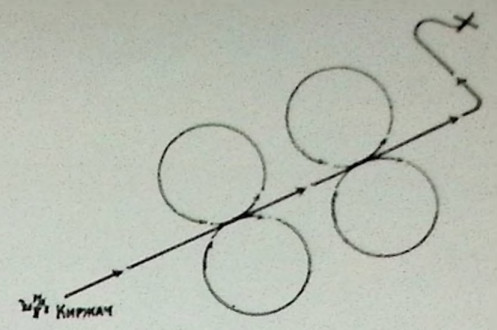
Until Gagarin's last report to the tower at 10:30 A.M., the crew had not been aware of or felt any danger or extraordinary condition. So what might have caused the crash?

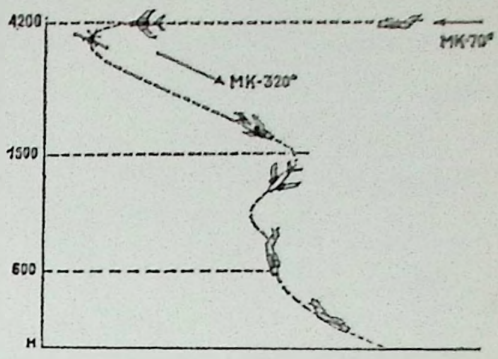
What about the weather? The ability to handle an airplane in bad weather is valued very highly among pilots, and they make separate entries about it in their flight logs. On that fateful day, Gagarin and Seryogin were navigating between two layers of heavy cloud cover—the lower one at 500 to 1,500 meters above ground and the upper one at 4,500 to 5,500 meters—when Yuri Gagarin requested permission to return.

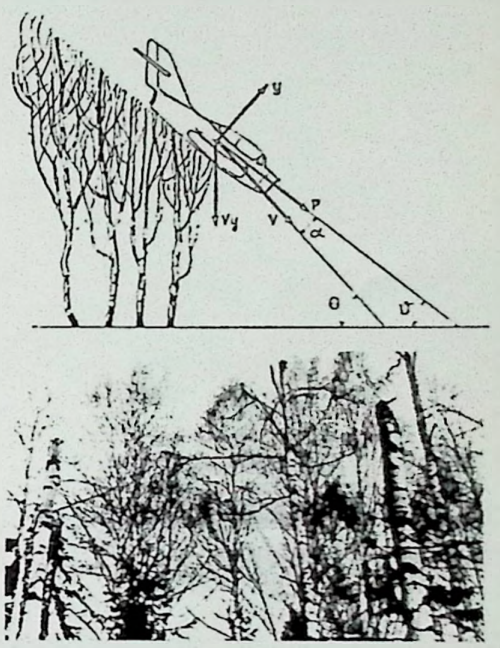




These drawings illustrate conditions for the flight. Clockwise from left: Streams of air running down an airplane's wings form vortices. It would have been next to impossible for the plane to have handled such a strong vortex. The flight took place between two layers of thick clouds. The test mission included a series of turns. The most likely trajectory of the flight immediately before impact. The position of the plane in relation to the ground before the crash.







Above: The tops of these birch trees were sheared off by the falling plane. Below: A monument to the two pilots has been erected at the crash site.

A group of experts on flight dynamics fed all of the data gathered by the investigators into a supercomputer.

After requesting and receiving permission to turn back toward the airfield, Gagarin had to swing his plane around and descend at the same time. Since he was navigating between two layers of heavy cloud cover, he could not have seen the Earth's horizon. Then something happened that caused the plane to go into a steep dive or tailspin.

Three Possible Reasons

The investigators put forward three possible causes of the crash.

Gagarin may have seen or thought he had seen another plane, a weather balloon or even a bird or a flock of birds. Though investigators firmly ruled out a midair collision, they could not be certain that Gagarin had not seen an obstacle suddenly appear in front of him.

The aircraft may also have gotten caught in turbulence from another plane in the vicinity. Pilots are very aware that in group flights and during midair refueling they should avoid getting caught up in the turbulent air currents caused by a nearby plane. This turbulence can cause a plane to veer out of control and to go into a plunge.

A vertical draft may have thrown Gagarin's MIG-15 out of control, sending it into a nose dive. As an advancing cold front was forecast for that day, the third possibility could not be definitely ruled out.

Investigators concluded that the crash might have been caused by a combination of two or three of the above-mentioned factors. When the horizon is not clearly visible to pilots, they must rely on their instruments for navigation, above all, their altimeter. Any sharp maneuver, particularly one involving a steep descent, may cause false readings on the altimeter. If this had been the case, Gagarin and Seryogin would not have been able to determine the altitude at which they were flying until they had emerged from the lower layer of cloud cover. And that might have been only at an altitude of 500 to 600 meters—by far too low to maneuver their craft out of a sharp dive or tailspin.

In summation, we will attempt to reconstruct the dramatic events that took place during the last minute of flight. Having received permission to return to the airfield, Gagarin began to descend and turn back. This maneuver is known to increase the air pressure on the pilot. Somewhere near the edge of the lower layer of cloud cover the plane experienced the impact of the above-mentioned factors and, most probably, began to roll.

The commissions' findings showed no evidence of irregularities, and investigators concluded that preparations for the flight on March 27, 1968, had been carried out in keeping with existing rules and technical regulations.

For several seconds Gagarin and Seryogin fought bravely to right the craft's position as pressure increased 10 to 11 times. Only strong, healthy and well-trained pilots can endure such loads. Jet pilots are routinely trained to endure eight-fold load increases. When pressures increase 12 times or more, a plane starts to break up, especially the wings.

Neither pilot attempted to use their ejection seat. Perhaps their experience as test pilots, their years of training, led them to the only possible solution: Find a way to land the craft safely.

Fighting until the end to save themselves and the craft, both pilots bravely perished doing what they had lived for—flying jets. Had they had 250 to 300 meters more altitude or an extra two seconds in which to maneuver, they might have been able to pull back up and avoid disaster. Those are the kinds of things that make the test pilot's job dangerous and that sometimes cost them their lives.

Gagarin and Seryogin's flight, which had lasted for 12 minutes, came to a critical halt in just one minute. The best qualities of these pilots—courage, commitment to duty and skill—were suddenly and quickly put to a severe test. Though they perished in their efforts, both men stood that test bravely. ■

ALMOST A YEAR IN SPACE!

Top: At 12:16 P.M. (Moscow time) on December 29, 1987, cosmonauts (left to right) Alexander Alexandrov, Yuri Romanenko and Anatoli Levchenko returned to Earth after successfully completing a program of scientific and technical research and experiments aboard the Mir *orbital complex. Center: Crew evacuation specialists and news photographers hurry to the descent capsule of the Soyuz TM-3, which landed 80 kilometers from Arkalyk. Left: Commander Romanenko gives his first interview after spending 326 days in orbit. Above: Levchenko is helped to a waiting helicopter.*

On December 29, 1987, Yuri Romanenko returned to Earth after a record 326 days working aboard the *Mir* manned orbital complex. Vladimir Titov and Musa Manarov, who are currently on the complex, might even break that record. "The objective, however, isn't to set records," said Academician Oleg Gazenko, director of the Institute of Medical and Biological Problems, in an interview with Boris Konovalov.

Photographs by Alexander Mokletsov and Igor Mikhalyov

Q: How did space medicine prepare for the record flight?

A: Yuri Romanenko's flight had more to do with studying human endurance than with setting records. Such flights into the unknown will continue. We have been simulating them on Earth. Our institute tested 10 people in conditions of virtually complete isolation for a year. The aim was to find preventive measures to offset the effects of weightlessness and space life. We experimented with training devices, pharmacological preparations as well as new pressurized suits.

Though this study helped with the Romanenko flight, it will be of greater significance in the future. We are continuing to observe the people who took part in the tests, and we will compare their results with Romanenko's.

Q: Can people remain in space for more than a year?

A: In my view, people can work for 18 months to two years in space. Everything depends on the make-up of the individual and the comforts that are provided up there. The situation is similar to that of people working in polar regions. Some people simply cannot adapt to the conditions of Antarctica and the Arctic, while others return winter after winter, spending long periods of time there.

We must determine the optimal time frames for flights, taking into account individual requirements.

Q: Are there biological barriers to long-duration flights? Also, can the physiological changes that take place be reversed?

A: Complete and total reversion is out of the question. Time simply stops for no one. All of us undergo changes every minute of the day. That's inevitable. Someone who spends just months in space will have changed because of natural processes.

As for barriers, that's not an easy question to answer. For the time being, space medicine is engaged in what may seem, at first glance, a strange thing. We are concentrating our efforts on having our cosmonauts remain terrestrial beings rather than on their becoming space people. The simple reason is that they have to come back to Earth's gravitation.

If a person were to remain in space indefinitely, the problem of adaptation from weightlessness would disappear. Evidently the human body has the ability to adapt to space conditions, and people could come to consider themselves sky dwellers. But they would be different.

From the point of view of physical loads, living conditions are easier in space than on Earth. Less energy needs to be exerted, which gives people a sense of greater freedom. They can swim in weightlessness like a fish does in water. With time, these new skills might become fixed. People might be happy and content living in space, but if they ever wanted to return to Earth, it would be incredibly difficult for them.

Hence, our cosmonauts are required to use exercise bicycles, to run on moving treadmills and to carry out demanding programs of physical exercise. It's tough on them, but they know the exercises guarantee an easier readjustment when they return to Earth.

Q: A manned mission to Mars would take a long time. Wouldn't the cosmonauts become irreversibly adapted to weightlessness?

A: We are currently gaining much experience in long-duration flights in near-Earth orbits. If a flight to Mars in conditions of weightlessness proves undesirable, we may resort to using artificial pressure. Experiments with animals onboard biosputniks show that artificial gravitation effectively guards against biological problems.

Here, however, some other problems arise, primarily technical ones. We need to create a rotating, doughnut-shaped device that could produce a centrifugal force like the Earth's gravitational pull. This would keep the cosmonauts on the floor. But work in space also calls for a nonrevolving aspect where weightlessness would reign. That creates the problem of having the cosmonauts pass from one part of the ship to the other. And the change in conditions might be sharp. There's no way of simulating that on Earth. Short space expeditions may provide us with answers. These flights require a person to switch from Earth's gravity to weightlessness and back quickly. We learned that that causes adaptation problems. More research is needed.

Q: A Mars flight would require huge stores of water, oxygen and food, which could hardly be supplied from Earth. How ready is science to equip lunar and other space settlements?

A: Several research centers are presently investigating this. Experimental work is also under way in space. But the lack of powerful energy sources is holding us back. International organizations are now studying this problem too.

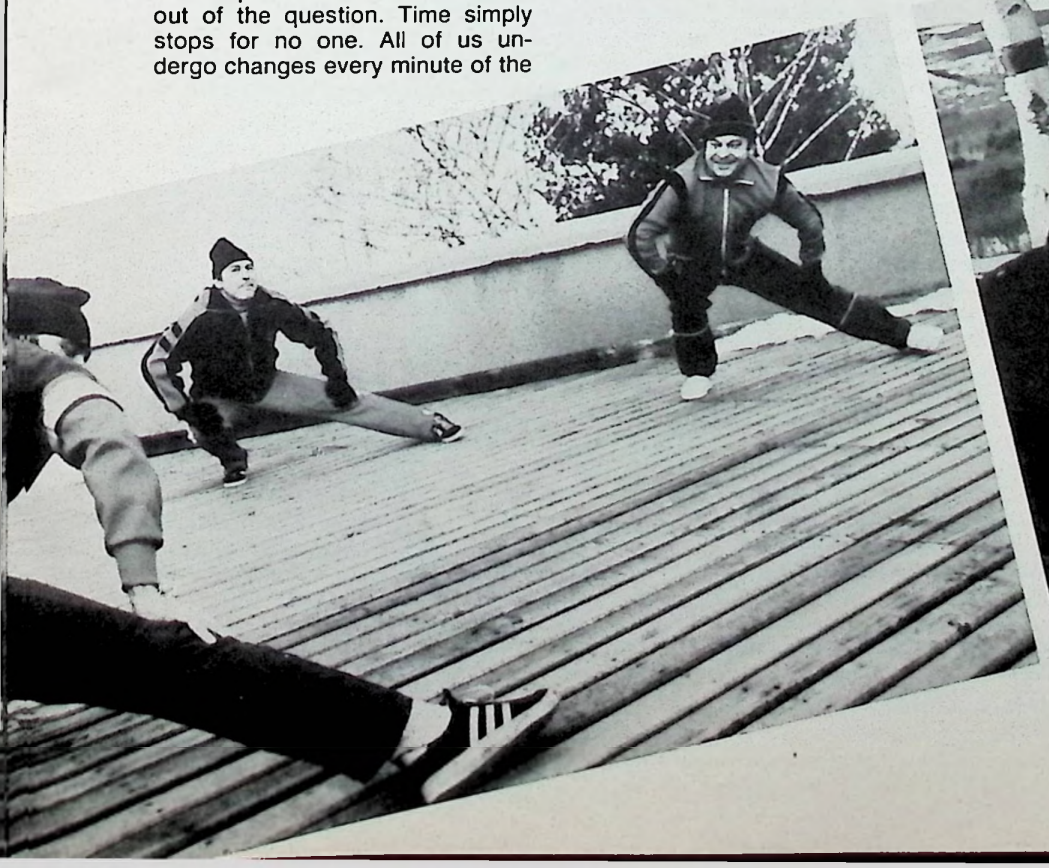
Q: James Fletcher of the U.S. National Aeronautics and Space Administration said, when opening a congress of the International Aeronautical Federation in Brighton, England, that in 30 years a child might be born at a lunar settlement. Is this likely?

A: Scientists are currently discussing the establishment of lunar settlements. From the point of view of science, lunar settlements would be valuable, but it's not clear what the practical benefits would be. And for the next few decades, funding of space missions will depend on benefits. Perhaps large near-Earth orbital stations will prove more economically viable.

There are no fundamental impediments to childbirth in space. Experiments on biosputniks and orbital stations with flies, fish and some animals have shown that weightlessness does not prevent the arrival of a new generation. And if families inhabit lunar or other space settlements, I'm sure there'll be cosmic babies.

There are no doubts that people can spread throughout the solar system. But there is the danger that our primogenital Earth will become alien to a space generation, which might well find Earth's gravity impossible to survive in. Only the future will show if humanity needs such a breakaway from the Earth. ■

Courtesy of the newspaper *Izvestia*



Above: Romanenko with his family.
Above left: A training session—physical fitness plays an important part in the cosmonaut's life.

WINNING A BET!

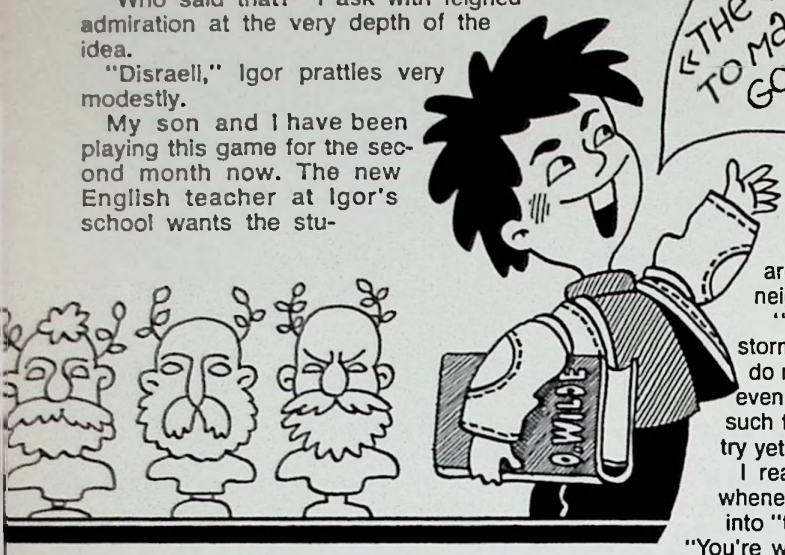
By Darya Nikolayeva
Drawings by Valeri Bochkov

IT IS much easier to be critical than to be correct," my son, Igor, says in an edifying tone of voice, looking at me intently.

"Who said that?" I ask with feigned admiration at the very depth of the idea.

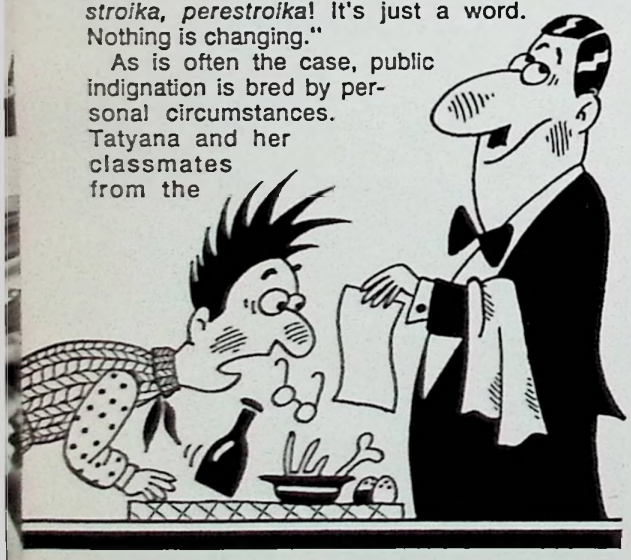
"Disraeli," Igor prattles very modestly.

My son and I have been playing this game for the second month now. The new English teacher at Igor's school wants the students to learn and to memorize new words in context, that is, in the form of quotations, maxims and aphorisms. So, from time to time, Igor shares some of the borrowed pearls of wisdom with the family.



Tatyana, who is married and no longer lives with us, does not know about the game. She is so surprised with her brother's sudden erudition, she loses track of what we were talking about and of the final argument with which she was going to pin me. She forthrightly states: "*Perestroika, perestroika*! It's just a word. Nothing is changing."

As is often the case, public indignation is bred by personal circumstances. Tatyana and her classmates from the university had decided to set up a cooperative for producing ceramics. They thought they wouldn't have to obtain a loan from a bank, that between their personal savings and the contributions they would solicit from their parents, they could cover the expense of buying a kiln and the necessary materials, of renting premises for a workshop and of securing a license from the city. Carried away with the idea, the group fantasized about selling their goods at the Izmailovo nature park where, by a recent but very popular tradition, amateur artists gather every Sunday to display and sell their works. As befits their age, Tatyana and her friends had a clear idea only about how great the demand would be for their goods and about how much they would make in addition to their university grants.



The Moscow City Soviet, however, refused to grant the cooperative permission until the local authorities could come up with sufficient premises, and that won't be easy: A kiln and chemicals are two items that can turn any quiet neighborhood into a disturbed beehive.

"That's just a pretext," Tatyana storms. "A bureaucratic trick in order to do nothing. Nothing but red tape. Don't even try to deceive yourselves: There's no such thing as individual labor in this country yet."

I react like a bull that sees a red flag whenever someone starts dividing people into "them" and "us."

"You're wrong," I begin, "and I can prove it. Tomorrow I'll do everything using only private services. Wanna bet?"

Tatyana agrees to call it a deal.

" 'Nothing is so good as it seems beforehand,' " Igor chirps in, citing Ralph Waldo Emerson.

The next morning confirms the justness of the aphorism. Politely, I dismiss the driver of a state-owned cab, while I stand on the corner trying to hail a private taxi. I know exactly what it should look like. The day before I had read in the newspaper that a commission, which was set up to approve a special insignia for private cabs, had resolved that a colorful design should be added to the proposed sign, noting that "even the most insignificant element in the makeup of our city should be esthetic." Now that I'm hopelessly late, I'm no longer thinking about esthetics, and I hop into the first cab that stops beside me. The car has no insignia, which means that the driver has no taxi license, but driving without one doesn't seem to bother the driver at all.

"Why pay for a license if you can get away without one?" he asks me. A license costs between 400 and 1,500 rubles a year, depending on the republic. Obviously, the sum has been spun out of thin air. "Things shouldn't be done this way," he grumbles.

Prompted by Oscar Wilde, Igor would say: " 'Discontent is the first step in progress of a man or a nation.' "

When I finally get to the office, I ask all my friends to inquire about cooperatives and other types of individual enterprise. The list of private businesses is long and includes cooperatives producing all sorts of handicrafts and artifacts, providing all kinds of services and processing scrap metal and wastepaper. There are even a cooperatively run marriage agency, a cooperative for growing ginseng and one for making copies of ancient musical instruments. I wonder—is the demand for old instruments high enough to ensure someone a steady source of income?

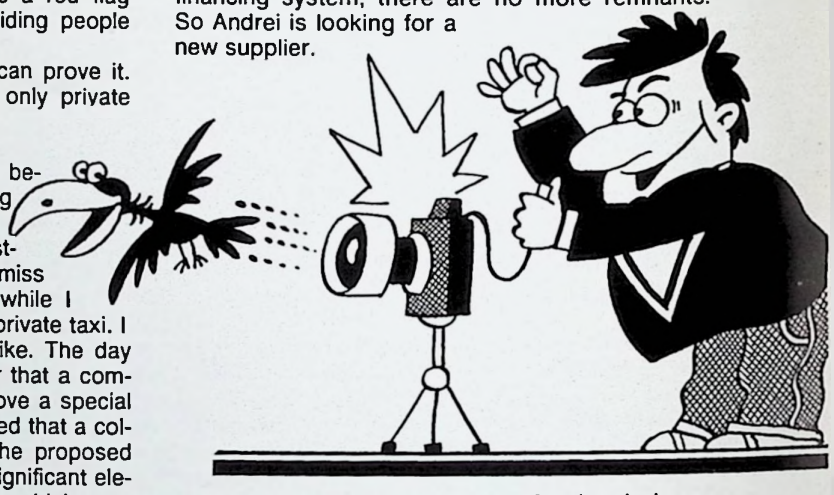
On my initiative, my colleagues and I head for a cooperative café for lunch. The café opened not far from our library last summer, but we haven't eaten there yet. At first, there were long lines and rumors of exorbitant prices. The situation with the lines has improved, but not with the prices. I spent seven times more for my lunch than I usually spend, and a friend of mine who, like an O.Henry character, asked for an out-of-season peach, 11 times more. But believe me, the lunch was worth every kopeck: a neat and cozy table, good service and superb food.

On the way back from the café I have my picture taken by a street photographer. When I look at the photo, I vividly remember a marketplace photographer from my childhood. He had a cardboard mockup of a horse and a rider. We, the kids in the neighborhood, would stick our heads into the hole, which opened on the face of the rider, and have our pictures taken.

Before returning home, I drop by a cooperative sewing shop. It seems to be doing a prospering business, making jackets, slacks and shirts in the latest style for the young. Andrei, the 27-year-old fashion designer who heads the shop, thinks at first that I'm an inspector who has come incognito: I'm not buying anything, just asking a lot of questions. Finally, he believes my story, and we talk.

Five people work in the cooperative full time and two more on a contract basis. With the exception of Andrei, all of the workers have permanent jobs at state-run enterprises. Each worker earns around 200 rubles a month at the sewing cooperative, in addition to their regular salary at a state-run enterprise.

The lack of good fabric is quite a problem. At first the cooperative bought remnants from a nearby sewing factory. However, since the factory changed over to a cost-accounting and self-financing system, there are no more remnants. So Andrei is looking for a new supplier.



The cooperative has no professional dressmakers. "Several people applied for a job, but they weren't up to our standards," Andrei says. "To us, the customer is always right. So workers with a poor attitude won't fit in here."

I leave the cooperative feeling quite satisfied with our conversation. I'm also taking home a nice three-color jacket, which I bought for Igor.

It is very attractive, and it, in itself, is proof enough to win the bet. In the evening I hear Igor talking with his sister on the phone. "Remember what Oscar Wilde once said: 'The best way to make children good is to make them happy.' Remember those words, you may need them soon," he exults.

What's he talking about? And why soon? ■

HELPING CHILDREN

The Soviet Children's Foundation is striving to awaken public awareness of children's needs.

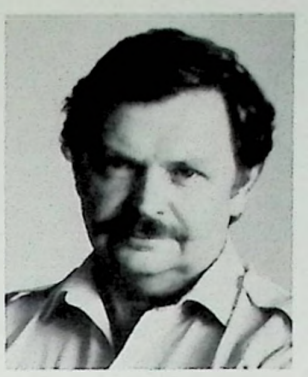
The Soviet Children's Foundation, a self-governing organization recently set up in the USSR, coordinates the efforts of private citizens, enterprises, community organizations, professional unions and national institutions in helping needy children and families. SOVIET LIFE special correspondent Ariadna Nikolenko talks with Soviet writer Albert Likhanov, chairman of the board of the foundation.

NIKOLENKO: How did the idea of a children's foundation come about?
LIKHANOV: It isn't a new idea. In January 1924, at the Congress of Soviets held in memory of Vladimir Lenin, who had just died, President Mikhail Kalinin proposed establishing a foundation for the support of homeless children and naming it after Lenin. The foundation, which existed from 1924 to 1938, contributed greatly to solving the problem of homeless children, a grave consequence of the First World War, the Civil War in Russia and the foreign intervention against the young Soviet republic.

The foundation was more than a fund-raising effort. It was the embodiment of Lenin's thoughts on how ordinary citizens could effectively participate in state affairs.

Sometime around 1937 the false notion that the state could handle all problems without public participation took hold. The foundation ceased to exist in 1938. I believe that was a mistake for which we've been paying ever since.
NIKOLENKO: What is the main objective of the new foundation?
LIKHANOV: Our purpose is multipronged. We not only provide assistance to orphans, handicapped children and families but also do what we can to strengthen the material base of children's health-care institutions, specialized kindergartens and schools. Our chief task, I'd call it our supertask, is to heighten people's awareness of the needs of children.

We've spent too many years impassionately stating that children are the only privileged class in our society, instead of opening our eyes to children's problems and working to resolve them.
NIKOLENKO: Have we compromised the humanitarian notion of philanthropy?
LIKHANOV: The way we understand the word "philanthropy" differs from how it was understood in prerevolutionary Russia or in many other countries. Philanthropy is not the good will of the rich toward the poor, but rather the good will of the strong toward the weak, of the adult toward the child, of the experienced toward those lacking experience.
NIKOLENKO: Would you say that reestablishing the foundation is evidence of the moral rejuvenation of our society?
LIKHANOV: Of course. The foundation has become possible because of the current changes taking place in our society. I had been pushing the idea of such a foundation for many years, haunting, in vain, the offices of bureaucrats in high places.
NIKOLENKO: The foundation has a very long list of sponsors, including both mass organizations like the Soviet Peace Committee and the USSR Writers Union and state-run institutions like the Ministry of Justice and the Ministry of Finance. How have you enrolled your sponsors?
LIKHANOV: We have invited some, while others have volunteered their help. Many of our sponsors handle questions of children's welfare and education in the course of duty. But we're not counting on our sponsors alone. We want to establish our own structure based on the initiative of private citizens and work collectives.



Albert Likhanov is a writer and the chairman of the board of the Soviet Children's Foundation.

NIKOLENKO: Many problems begin with the family, don't they?
LIKHANOV: At various stages of our development we tried to persuade our citizens that the state should discharge the functions that nature has allotted to people. We even tried to have the state take over what should be the parents' concern. Those attempts were ridiculous and naive. Even the most perfect system cannot substitute for a child's parents. Even the best of teachers cannot give children the warmth and security that their parents can, provided, of course, that the family is a happy one. A strong family is the basis for a strong society, for healthy morals.
NIKOLENKO: Let's talk about children's homes. Is the fact that they exist connected with unhappy families?
LIKHANOV: Today it is, although the system of children's homes emerged as a natural outgrowth of our history. After the October 1917 Revolution, these homes helped to resolve the problem of homeless children in a very short time. After World War II, children's homes gave shelter to war orphans. Now there's a different phenomenon. Many of the children in orphanages and other institutions are the victims of irresponsibility rather than misfortune. They have natural parents, yet they don't have them. Today's children's homes are the product of such terrible social evils as alcoholism, drug addiction and sexual abuse.
NIKOLENKO: How did it happen that the public hasn't been concerned with the children's homes?
LIKHANOV: When we preferred to see everything through rose-colored glasses, we turned a blind eye to the bad things. I've tried to sound the alarm about the unfavorable situation in our children's homes. But the homes shut out those of us pounding on the doors trying to get in. In a closed system with a few adults and many children without the protection of their parents, the adults have the upper hand and the last word. Of course, many, many wonderful and responsible people have devoted their lives to helping these kids. Take Antonina Khlebushkina, the director of a children's home in Tashkent, Uzbekistan, and a recipient of the Leo Tolstoy International Gold Medal.

Over the 45 years of her directorship, Khlebushkina has mothered 3,000 children. Although many of these kids are grown up and have families of their own, they still call her "Mom." Unfortunately, we don't have enough people like her.

Not infrequently, bad people who worked at children's institutions committed injustices with impunity, the children not knowing where to turn for help. We receive many letters from former residents. Some of them have never been able to overcome their insecurities. They don't blame anyone in particular, although the damage done to them is obvious.
NIKOLENKO: What is the situation now?
LIKHANOV: The Central Committee of the Communist Party adopted a resolution on eliminating the shortcomings in the work with orphans. The resolution calls for radically restructuring the system of children's homes. The government will increase its current 600-million-ruble expenditures for maintenance of children's homes by an additional 420 million rubles. As for our foundation, we have a wealth of work to do. We must see to it that children's homes have permanent sponsors, representatives of the community. Kindness and humanism are typical of the Soviet people in general. There is a huge potential for philanthropy, which has not been tapped.

We're open to any good suggestions, and we're ready to use any positive experience in this area.

Restructuring the system of children's homes is a long-term process. Children need protection in three areas—guidance, which is supplied by the people who direct the children's homes; medical care, which involves improving medical services; and the law, which concerns safeguarding the legal rights of children. There must be social guarantees too. At present nearly all former residents of children's homes attend job-training classes after only eight years of general education. Very few finish the regular 10 years of schooling and go on to a college or a university. However, the majority of the children who resided in the first Soviet children's homes established after the Civil War continued on to institutions of higher learning. This is a shortcoming of our educational system. There are boarding schools where children live and study, and there are children's homes where children have room and board but must attend a neighborhood school. The teachers in the neighborhood schools are not equipped to handle the special needs of these children, and, as a result, their education suffers.
NIKOLENKO: I've heard that beginning with this year some teachers colleges have introduced special departments that will train the teaching staff for children's homes.
LIKHANOV: True, special departments like that have been set up, but it will take five years before the first group of teachers graduate. We can't wait that long. We want good teachers in children's homes now, and we're working to achieve this goal.

Our foundation can and must be the initiator of many undertakings, including testing the professional qualifications of teachers for children's homes. If a teacher holding the job is found unfit, he or she must be disqualified from teaching.
NIKOLENKO: What was the public's reaction to your revelations about children's homes?
LIKHANOV: We knew there'd be a reaction, but we didn't expect to receive so much support. Each day we receive hundreds of letters, cables and financial contributions. As much as 125 million rubles have already been deposited in our special account. People offer ideas and assistance—from sponsoring benefit concerts to applying for jobs. Many people are willing to work at children's homes.
NIKOLENKO: The Soviet Children's Foundation has two bank accounts, including one at the Bank for Foreign Trade. Can foreigners make donations?
LIKHANOV: Yes, we have an account–No. 7070—for Soviet citizens living abroad and for citizens from other countries who want to contribute.

A photograph of the 1978 graduating class of the Polyany Boarding School.

YESTERDAY'S ORPHANS

Children deprived of parents are taken care of in state-run homes, orphanages and other institutions until the age of 18. Starting out in life, many say they feel handicapped compared to other youngsters who have grown up in warm, loving homes. Ilya Gitlits talked with some members of the 1978 graduating class of the Polyany Boarding School in Ryazan, Central Russia, to find out what's become of them since leaving school.

Believe it or not, I wanted to be an actress," says Alla Pchelkina, 26, affectionately holding her three-month-old son in her arms. I've no reason not to believe her, but her schoolteachers would never have thought that this young woman would turn out to be a loving wife and mother. At school Alla's reputation left much to be desired. After one particular escapade, her teacher Nina Kopylova warned her: "Unless you change, you'll wind up in the gutter, and your unwanted children will be placed in a children's home."

Alla was seven years old when she first came to live at the children's home. Her mother died in a car accident, and her father, who had abandoned the family sometime earlier, visited his daughter only once, three years after she arrived at the home.

"He tried to be nice to me," the young woman remembers. "He gave me candy and promised to take me home with him the next day. I haven't seen him since."

Alla was the talk of her school in the negative sense of the word. She wasn't interested in studies. Singing and dancing were her only loves. She started smoking at 14 and having sex before she turned 16.

Today Alla simply marvels at the patience of her former teachers, even when she was rude.

"I could get away with anything at school," she remembers, "but things were different when I started working at the poultry-processing plant. I had a difficult time adjusting at first."

As the saying goes, "Every cloud has a silver lining." At the plant Alla met the boy she was to marry.

"I'd always dreamed of meeting someone who'd love me," she says. "My husband, Sergei, adores me, and that makes me happy."

Although Alla earned good money at the plant—about 280 rubles a month—she's not sure she'll return to her former job when her maternity leave is up.

"I no longer want to become an actress. I'd rather get a job in sales, where I can meet new people every day and be helpful." ▶

Left: Yelena Kalmykova is a legal assistant with a Ryazan firm. She has argued and won several cases before a court of arbitration, resulting in the return of tens of thousands of rubles to her firm. Far left: Nikolai Pletnev, a graduate of the Moscow Institute of Culture, is now the director of an amateur club in Ryazan.

Legal adviser Yelena Kalmykova's day is packed with telephone calls, endless negotiations and visits to court.

"When I was little, I never played house. I played courtroom," she says.

Yelena was placed in her first children's home at the age of three. She saw her fill of the strong taking advantage of the weak, the older kids teasing the younger ones.

"When I was in high school, I decided to study law."

Yelena came to Moscow to enroll at the law institute. She had 25 rubles in her pocket—the sum each 18-year-old receives on leaving a home. However, she failed to pass the entrance exams and was soon back in Ryazan.

That failure didn't devastate Yelena, but she had to find work and a place to live.

"At the children's home I didn't have to think about anything. Now I was all alone in this huge world. I felt like a helpless little kitten. I knew nothing—neither the price of bread nor anything about family life."

Yelena took a job at the local poultry-processing plant where many of her former classmates worked. There she met a young man, and they got married. It wasn't long before their son, Maxim, was born. That was the same year Yelena successfully passed the entrance exams to a law institute.

"I spent so much time studying for my law degree and taking care of Maxim that I guess my husband kind of got lost in the shuffle. It wasn't too long before we got divorced."

While her marriage was a failure, her legal career was a success. She became an assistant to a district prosecutor and then an investigator at a regional procurator's office. In 1986 a large production association offered her a position as a legal adviser.

Yelena has argued, and won, more than one case in front of the arbitration court, saving her association tens of thousands of rubles.

What about her wages?

"I've no reason to complain," she says. "I take home more than 420 rubles a month."

And free time? Yelena spends all of her evenings and weekends with Maxim. They live in a nice apartment in downtown Ryazan. "I want Maxim to have everything I never had," she says, closing the door of the little boy's room, which is full of colorful toys. "I'll never forgive my mother for being an alcoholic," she continues in a low whisper. "I haven't shut her out of my life, but we'll never be close."

Hairdresser Olga Rychkova believes her job requires an ability to listen to people and to show concern.

"My customers tell me everything, but I never mention growing up in a children's home."

Olga lived in a children's home from the time she was four years old.

"Maybe I'm wrong, but I don't want people to know that I'm from an orphanage. I hate recalling the time I spent there."

In school Olga was a so-so student and never got very close to any of her teachers. Getting out of school as soon as possible was her only goal.

"The people were good to me, but I wanted my mother. Nobody could ever take her place."

When Olga was 12 years old, she started doing her girl friends' hair. When she finished school, she tried several jobs, though, before enrolling at a hairdressers school and doing what she enjoys best.

Olga has 12 customers a day, but she's always willing to work overtime if somebody needs her.

"To me, the customer is always right," she says.

Olga is the boss of the family. She's sure of her husband's love and doesn't mind that their three-year-old daughter is more attached to him than to her.

"I can be very strict when it comes to discipline," she says.

Olga has many girl friends, none of whom are from the children's home.

I met Alexander Kondrashin, an athletic-looking, six-feet-five-inches-tall hunk of a guy, at an amateur concert. He was singing Sergei Yesenin verses that have been set to music. A great Russian poet, Yesenin was born in a village in Ryazan Region.

"I come from a village too," says Alexander. "I found out about that when I was 14 years old. Until then I had no idea as to where I was born or who my parents were."

When Alexander was in junior high, he was summoned to the principal's office one day and was told that his mother had been found at last.

"When my mother and I finally met, she was crying, asking for my forgiveness. She told me that her parents had forced her into giving me up for adoption. She pleaded with me to come and live with her in the village."

Once in the village, Alexander met his three younger brothers. The boys literally hung on his every word and did anything he asked them to do. However, Alexander didn't stay with his newly found family.

"The other village boys made me feel like an alien from another planet. We had nothing in common, and I returned to the children's home."

Now Alexander spends his holidays with his mother, helping her around the house and in the garden.

For the past few years he has been a metalworker, although back in school he wanted to become a film projectionist.

"At the children's home we didn't have much opportunity to watch movies. Now that I can see any movie I want to, I don't have the time."

Alexander likes to keep himself busy. He plays volleyball and is an amateur singer. He likes hiking and dancing, and frequently goes to a disco. He knows how to play the piano, crochet, knit and embroider. But no matter how busy he might be, he always makes time for his friends from the children's home.

"I like getting together with old friends. But to tell you the truth, I'm tired of them asking me when I'm going to get married. I don't think it'll happen soon. I've seen too many broken homes and suffering children from unhappy marriages. When I marry, I want it to be forever."

"Sentenced to four years in prison, and he deserved it" is what the young men and women whom I met said about Sergei Polyakov. They know him from the children's home and always remember him as being rude and cruel.

After finishing school, Sergei held several jobs, but he could never get along with his coworkers. He did mediocre work and demanded attention.

One Sunday night he arrived at a workers dormitory. His eyes were red, his face was swollen and he looked as if he hadn't shaved for several days.

"We were having a birthday party for one of our friends," says Yelena Budkina, a former

"When I was young, I never knew a parent's love," says Galina Gracheva. "Now that I have kids of my own, I want to give them everything I never had." Right: Tatyana Korolyova works on a poultry farm. She is also studying at an agricultural college.

Alexander Kondrashin is a fitter at a poultry farm. Other graduates of the Polyany Boarding School work there too. Right: "My customers always confide in me," says Olga Rychkova, "but I never mention my past."

classmate of Sergei's. "When he said something obscene to a girl, another guy jumped in to protect her. Sergei pulled a knife and stabbed him."

Sergei was sentenced to four years in prison for his crime. Though none of his former classmates and coworkers feel sorry for him, they hope that this time he has learned his lesson and figures out what he wants to do with his life.

Never whimper, never cry, never sleep late in the morning—I learned these three commandments when I was in the children's home," says Tatyana Korolyova. "I remember feeling very hungry, but dinner was a long way off. My roommate was chewing on some goodies she had brought back with her from a visit home. There was no chance of her sharing her food; she wanted it all for herself. So I told myself: 'Don't whimper!'

"I liked playing ice hockey with the boys. I remember getting kicked so hard once that I saw stars. I was about to burst into tears when an inner voice commanded: 'Don't cry!' And if you go in for sports, you have to get up early. So I never slept late in the morning."

Now, not only Tatyana but also her 29-year-old husband and their five-year-old son live according to these rules.

When Tatyana left the boarding school, she wanted to continue her education at an institute of physical culture, but she was afraid of living alone in a strange city. Instead, she took a job at the local poultry-processing plant, where she met her future husband, Vyacheslav.

Since the first time Vyacheslav brought Tatyana home to meet his mother, the two women have been as close as any mother and daughter. And yet Tatyana doesn't call Vyacheslav's mother "Mom," as some brides do. "The word 'mother' is very special for me," she says.

The Korolyovs earn 600 rubles a month. That's pretty good money, but the couple spend a lot too. Recently, they received a one-bedroom apartment from the plant, and they're busy furnishing it.

"We've got everything we need, and now we're planning on buying a car," says Tatyana.

The Korolyovs are a happy, close-knit family.

"Most of our friends are former schoolmates of mine," says Tatyana. "We share everything—the good times and the bad."

Five feet four inches tall, Nikolai Vasin, 27, was the oldest and the shortest of his classmates. But being the shortest has never been a problem. "On the contrary, the bigger kids always looked after us little ones," says Nikolai.

Nikolai believes in being a man of integrity. He hates dishonesty and lies. Maybe that's why he joined the local militia after graduating from school.

"I like my job. I feel I'm very useful to society."

Nikolai was too young to remember being placed in the children's home, but now he is very grateful to his teachers.

When he was nine, he learned that he did have a mother, but meeting her did not bring him joy.

"She couldn't find a single warm word for me. Whenever she came to visit me at the home, we would sit looking at each other without saying a word. I've only just recently begun to understand her. She probably needed more reassurance than I did. She had come to me for comfort, while I was expecting the same from her," he says.

"I can't say that my school chums and I observed the high moral standards our teachers tried to instill in us. In the summertime we thought all the private vegetable gardens bordering the school were ours."

He had his first and only run-in with the law when he, together with several other boys, were caught pilfering somebody's garden. When the militiaman found out that the kids were from the children's home, he asked the owner of the garden not to make a formal complaint.

"How can you begrudge these boys a few plums?" he asked the owner of the garden.

"I'd have gladly given them the fruit, if only they had asked," the owner answered, giving the boys a basket of plums.

What impressed Nikolai most was how the militiaman had handled the situation. Later, when he had to write a composition on what he wanted to be when he grew up, Nikolai described the incident and said that someday he would join the militia. When he graduated, he enrolled in a two-year militia-training school.

Nikolai is presently an investigator at a militia station some 50 kilometers from Ryazan. His fellow officers consider him a staunch upholder of the law. They say he is just as strict with himself.

Nikolai reads everything about children's homes. Some of the things he reads infuriate him, like the statement that appeared in one newspaper claiming that a person brought up in a children's institution is unable to have a healthy and stable family relationship.

"That's utter nonsense," says Nikolai.

The director of the Amateur Activities Club in Ryazan, Nikolai Pletnev, heads a staff of professional dance, voice, drama, music and graphic arts teachers. Not all of them know, however, that their well-dressed and well-mannered boss grew up in a children's home.

"Some of the kids at the children's home spent weekends with their parents; others only attended our school but lived at home. I never envied those who had parents or were better fed. I envied those who were dressed better than we were.

"We wore dull uniforms. But most of all, I hated the dufflebags we had to carry when going away to summer camp. Our names were printed on the top of them, and every time I had to carry mine, I felt miserable, thinking that everybody was pointing a finger at me."

Nikolai spent his very first paycheck on a piece of luggage. Also, though he now has a complete wardrobe of suits and numerous pairs of matching dress shoes, he still cannot resist the temptation to buy more clothes.

The greatest objection he and his schoolmates had toward the school was the drill corps atmosphere that existed there and the policy of suppressing the personality that some of the teachers and counselors followed.

For the kids in the school, television was the window on the world, and though watching TV after 9:30 P.M. was forbidden, the youngsters always found a way. They'd even try to imitate their favorite actors.

Nikolai organized an amateur group at the school, and his love for the arts later led him to the Institute of Culture in Moscow.

"I didn't want to be either an actor or a stage director," says Nikolai. "I wanted to become an expert in helping people spend their free time creatively."

He says he'd never have received his college diploma had it not been for his schoolmates encouraging him and urging him on.

"I'm sure this team spirit will remain with us throughout our lives," he says. ■

Left: Alla Pchelkina's ambition was to be an actress. But now that she's married and has a child, she says she's content. Above: Nikolai and Natalia Vasin at home. Both are graduates of the Polyany Boarding School.

ONE BIG HAPPY FAMILY

By Alexander Batalin
Photographs by Pyotr Malinovsky

As a family project, the Rozhkovs are clearing the plot of land for their country cottage. The family (clockwise from top left): Vladimir, Larisa, Dad, Maria, Yevgenia, Darya, Mom and Natasha. The eldest son, Dmitri (not shown in the photo), is away from home in the army.

Victor and Galina Rozhkov live in Irkutsk, Siberia. Besides their two natural children, they are bringing up five other youngsters whom they have adopted.

One of the five, a three-year-old girl, had been living with her single mother, an alcoholic, who could not care for her. Another toddler had been abandoned by his parents in a hospital. A third infant's mother never came back to claim the baby from the maternity hospital.

These youngsters became available for adoption only after their natural parents had given up all of their parental rights to the children. According to Soviet law, adoption can occur if it can be formally established that the natural parents have neglected their obligations to their child for at least a year or if the parents themselves relinquish all claims to the child. In the case of the Rozhkovs, Victor and Galina had to struggle to gain legal custody of their five adopted children.

Both husband and wife are 40 years old. They attended the same high school and are both graduates of the faculty of geography at a local university. Victor is presently a senior research associate at the Siberian Branch of the USSR Academy of Sciences. Galina, who also held a full-time position, decided to quit her job after the children arrived and to spend as much time as possible at home. However, in order to make ends meet, she has taken a part-time job cleaning offices.

"Being a good mother to seven children is a career in itself," she says. "Parenting requires patience and dedication, among other things."

In fact, Galina is an extraordinary woman: She plays the piano and draws pretty well. She used to write poetry and has just finished a novel about the children. "They were my inspiration," the proud mother says.

Although Victor is engaged in serious research, which takes most of his concentration, he always finds time for the family. Skiing, other sports and photography, which are his hobbies, have become the favorite pastimes of the Rozhkov children too. Victor has also gotten the family involved in building a country cottage on a plot of land that it received from the state.

The Rozhkovs live in two adjoining apartments—a one-bedroom and a three-bedroom. Even with such a big family, there's never any fussing or much noise at their house.

Though the Rozhkov home runs smoothly most of the time, the children aren't angels and have to be disciplined from time to time. Sometimes it takes a bit of doing to make sure that the kids do their best at school.

The parents, too, are only human: They get tired and have to manage their money to have it stretch from one payday to the next. Besides, they must attend to plenty of things, big and little, that come with having a large family. Jealousy and sibling rivalry, however, are two things that are alien to the Rozhkov family. An atmosphere of kindness, respect and love fills the home.

Almost everywhere teenagers are a constant source of worry to parents, but that's not the case in the Rozhkov house. The older children have a great respect for their parents' way of life, and, therefore, they do whatever they can to set a good example for their younger brother and sisters.

What's different about this family? The children are given a say in all family matters from a very early age. Each Rozhkov child is required to do his or her share of chores around the house. The youngest children must pick up their toys and take care of the family pets. The older children help with the cooking, cleaning and laundry.

Coming from such a loving family, it's no wonder that Natasha, 21, the eldest daughter, has decided to work in a nursery school. She is also taking courses at the night school of the Irkutsk Teachers College. Son Dmitri, 18, is in the army now. After he finishes his stint, in about two years, he plans to enroll at the local polytechnic institute.

I asked the younger Rozhkovs what they want to do when they grow up. I was surprised that they had ready answers. Larisa, 13, wants to go to Moscow State University to study zoology. Vladimir, 12, plans on becoming a geographer and traveling a lot—like his dad. Darya, eight, is thinking of becoming an artist; and Maria, also eight, a veterinarian. The youngest Rozhkov girl, six-year-old Yevgenia, dreams of an acting career. Why did the Rozhkovs decide to adopt children when they could very well have had more kids of their own?

The family poses in front of the car it received from the state. Right: Playtime comes only after all school assignments are finished.

"Every human being has the right to happiness, and every child has the right to a happy childhood," Galina says. "But, by far, not every child is happy. Just look into the eyes of the youngsters in the children's homes—they exude sadness and expectation. How could anyone remain indifferent to them?

"There are about a thousand children's homes and orphanages in the country. The staffs at these institutions, for the most part, are doing their best for these children. But, really, how can you compare growing up in a loving home to growing up in an institution, deprived of maternal love and the feeling of being part of a family? ▶

Darya (left) and Maria (right)—both girls are eight years old—are classmates in school.

Togetherness is the key to the Rozhkovs' success. Parents and children spend a lot of time on family projects, from holding art competitions to picking vegetables in the countryside. Far right: Son Vladimir in the playground near his home. He wants to be a geographer, like his dad, when he grows up.

"Large enterprises have developed a tradition of supporting children's institutions in this country. They help a great deal in making the lives of orphans more comfortable and enjoyable. The enterprises give presents and sponsor excursions, among other things. But this has nothing to do with helping the children grow up to be mature adults, able to handle life on their own.

"When the children leave the institutions, they often feel alone, with no one to turn to in time of need. Small wonder many of them have difficulties adjusting.

"My husband and I decided that we wanted to provide a home for at least a few of the kids who have been robbed of things that families take for granted."

Galina and Victor Rozhkov can certainly be admired on a personal level, but might their experience suggest certain conclusions of importance for all society?

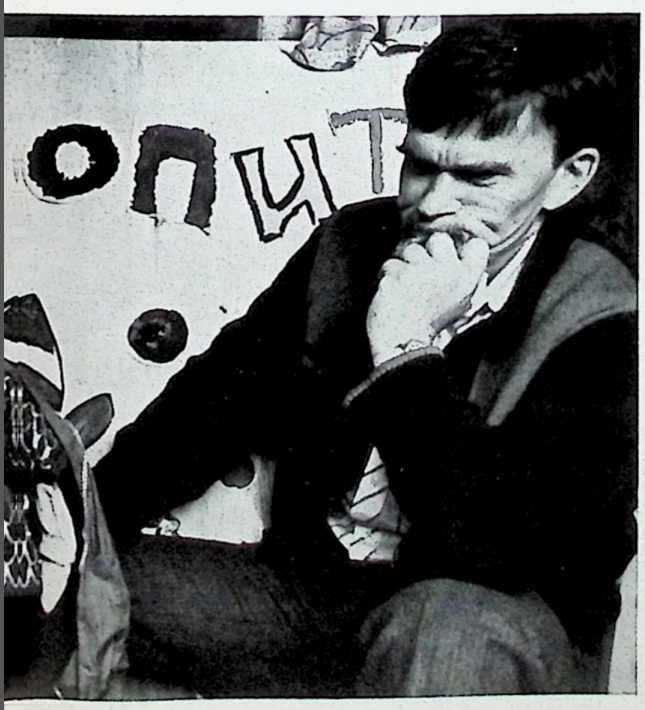
We are used to mechanically saying that the family is a unit of society—an important one at that. But somehow over the years many of us have shut our hearts and minds to such notions as "civic responsibility" and "thinking in terms of the good of society." A healthy society is unthinkable without healthy and happy children. The Rozhkovs should be an example for others to follow. However, the Rozhkovs did not accomplish their goal without the support of family, friends and a number of simply goodhearted folk.

When an article about the family appeared in a newspaper, people from around the country sent them letters of support and contributions. One letter was from a young couple from Leningrad, who have three children of their own but who decided to adopt two more. Another letter from a couple in Ivanovo with two children asked the Rozhkovs for advice about adoption. Victor and Galina have also heard from other parents of adopted children.

One letter from a young woman who had grown up in a children's home was especially touching. The woman wrote that her adult life has been particularly difficult for precisely the reasons Galina mentioned above. "When I left the home," she wrote, "I was so unused to family life that I made a total mess out of my marriage to a very wonderful guy. I also encountered difficulties on the job and couldn't work in the profession for which I was trained." Now that the young woman is working in a children's home, she has gained a great deal of understanding about herself. "But that doesn't ease the pain," she wrote. "Each of the 300 children who live here needs individual attention. Each needs love and security. I do my best at it, but how can one person do it all?"

How can this problem be solved? Obviously, it would be impossible to close down all of the children's homes and to find families for all the children living there. First, not enough people are

Thirteen-year-old Larisa with Chapa, the family pet. Right: Dad gets into the act with Vladimir for a rehearsal of a family puppet show.



willing to adopt, and those who want to must be carefully screened. The populations in children's institutions should be decreased, and the institutions themselves should be made to resemble real homes. Families like the Rozhkovs should receive support all across the board, legally and financially. The Soviet Children's Foundation, which has recently been established in this country, will play a large role in this respect. The Rozhkovs were invited to attend the initial meeting of the Children's Foundation in Moscow. And Galina Rozhkova was asked to sit on its governing board along with prominent cultural figures, scientists and government officials. She proposed a special project for discussion by the foundation: a family township for orphans.

"Between 15 and 20 families with natural and adopted children could live in a community of one-family houses, complete with gardens, playgrounds, sports facilities and a sort of community center or a club," Galina said.

"Such a community could be home for about a hundred orphans. They would stay with good families and have a mother and father and brothers and sisters. All of the parents could participate in community affairs. Some could teach music, dancing and drawing, while others could help with the sports and sciences. These fathers and mothers would provide more individual attention and love than the children would receive in a large children's home. Only the most active and interested adults, those individuals with a true love for children, would be welcome to join."

By granting the family township the status of a children's institution, it would then be accountable to the local educational bodies. The mothers of the families would receive either wages or a 50-ruble monthly allowance for each child in their care. The years the women spend rearing their natural and adopted children would be counted as part of their length of work record. Also, mothers of adopted children should be able to retire on pension at the age of 50, as mothers of large families can do under Soviet law.

In terms of money, Galina's project would be less expensive for the state than the present system of maintaining children in homes. But that's not its only merit. It would provide a more secure and healthier environment in which these unfortunate youngsters could grow and develop. ■

THE MAN WHO TALKS WITH THE PAST

By Valentin Kurbatov
Pskov Writer

A hulk of a man, art lover Saveli Yamshchikov gives the appearance of having stepped out of an old Russian novel, but in reality he is a very modern and dynamic person and always on the go. Arriving from Suzdal, Central Russia, in the evening, he surely will be on his way to, say, Vologda in the Russian North in the morning, and from there to Baku in Transcaucasia—that's his most typical route. Who is this "rolling stone," and what is his noble mission?

Saveli Yamshchikov is a serious scholar, yet everything he does has an element of sport about it: a peculiar combination. In Suzdal, he was a consultant on a new movie *Custodians*. In Vologda, he looked at museum holdings to see if any of the exhibits were in need of repair at the USSR Restoration Research Institute where he heads the art department. As for the Baku trip, that was to help Farkhad Khalilov, a first-rate local artist, prepare a one-man show for Moscow.

In between the three trips, the "rolling stone" found time to speak at a conference on art history in Kostroma and to host an evening with Margarita Terekhova at the Art Club in Moscow. Terekhova, a prominent actress, played the hero's mother and Natalya in Andrei Tarkovsky's *Mirror*.

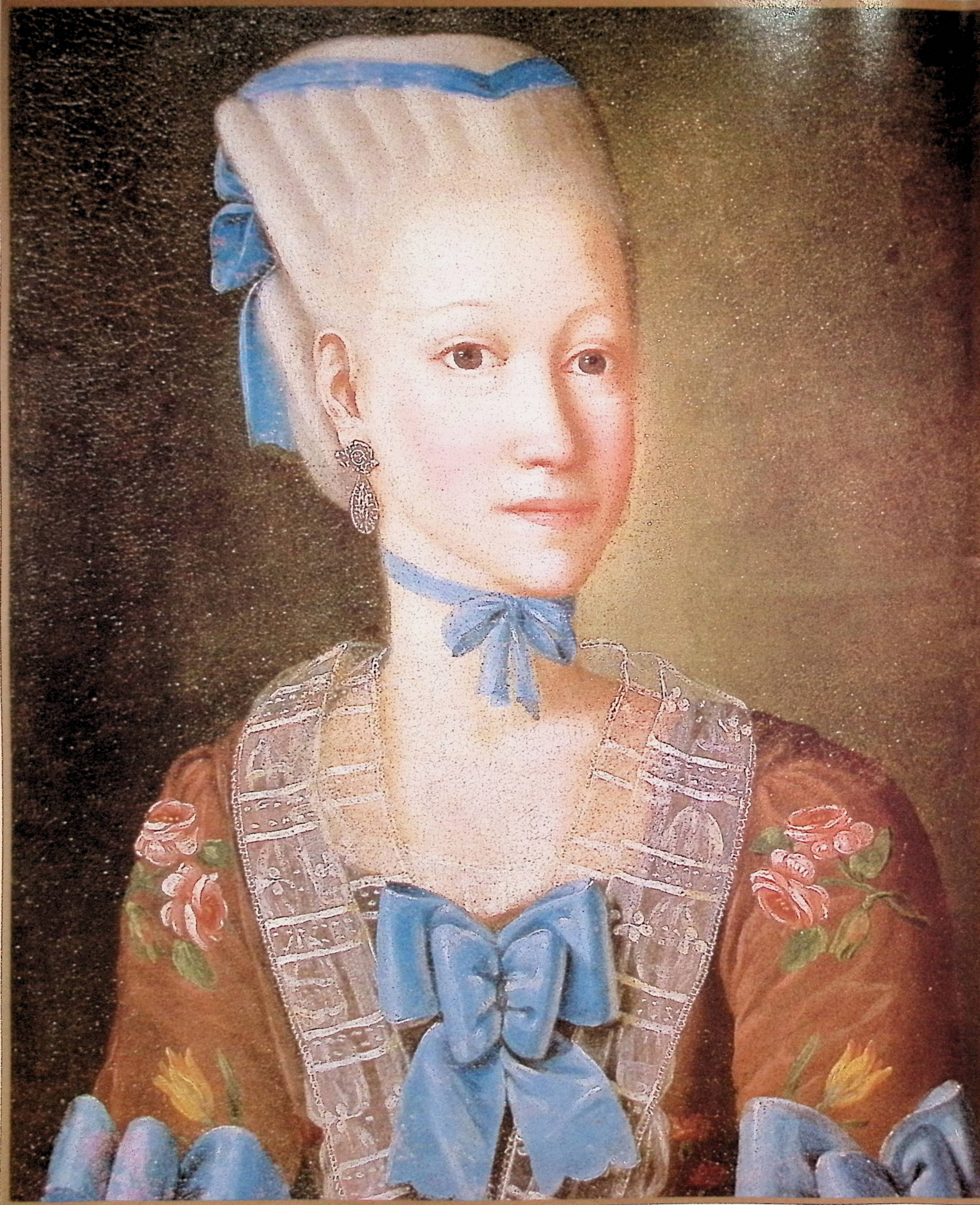
Yamshchikov is known for arranging a number of superb exhibitions, and the art catalogues and albums he compiles and annotates sell like hot cakes. A Merited Master of the Arts and a recipient of a silver medal from the USSR Academy of the Arts, Yamshchikov is a member of the board of the Soviet Culture Foundation. Surely, you'd think, this man would enjoy universal love and recognition from artistic circles. But that's not the case.

I spoke about Yamshchikov with several painters, art scholars and architects. Some expressed surprise at how he manages all that he does. Others were critical, saying, "Tough as nails, that one." His most ardent supporters openly admire him: "A jack-of-all-trades if ever there was one."

It's hard to categorize his profession. When I called him an art scholar or historian, I was reminded of his practical work, which takes up most of his time. "How can *he* be a scholar?" some retorted. When I referred to him as artist-restorer, I heard the remark: "You don't know what restoration is all about!"

Actually, Yamshchikov represents a new profession born out of the growing love for and interest in the past. Today, when art, like science, knows the dangers of narrow specialization, someone who can act as an intermediary among the various fields is a welcome arrival, especially someone like Yamshchikov, whose noble efforts are reminiscent of the work of the enlighteners of old. Organizing restoration work and exhibitions requires the skill of the diplomat, all the more so since the job brings one into contact with officials and artists, some of whom are able to sacrifice even the best projects to their own ambitions. The times called for specialists able to smooth out the wrinkles—and they came for- ▶

Art restorer Saveli Yamshchikov in the Vasili Tropinin Museum. Tropinin was a nineteenth century Russian painter.



Paintings by Grigori Ostrovsky. Clockwise from facing page: *Portrait of Y.P. Cherevina*, 1773. *Portrait of Alexei Yaroslavov. Portrait of a Woman*, 1789.

ward. But Yamshchikov is the most striking personality among them.

Born in 1938, Yamshchikov was the first one in his family to become an art restorer. He says he owes his choice of profession to the passion for history that swept Soviet society when he was a teenager. Yamshchikov enrolled in the History Department of Moscow State University in 1956.

That was a time when tourists were flocking to the old Russian towns, and collecting became everybody's hobby on which black-marketeering thrived. Art and lovers of art needed protection, and that would require erudite and resolute experts. With this as his motivation, Yamshchikov switched to part-time studies at the university and took a job with the All-Russia Art Restoration Center. Later he left the center to work with the USSR Restoration Research Institute. And he has been there ever since.

I first met Yamshchikov in 1970 in my home town of Pskov, a medieval town situated in the northwestern part of Russia. He was working with the crew of Andrei Tarkovsky's film *Andrei Rublyov*. That was Yamshchikov's first effort as a movie consultant. At the same time, he was busy with a team of restorers preparing a group of Pskov icons to be sent to Moscow. The team had set up a workshop in a medieval merchant's warehouse.

I soon became a frequent guest at the workshop. I enjoyed watching the deft hands work on the blackened, dry-rotted boards covered with greasy peeling paint. The job required incredible patience. I loved listening to the artists' conversation, though they talked shop nonstop.

At first I thought Yamshchikov had chosen his Pskov acquaintances at random, mixing restorers with doctors, blacksmiths, reporters and many, many others. However, I soon discovered these people not only provided him with practical assistance; they represented the town's community for him.

Yamshchikov told me that he has just as many helpers in the other old towns he visits on business. He refers to lots of people as "my friends" and treats anyone having anything to do with old art as part of "the family," whether the individuals know each other or not.

Soon after that trip to Pskov, Yamshchikov began hosting "Meet the Celebrity" evenings, which were sponsored by the Art Club in Moscow. The purpose of the gatherings was to acquaint audiences with people involved in interesting and very unique hobbies. On one memorable evening Academician Valentin L. Yanin, the famous Soviet archeologist, displayed his collection of gramophone records, including recordings of foremost Russian singers dating from the turn of the century. On another evening Mikhail Talvin, a leading dancer with the Bolshoi Ballet, exhibited his paintings. Everyone who attended those gatherings noted Yamshchikov's gift for communication and his ability to make everyone feel at home.

I wish I could spend more time in Saveli Yamshchikov's Moscow workshop, an old school outbuilding in the center of the city. Cheerful and hospitable, his place draws people like a magnet: artists, restorers, actors, poets, musicians and athletes. And good conversation flows.

Whether he is arranging a collection of paintings for a show, writing a prospectus or preparing a catalogue for an exhibit, Yamshchikov treats the old masterpieces as his dearest friends. He has a way of making the medieval icons and graceful eighteenth century paintings look at ease in our modern, bustling world.

Discoveries are what the art restorer lives for. When Yamshchikov places a soot-covered icon on his table, he's not sure what he'll find in the painting after it is cleaned. Is it the inspired creation of a great master? Or a work of an ordinary craftsman? However, he believes that, despite its lineage, the work belongs to history.

Restorers are painters, artisans, historians, philosophers and psychologists rolled into one. They follow a unique profession, devoting their lives to saving yesterday's artifacts for the enjoy- ▶

Yefim Chestnyakov. *Singers at the Throne.*

Yefim Chestnyakov. *Sit-around Gathering.*

ment of future generations. Though discoveries are rare, the restorer is always prepared to come across a forgotten gem.

Yamshchikov's discoveries of two unknown artists made front-page news: Grigori Ostrovsky, a brilliant eighteenth century painter, and Yefim Chestnyakov, a contemporary artist who died in 1961. The works of Chestnyakov, a modest village teacher, show penetrating feeling, strong symbolism, great originality and rich wisdom.

Ostrovsky and Chestnyakov are now firmly established in the annals of art history, yet the name of the person who discovered them goes unmentioned. That's just how it is.

Bringing an artist back from oblivion presents an imposing challenge. The indifference and doubts of the gallery officials must be overcome before an exhibit is held or a catalogue printed. And those who take on the challenge know full well that they'll be forgotten as soon as readers put aside the magazine or newspaper where they come across their names. But fame isn't the restorer's lot. So why are some willing to go through the trouble? The answer is simple: to enrich art history. That makes everything worth the effort—even if in so doing, the restorer gains the reputation of being an aggressive or a cunning guy.

When Yamshchikov visits uncooperative officials, he leaves no stone unturned, but sometimes he must face much more difficult things. There was the time he had to visit Ivan Voronov, a well-known art collector in Pskov who lay dying, in order to ask him to bequeath his pictures to the state. He hated bothering the old man with business, but the thought of the precious collection being not preserved as a unit in a museum but broken up and scattered all over the country drove him on.

After Voronov died, Yamshchikov had no trouble with the Russian pictures, but it was a different story with the Western European works. Yamshchikov explained:

"After a cursory examination, one of the commissions responsible for the legacy wrote a disastrous report appraising all of the paintings as fakes, or at least copies. I'm not an expert on Western European painting, but instinct told me that there had to be real gems among the Voronov canvases. I went to see Yuri Kuznetsov, an expert on the staff of the State Hermitage Museum in Leningrad, about my hunch. He and Irena Linnik, a Doctor of Science (the Arts) and another Hermitage expert, agreed to look at the collection.

"I was so excited that day! Like a schoolboy before final exams. The Voronov pictures were lined up against the walls in a large room in the Pskov Art Gallery. Kuznetsov and Linnik made a brief survey before carefully examining the canvases one by one.

" 'Watteau? A recent copy.'

" 'Teniers? Also a copy—an excellent one, though.' Then suddenly I heard, '*Flight to Egypt*? Superb! Must be a Van Dyck or have been done by one of his gifted apprentices.'

"It was really a Boeyermans, as Linnik proved later. Another painting attributed to a seventeenth century Spanish artist happens to be the only one of its kind in the Soviet Union.

"The final report appraised the collection as extremely valuable, and some of the works as unique. These pieces were sent to the institute where I work. They are to be included in an exhibit of Western European paintings from minor Russian museums, which will be opening soon."

That the exhibition will be held at all is a great achievement: Provincial museums are very reluctant to send pictures to Moscow for restoration or display. They are afraid they'll never get them back. That was exactly the situation with the sensational Grigori Ostrovsky Collection. The staff of the Soligalich Museum may have been wary about losing its pictures, but I recently saw the treasures safe and sound back in Soligalich.

The same situation occurred when the staff of the Pskov Museum realized the true value of the Voronov Collection. The museum was apprehensive that the Russian Museum in Leningrad and the Museum of Fine Arts in Moscow would appropriate the paintings through Yamshchikov's effort. The Pskov Museum's fear was unfounded too. It has acquired 50 superb Russian paintings from the Voronov Collection and soon will receive 15 more Western European works after they've undergone restoration and been exhibited in Moscow. That's the usual arrangement with such exhibits. If it were not for Saveli Yamshchikov, the Voronov Collection would hardly have found its way into any museum.

> Restorers are painters, artisans, historians, philosophers and psychologists rolled into one. They follow a unique profession, devoting their lives to saving yesterday's artifacts for the enjoyment of future generations. Though discoveries are rare, the restorer is always prepared to come across a forgotten gem.

Over the years Yamshchikov has discovered several top-class painters. He also compiles prospectuses and makes posters for exhibits he arranges. Many Soviet towns have displayed icons that he has had restored. After traveling around the country on exhibit, these works of art now occupy places of honor in museums.

Yamshchikov has assumed an innovative approach to popularizing old art. For instance, his institute painstakingly restores old icons, classifies them according to school and century, and then distributes them to museums. Sometimes the institute arranges its own displays, but it never advertises them.

This practice runs counter to Yamshchikov's thinking. He strongly believes art belongs to everyone, and everyone should have the opportunity to see it. He makes it a point to announce exhibits and displays.

Thanks to the promotional work done by Yamshchikov, exquisite exhibitions of icons from medieval Vologda, Pskov and Karelia, shows of eighteenth and nineteenth century portraits from Yaroslavl Region and one-man shows, such as the Chestnyakov exhibit, are gaining popularity among a cross section of the general public. Though Yamshchikov's name never appeared on the display posters, every one of the exhibits was his idea. Apart from exhibits, the art restorer, with his close associates Sergei Golushkin, Nikita Goleizovsky and Alexander Bykov, has prepared more than 50 art books, which have received good reviews. In collaboration with Gerald Vzdornov, Yamshchikov has edited selected works by Nikolai Sychev and Alexander Anisimov, prominent art historians and restorers active at the turn of the century. Another scholarly work is currently in print.

History is an account of wars and struggles, seldom broken by quiet periods when beauty and reason held sway. Precious written monuments have perished in the flames of war aplenty, but some treasures of the national spirit have managed to survive intact in palaces and peasant huts. Paintings and icons are among such treasures, and today art restorers are lovingly bringing them back to life.

Old artistic gems are the roots of present-day culture. They help us understand our ancestors' tenacity and fortitude and are monuments to their intellectual wealth. That was the case with a recent exhibition of objets d'art that were found around the country, restored and put on display in Moscow and Leningrad. This major project included over a thousand items from all ages, some dating to the third millennium B.C. Preparations for the exhibition took Yamshchikov and his colleagues five years. A lavishly illustrated article on his contribution to the exhibit appeared in the August 1986 issue of SOVIET LIFE.

Surpassing all expectations, the exhibition was a smashing success. "For the first time I realized how lucky I am to be in my profession," said Yamshchikov. "My work on that project brought me into contact with lots of people who are reviving the past for the sake of the present and future generations. That's what art preservation is all about."

Author's note: It was a great challenge for me to write about Saveli Yamshchikov. I had ample material to work with—his writings, exhibition prospectuses and whatnot—but I wanted to "paint" a subtler picture of this devoted man. Yamshchikov's love for his work, his city and his friends—that devotion is the backbone of his purposeful and enthusiastic character.

BORN FOR MUSIC

By Alla Belyakova
Photographs by Rudolf Kucherov

The Academic A Cappella Choir was in a state of decline when Vladislav Chernushenko became artistic director. Today the choir performs music of all epochs and all nations to standing-room-only audiences.

Facing page: Vladislav Chernushenko. Above: A performance of the choir.

At home and abroad, the famous Academic A Cappella Choir always sings to full houses, and its performances are sold out as soon as the tickets go on sale. That wasn't always the case, though, not before conductor Vladislav Chernushenko took over as artistic director of the choir.

Tonight Sergei Rachmaninoff's *Vesper Mass* lasted more than an hour, but the spellbound listeners were oblivious to the passage of time. A masterpiece of Russian choral music, the *Mass* was put back in the repertoire after an absence of 50 years. Some vigilant official had banned it in the thirties because of its religious content. Now the A Capella Choir sings music of all epochs and nations. Mozart's *Requiem* and Tchaikovsky's *Liturgy*, Beethoven's *Ode to Happiness* and Bach's masses and fugues, mischievous Russian rounds and cantatas, and oratorios of modern composers are all in its expanded repertoire.

It took Chernushenko 13 years to restore the choir's old reputation. Like an untended garden, it had fallen into decline, with conductors changing all the time and the best singers leaving. Packed houses and tours had become a thing of the past.

When Chernushenko took over as artistic director, he was already at the height of his career. The Leningrad Chamber Music Choir, which he organized, had already won recognition at international competitions in Italy and Hungary. But seeing the A Cappella Choir in trouble made him get involved. He had been a member of the choir at one time, and it was like family to him.

Chernushenko was born in Leningrad in 1936, in one of the city's old districts. The Alexander Nevsky Monastery was across the street from the house where he lived. His paternal grandmother is buried in the monastery's cemetery. His maternal grandmother died during the siege of Leningrad, when ▶

Chernushenko was only five. "For some reason, it's not that terrible winter of 1941, but the bright, penetrating sunlight of the spring of 1942 that is vividly etched in my memory," he says. "After the gloom and the freezing cold, the spring was unforgettable. The other thing I remember is the water squishing under the wheels of the big truck that carried me out of the besieged and starving city across the ice of Lake Ladoga. It was the truck's final run before the thaw set in. My brother and I survived, but our little sister died during evacuation. The blockade undermined my father's health, and he died three years after victory."

His father's death made 12-year-old Vladislav grow up very quickly. He studied at the choir school sponsored by the Leningrad A Cappella, the very choir that he now conducts. He lived in a boarding school, which became home and family to him. The older children in the school looked after the younger ones. "At 15 I started to take odd jobs. I had to help my mother, and I wanted to give the boarding school kids an occasional treat. They went into raptures every time I brought back some candy or cookies. Life was austere after the war, and most of the boarding school youngsters were orphans."

The choir school decided Vladislav's future. He had loved to sing from the time he was a young child, and he had studied music with enthusiasm.

"At the choir school I met a lot of extraordinarily kind people, who were always ready to help. And there were first-class professionals too. That's the most important thing for children. They can forgive a teacher a mistake, but not ignorance—never. Nine students were in my class, and all of them went on to become fine musicians. Alexander Dmitriyev is conductor of the Leningrad Philharmonic Symphony Orchestra; Vitali Vasiliyev is chief conductor at the opera theater. Three other students, myself included, were recommended for the Leningrad Conservatory after graduating from the choir school.

"I enrolled in choral conducting and composition simultaneously. Our teachers set the example. The head of our department, Vladimir Dmitriyevsky, was a graduate of the physics and math departments of Moscow State University and two departments of the Conservatory. He had a brilliant knowledge of Latin. To this day, we sing his faultless translations of requiems and masses. We were full of energy and eager to be doing things in our student years. We got together the first student pop group in the country. We never imagined it would be the first of thousands of similar groups. But for me, the choir came first."

When Chernushenko graduated from the Conservatory with excellent marks, he was recommended for graduate school and offered an apartment, no trifle in those days. However, he chose to go to Magnitogorsk in the Urals as an ordinary music teacher. Incidentally, all of his classmates also took jobs in out-of-the-way places. "That was the smartest move I ever made," says Chernushenko. "I had the chance to discover what I was capable of. I wanted to start from the ground up and see the results."

Five years in the Urals proved he was right in believing that a man can move mountains if he throws himself completely into what he is doing. The children's choir that he organized in Magnitogorsk won a review held in the republic. Many of the young singers later pursued careers in music.

After he returned to Leningrad, Chernushenko continued his studies. He went to the Conservatory once again and enrolled in the symphony orchestra conducting department, taking graduate courses at the same time. Moreover, he worked as choirmaster. He never separated theory from practice. "Although by that time I had a family to support, making money was not my goal. It was merely the means of subsistence," he says. "My aim was always to do interesting work. Happily, I have an understanding wife. We lived very modestly, and life was just beautiful."

Recognition came to Chernushenko when his Leningrad Chamber Music Choir became the hit of the theater season. The choir started out as an ordinary amateur chorus in one of the city's palaces of culture. Chernushenko recalls that only five men and 15 women out of the 60 names on the list turned up for the first practice. "We met seven or eight times a week, instead of the usual two. The singers believed in me and in the power of music, and together we began to make progress. When I heard them sing Vivaldi with Yevgeni Mravinsky's world-famous orchestra, I could hardly believe my ears. Such happy moments make life worth living."

Chernushenko left this choir only for the sake of the Academic A Cappella Choir, which he also trained to perfection.

Later his appointment as rector of the Leningrad Conservatory surprised no one except himself. He was a talented conductor, a good organizer and an erudite person wholly devoted to music. "The appointment took me by surprise," he says. "The thought never entered my head, either consciously or unconsciously. To be asked to carry on the work of such predecessors as Anton Rubinstein and Alexander Glazunovl I was proud but also somewhat scared. One thing I knew for sure: I was not going to abandon the A Cappella. If I'd had to make a choice, I would have given up the Conservatory." However, Chernushenko was never asked to choose, and he remained with both the Conservatory and the A Cappella Choir.

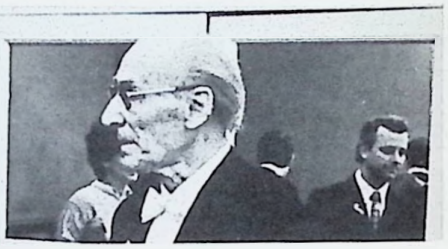
The first conservatory in Russia, the St. Petersburg Conservatory, was founded 126 years ago, and it has contributed a number of illustrious names to Russian culture. Tchaikovsky was a member of its first graduating class.

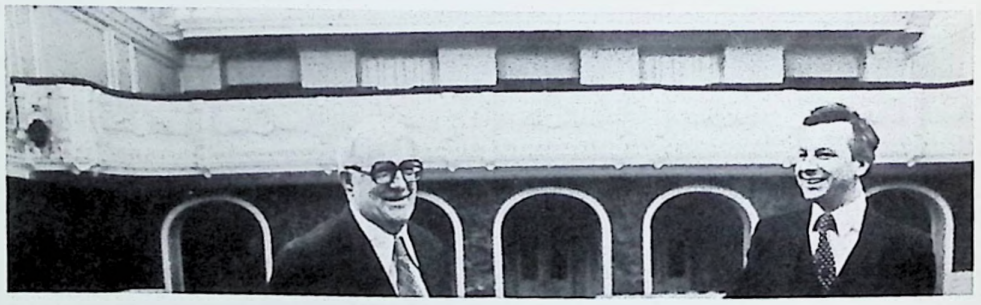
In the vaulted study with its old-fashioned armchairs, under the stern gaze of Rubinstein and Glazunov, whose portraits hang on the wall, Chernushenko doesn't look like a maestro at all. There is something boyish about him still. He is usually dressed in a sweater, corduroy jacket and sneakers. A rector in sneakers? A concession to the times?

The Conservatory's day department has 860 students; the evening department, 35; and the correspondence course, 120. These are all aspiring singers, pianists, conductors, composers and music critics. Everyone who enrolls at the Conservatory dreams of becoming a great artist. But possibly only one out of a hundred will attain the heights of virtuosity.

Vladislav Chernushenko believes the Conservatory is a place for outstanding musicians who combine teaching with concert activities. Anatoli Nikitin, a fine cellist, has created a school of cello, and one of his fourth year students, Leonid Gorokhov, has already won a prize at an international competition. Nikitin has been teaching Gorokhov ever since he was in the sixth grade of the Conservatory's music school.

"The higher school system was rigid in many respects," says the rector. "For instance, I couldn't get a famous musician to teach at the Conservatory because I couldn't pay him as much as he was accustomed to receiving. So I had to make do with mediocre teachers, who were satisfied with our salaries. I don't think that's a normal state of things. *Perestroika* has finally given me a free hand.





Chernushenko with the renowned conductor Yevgeni Mravinsky (top) and the famous composer Georgi Sviridov (above). Facing page: The choir in the garden of a palace in a Leningrad suburb.

"The Conservatory has to deal with questions pertaining to musical education countrywide. It has to train brilliant performing musicians and enthusiastic educators for all spheres of musical life, from secondary schools to amateur art clubs. Neglect of musical and artistic education affects morale and even the economy. Experiments in the USSR and other countries, Japan for instance, have shown that a person educated in the humanities is a better worker than one who is not. The former cannot stand hackwork. It is not surprising that there were some fine musicians among the great scientists. Alexander Borodin was a very good chemist and a remarkable composer. Niels Bohr considered himself a professional pianist and an amateur physicist. The Conservatory graduate should be devoted to art not for prestige; fame and applause should not be the motivating force. There are no 'small' or 'large' stages; there is either true art or surrogate art." Chernushenko's example is the best proof of his words.

"It's not easy combining the work of the A Cappella Choir with the management of the Conservatory. But one is impossible without the other." The Conservatory's first rector, Anton Rubinstein, once said that music demanded all of our thoughts, our time and our energy. Vladislav Chernushenko lives according to that principle.

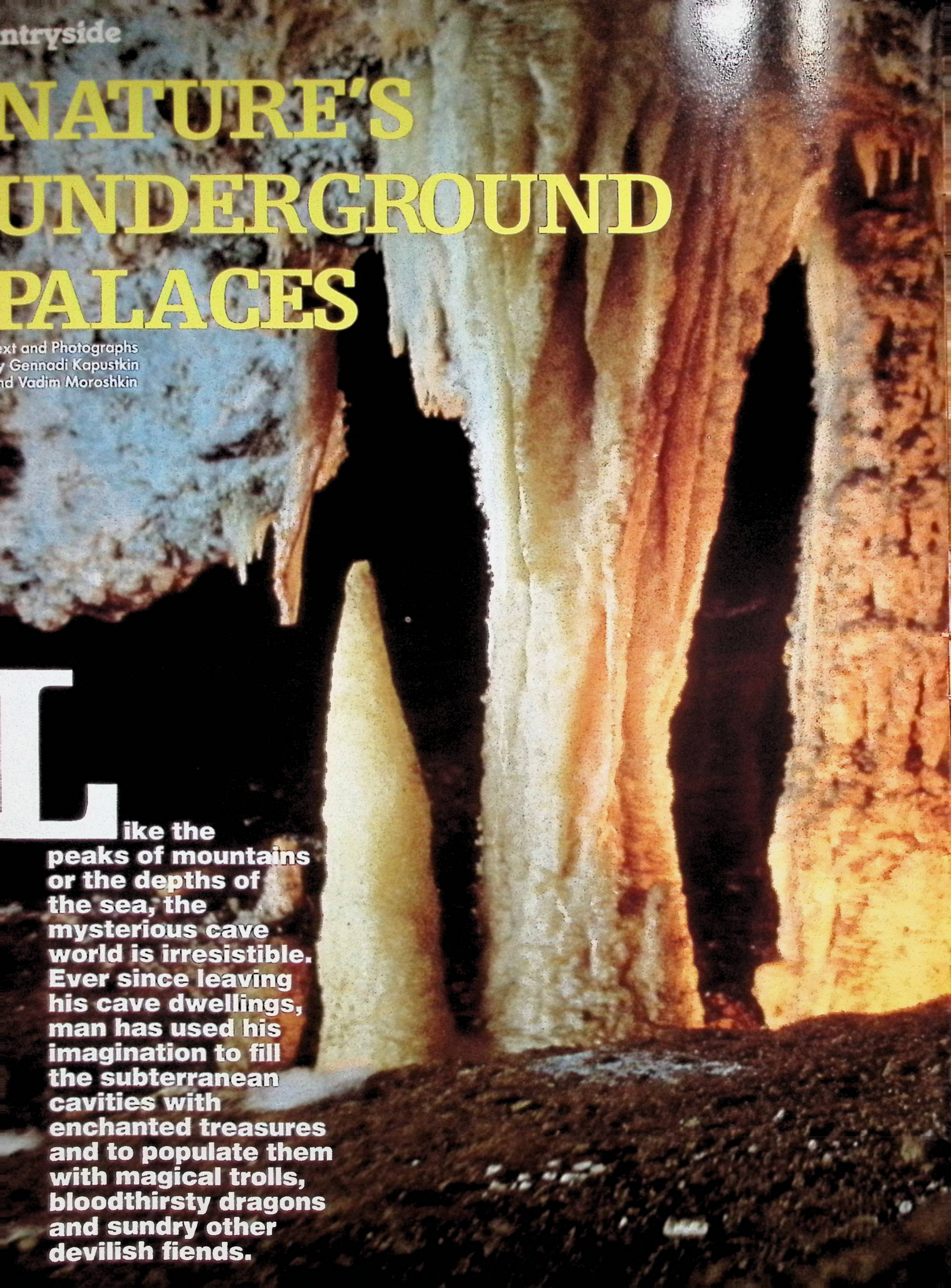
He has achieved much, though he still has one unrealized dream—to be the conductor of an opera theater.

"I'm a theater devotee at heart. I love the stage," the rector admits.

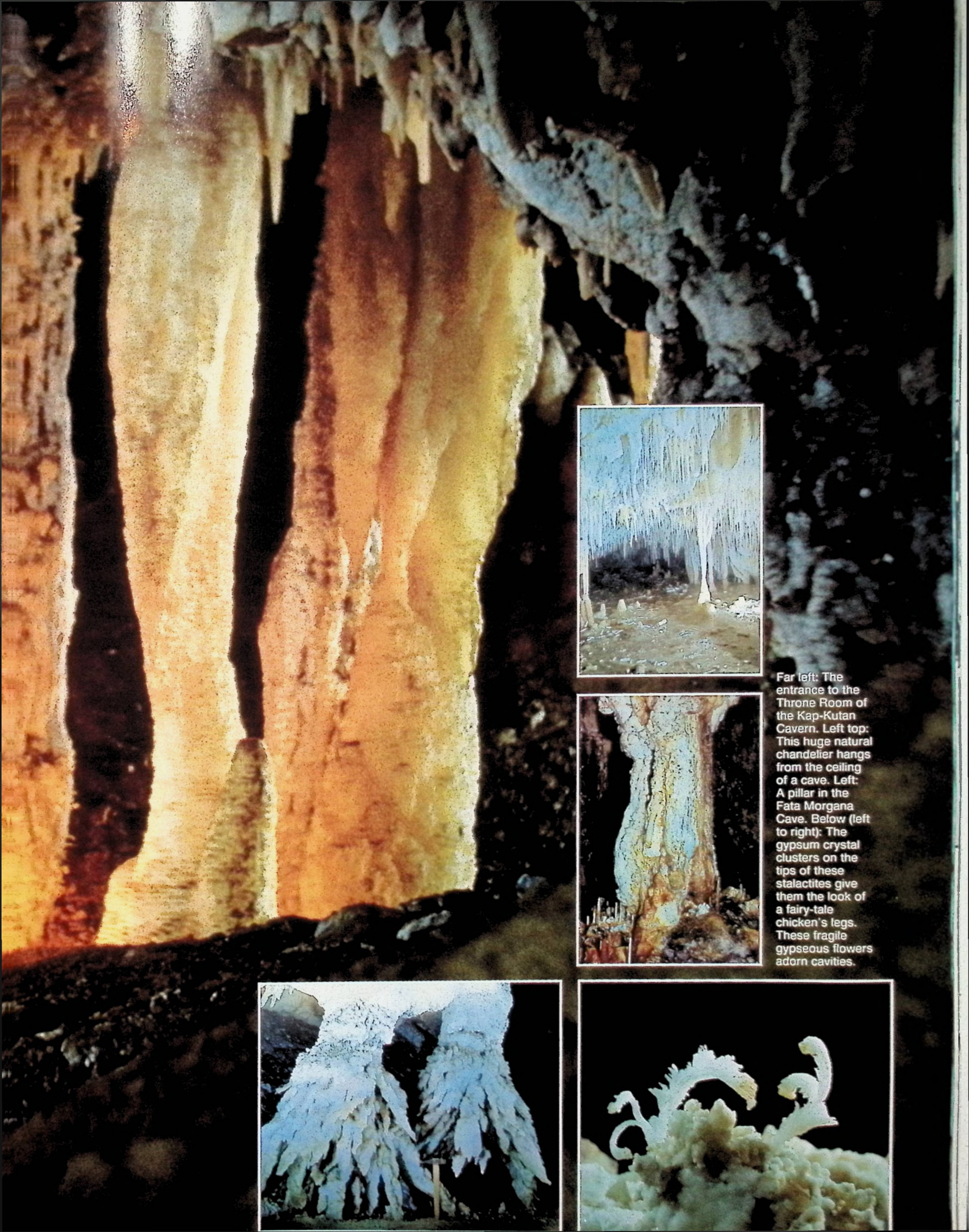
Who knows, we may yet see him on the conductor's podium at the famous Leningrad Opera Theater. ■

NATURE'S UNDERGROUND PALACES

ext and Photographs
y Gennadi Kapustkin
nd Vadim Moroshkin

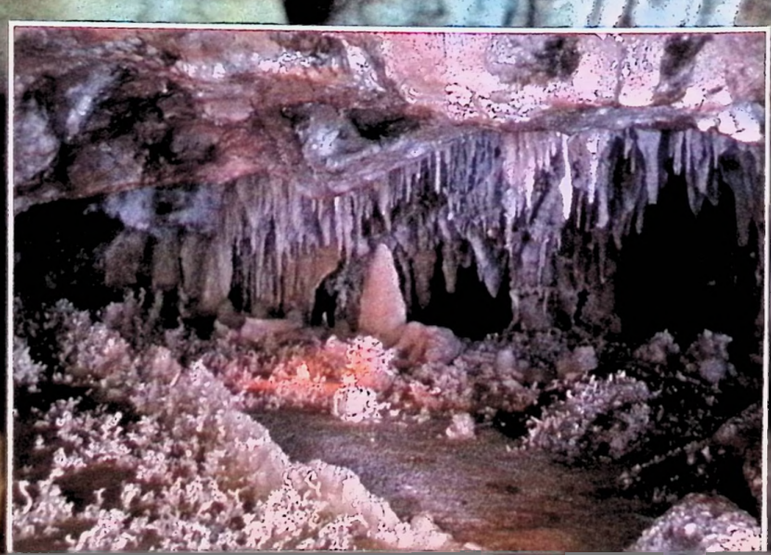


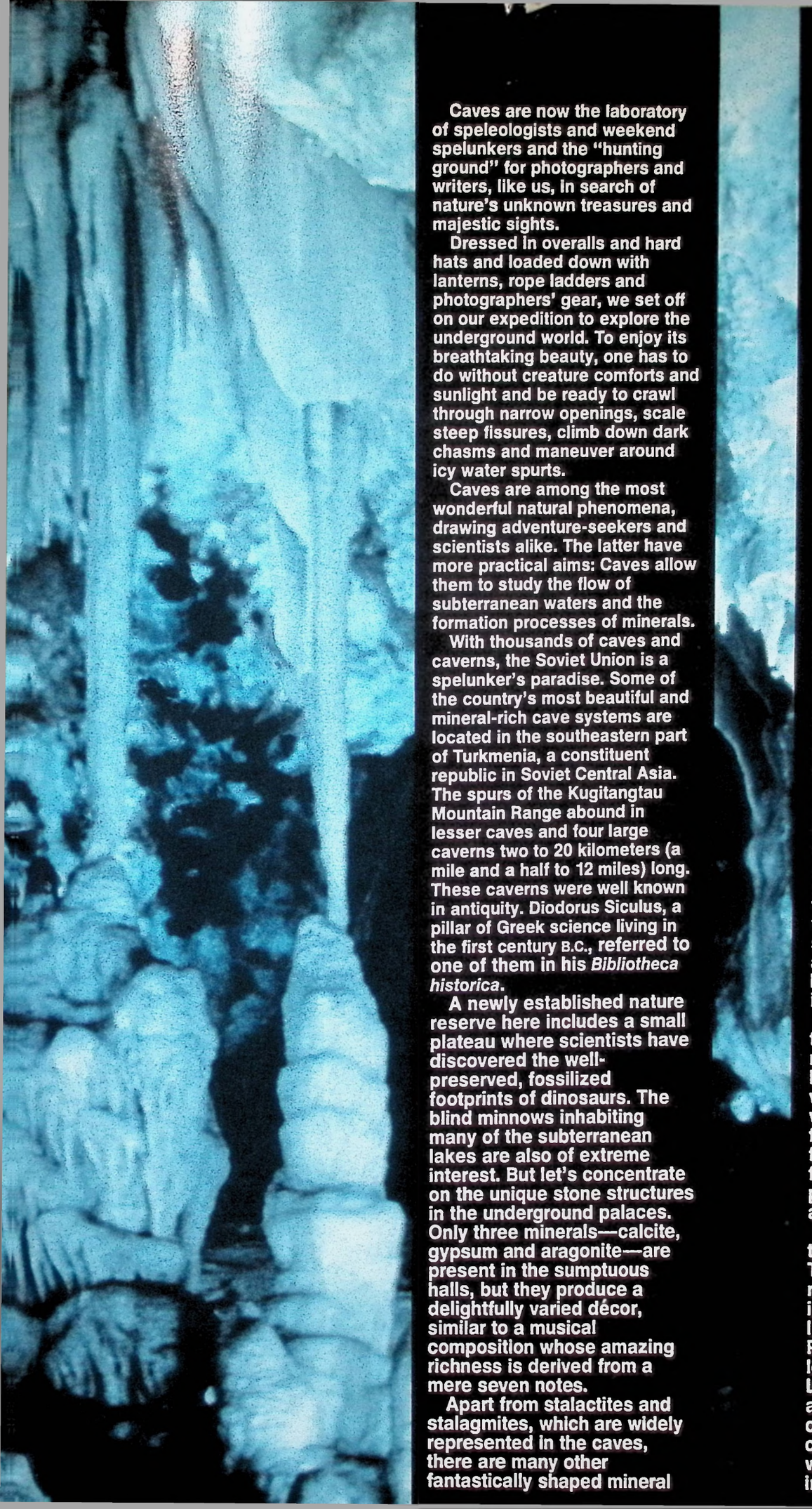
Like the peaks of mountains or the depths of the sea, the mysterious cave world is irresistible. Ever since leaving his cave dwellings, man has used his imagination to fill the subterranean cavities with enchanted treasures and to populate them with magical trolls, bloodthirsty dragons and sundry other devilish fiends.



Far left: The entrance to the Throne Room of the Kap-Kutan Cavern. Left top: This huge natural chandelier hangs from the ceiling of a cave. Left: A pillar in the Fata Morgana Cave. Below (left to right): The gypsum crystal clusters on the tips of these stalactites give them the look of a fairy-tale chicken's legs. These fragile gypseous flowers adorn cavities.

An impressive grouping of columns in the Throne Room of the Kap-Kutan Cavern. Below (left to right): Lacy helictites are hidden in out-of-the-way niches. Formations of "goblins" crowd the bottom of a dry, subterranean lake.





Caves are now the laboratory of speleologists and weekend spelunkers and the "hunting ground" for photographers and writers, like us, in search of nature's unknown treasures and majestic sights.

Dressed in overalls and hard hats and loaded down with lanterns, rope ladders and photographers' gear, we set off on our expedition to explore the underground world. To enjoy its breathtaking beauty, one has to do without creature comforts and sunlight and be ready to crawl through narrow openings, scale steep fissures, climb down dark chasms and maneuver around icy water spurts.

Caves are among the most wonderful natural phenomena, drawing adventure-seekers and scientists alike. The latter have more practical aims: Caves allow them to study the flow of subterranean waters and the formation processes of minerals.

With thousands of caves and caverns, the Soviet Union is a spelunker's paradise. Some of the country's most beautiful and mineral-rich cave systems are located in the southeastern part of Turkmenia, a constituent republic in Soviet Central Asia. The spurs of the Kugitangtau Mountain Range abound in lesser caves and four large caverns two to 20 kilometers (a mile and a half to 12 miles) long. These caverns were well known in antiquity. Diodorus Siculus, a pillar of Greek science living in the first century B.C., referred to one of them in his *Bibliotheca historica*.

A newly established nature reserve here includes a small plateau where scientists have discovered the well-preserved, fossilized footprints of dinosaurs. The blind minnows inhabiting many of the subterranean lakes are also of extreme interest. But let's concentrate on the unique stone structures in the underground palaces. Only three minerals—calcite, gypsum and aragonite—are present in the sumptuous halls, but they produce a delightfully varied décor, similar to a musical composition whose amazing richness is derived from a mere seven notes.

Apart from stalactites and stalagmites, which are widely represented in the caves, there are many other fantastically shaped mineral formations, some several millenniums old, others just in the formative stage. The Kugitangtau's caves contain the world's largest gypsum deposits in druses with transparent projections up to a meter and a half (five feet) long. Some rise from the floor like columns, others hang from the ceiling like chandeliers, still others crown stalactites. Some of the gypsum stalagmites and columnlike stalactites, covered with sparkling snow-white crystals, measure up to six meters (20 feet) high. Hundreds of stalagmites form majestic rows of pillars or stone forests. Chrysanthemum-like clusters of filiform gypsum crystals adorn niches and cavities.

Since subterranean temperatures reach 28 degrees centigrade in Kugitangtau, crystallization is rapid, especially for calcite. Many halls have thousands of white, yellow, red and tawny stalactites and draperies (flat stalactites). Organic, ferric hydroxide, manganese and clay compounds account for the varied hues. Shape and structure depend on many factors, such as air currents, humidity, temperature fluctuations and the rate of water flow, among others. A broad combination of formative factors accounts for the amazing variety of shapes. Different formations are found in the same hall, like the Throne Room in the Kap-Kutan Cavern.

The Fata Morgana Cave, at the foot of the Kugitangtau range, has several incredibly beautiful halls with gypsum walls and columns encrusted with semitransparent calcite film and lacework soda-straw formations that vary in color from bright scarlet to dull purple, which is striking against the white background.

Festive in their grandeur, the caves in southeastern Turkmenia provide researchers with ample information about the birth, life and demise of minerals. Photographers, too, are no less lucky in their pursuits. Light settings and flash attachments permit the camera to capture unusual compositions, some radiant with light, others submerged in pitch darkness. ■

A wartime photo of Soviet and American pilots, mechanics and airfield personnel taken at Fairbanks, Alaska. Above: 1944. American fighters make their way to the front from Alaska via Eastern Siberia. Shown is the active Avacha Volcano on the Kamchatka Peninsula.

An open letter to American World War II fliers

let's meet again!

Dear American World War II Veterans: We are Soviet fliers who participated in the ferry of warplanes during the Alaska–Eastern Siberia–Front airlift. Judging by the number of letters from the United States sent in response to the article about this page of World War II history that appeared in the December 1986 issue of SOVIET LIFE magazine, many former American fliers, aircraft technicians and airfield employees still remember those grueling but wonderful days when we were comrades in arms.

We Soviet airmen haven't forgotten those times either. We remember well the events of the war years and the faces of our war buddies—Russians and Americans—and the cherished names of those who gave their lives for the sake of victory.

However, we're not going to conceal the fact that the main reason for our writing this open letter is our concern for the destiny of the world, for the future of our children and grandchildren. We deeply believe that the mountains of weaponry amassed all over the planet—including the deadliest, nuclear weapons—are incapable of protecting our countries and peoples against catastrophe. Were we dreaming of these horrid stockpiles when, through joint efforts, we routed that strong and insidious enemy—nazism—over 40 years ago? Was that the future we desired for our countries, for our loved ones after the victory we wished for so badly? At that time it seemed to everyone that peace and tranquillity, happiness and joy, would reign forever on our long-suffering planet.

Above right: 1941. Legendary Soviet flying ace Ilya Mazuruk, Hero of the Soviet Union, commanded the First Shipping Division. Facing page, bottom: 1944. A wedge of American Air Cobra fighters, piloted by Soviet airmen, passes the snow-topped mountains of the Verkhoyansky Range, Eastern Siberia.

That's why we are particularly supportive now of our leader's, Mikhail Gorbachev's, call for a new way of thinking in the nuclear age. His idea presupposes gradual disarmament and cooperation, rather than confrontation and enmity. We also share his view that the only way out of the dead-end street of confrontation lies in dialogue, contact, discussion and negotiation.

The path to mutual understanding and trust is perhaps easier for you and us than for others. Both of us went through the horrible years of the Second World War, frequently looked death in the eye and lost our buddies. Finally, our youth—supposedly the best years of a person's life—flashed by on the battlefield during that cruel war. Things like that can never be forgotten!

Each soldier forged his own way through the war. Ours was laid on land and in the air.

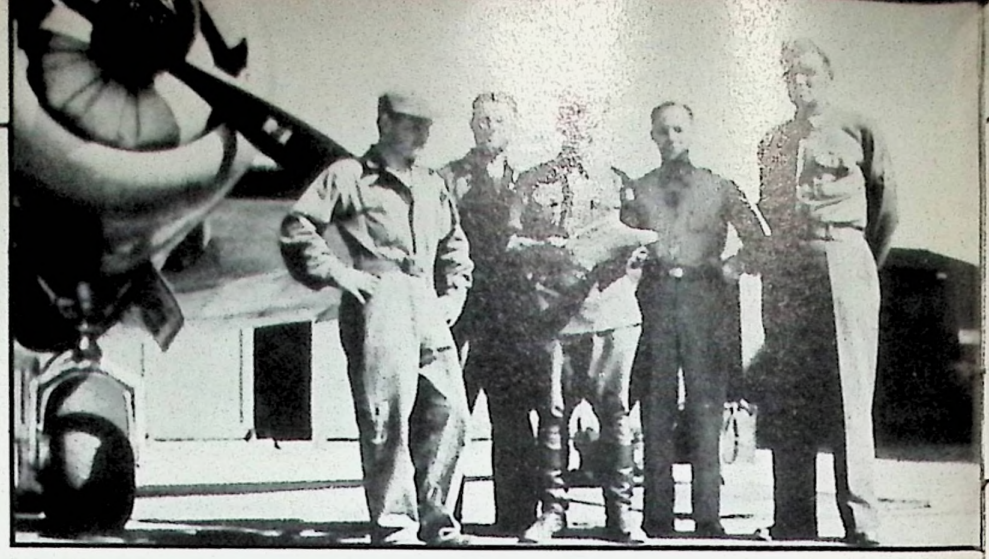
There's no doubt about it—it wasn't easy for the young Soviet fliers to master the American aircraft. They had to learn quickly and undergo a great deal. The flights in arctic conditions were particularly harrowing. The Russian guys learned to operate and land the planes by instruments alone, flying "blind," so to speak. It was this ability that kept many of them alive. Regrettably, not all of the planes reached their intended destination—Krasnoyarsk, from which they continued on to the front. It was a tortuous route. The pilots had to contend with the treacherous arctic cold and fog and unpopulated expanses of tundra and taiga, many thousands of miles wide. There weren't enough airfields in Alaska, on the Chukchi Peninsula or on the Kolyma Lowlands, and the way the airstrips were equipped—there's just no comparing that with the present situation. That's why the risky flights over the ice hummocks of the Arctic Sea, the Bering Strait and the Verkhoyansky and Kolyma ranges took the lives of dozens of Soviet fliers. ▶

To this day, geologists, builders and hikers come across the remains of our comrades and their planes in the taiga and tundra.

Yes, the severe North spared neither men nor equipment. Remember how the cold turned the oil in the Air Cobra engines into chunks of ice, how the refueling lines broke and the brakes failed because of the frost! But the fliers did not knuckle under to the fierce cold. The teamwork of the technicians and airfield workers in Nome and Fairbanks, Alaska, and their Soviet counterparts on the windswept landing strips in Uelkal, Markovo and Seimchan and on the Chukchi Peninsula and the Kolyma Lowlands was truly heroic.

Our fliers sang praises to the high-quality American flying machines—the Air Cobra fighters, A-20 (Boston) and B-25 bombers, and transport craft. In them Soviet fliers performed feats of valor, in them they perished like heroes.

Can one forget the touching and generous act of the American teenagers from a school in Buffalo, New York? These fine youngsters gave up their



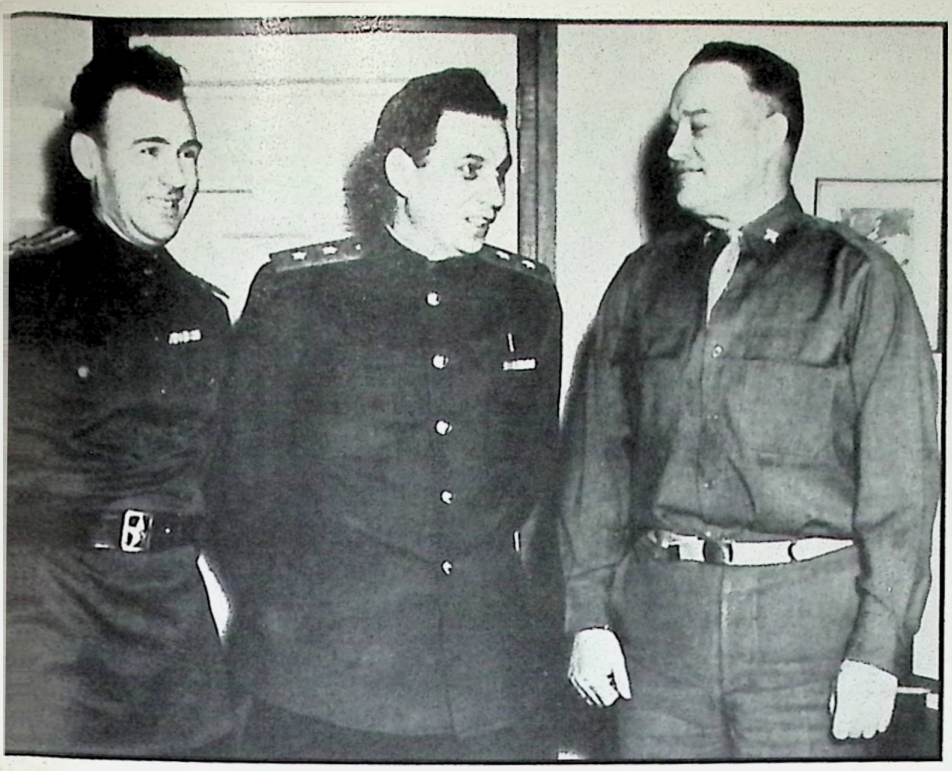
A young Siberian woman bids farewell to a flier on his way to the Western Front. Above: 1943. A keepsake photo of an air ferry crew.

school breakfasts, lunches, entertainment and candy to raise money to buy a military fighter plane. The children donated the plane to Soviet fliers.

Can one forget the fact that almost every fighter or bomber that left for the distant Soviet-German front carried parcels for the men of the Red Army? The packages contained warm mittens, socks and medicines, gifts from American women, who sincerely wanted to do whatever they could to defeat our common enemy.

In 1944 many of us had the honor of meeting U.S. Vice President Henry Wallace in the settlement of Uelkal on the coast of the Bering Strait on the Chukchi Peninsula. President Roosevelt had instructed him to acquaint himself with the ferry route, visit cities and townships in the Far East and Eastern Siberia, and meet with Soviet military leaders. As the Vice President himself said afterward, his visit to the Soviet Union was a success. The Vice President, his chief pilot Richard Key and the members of his airplane's crew were treated to real Russian hospitality by the Siberians. The Vice President could see for himself our people's warm feelings toward the American people and their devotion to their Allied duty. Our people remained true to their duty to the final days of the war. The reliable air bridge that connected our two countries soon turned into a bridge of

Right: 1944. On the instructions of President Roosevelt, Vice President Henry Wallace (third from left) visited the Eastern Siberian cities and settlements along the air ferry route.



regular Soviet-American diplomatic and military contacts. In short, the air bridge functioned intensively in wartime, working for the peace that was to come. Finally, the long-awaited peace arrived, a peace for which our peoples and all of humanity had paid so dearly.

More than four decades have passed since then. What can be said about these years? Regrettably, mistrust and competition in weapons reared their ugly heads and kept trying to prevail over good will, over the memory of us as comrades in arms. Cracks appeared in the bridges that had united us on the Elbe, in Alaska and on the Chukchi Peninsula.

Surely, any attempt to sow discord between us has no future. If a third world war were to break out, neither you nor we nor the rest of humanity would survive. That would be the end of life on our planet. You must be just as aware of this as we are.

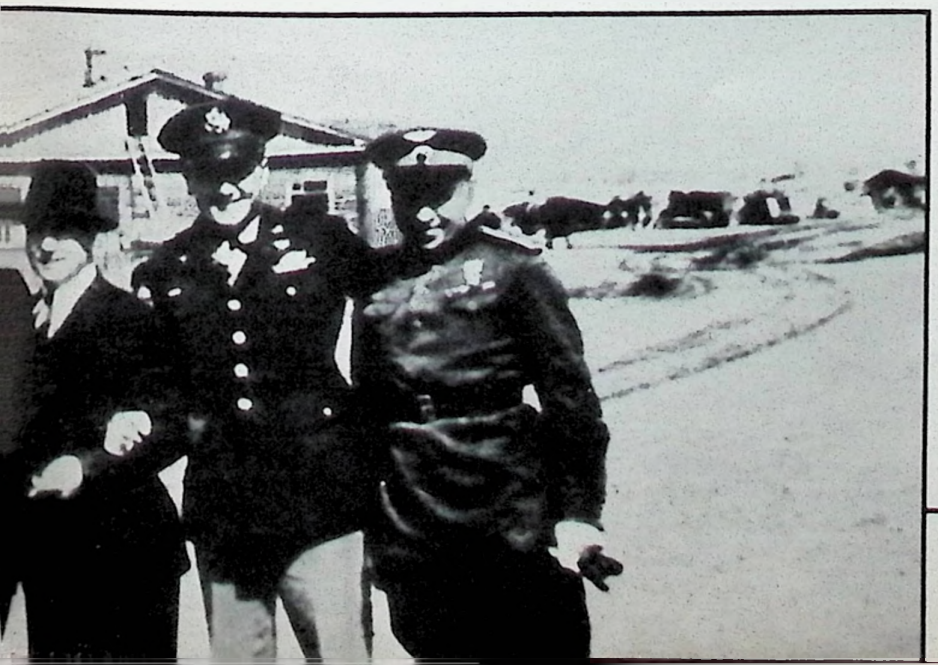
Mutual distrust has failed to wipe out the memory of our wartime youth, years spent in struggle against the common enemy. Those are the years we tell our grandchildren about, hoping all the time to meet with our wartime pals from America.

We veteran airmen pin much hope for a thaw in Soviet-American relations, for an improvement in the international climate as a whole, on the results of General Secretary Gorbachev's visit to Washington last December and on the outcome of his meetings with President Reagan, and, most importantly, on the INF Treaty that was signed by the two leaders. Of course, that is only the first step toward the actual destruction of nuclear weapons, but if our two nations continue to act constructively, the Soviet and American peoples and the rest of the world will have a chance of getting rid of the horrible threat of war forever. Let's also do whatever we can for détente and disarmament.

How lucky the veterans of the Soviet-American meeting on the Elbe are! They get together on a regular basis and keep in touch with one another. We'd like to propose to our American counterparts—veteran fliers, aircraft

Above left: Colonel Mikhail Machin (left) and Lieutenant General Pyotr Rudenko (center), representing Soviet military command in the United States, pose with General Johnson, commander of the U.S. air base in Nome, Alaska.

Above: 1943. This shot was taken in Fairbanks, Alaska. The difficulty of their mission, the hardships en route, created bonds of friendship among the crews.



mechanics, people who worked at the Nome and Fairbanks airfields during the war, anyone who was involved in one way or another with the Alaska–Eastern Siberia–Front ferry route—let's meet again! Let's get together! We'd have plenty to talk about, tons of memories to share! Where should we get together, and how should we go about it? We're looking forward to receiving any suggestions you might have. Please send them to the following address:

David Samoilovich Sherl
Secretary
Veterans Council
Prospekt Mira, 79/23
129110 Moscow, USSR

or to the Moscow Editorial Board of SOVIET LIFE magazine:

SOVIET LIFE
Novosti Press Agency
Zubovsky Boulevard 4, K 21
103786 Moscow, USSR

For Soviet war veterans, participants in the Alaska–Eastern Siberia–Front aircraft ferry, we remain fraternally yours,

Signed: Air Force Major General Ilya Mazuruk
Air Force Lieutenant General Mikhail Machin
Air Force Major General Mark Shevelev
Air Force Captain Peter Gamov
Air Force Major Fyodor Zhevlakov
Air Force Captain Victor Perov
Air Force Captain-Engineer Dmitri Ostrovenko
Air Force Captain David Sherl

A BREATH OF FRESH AIR

By Valentina Mikhailovich
Music Critic

Recently there has been marked progress in the expansion of Soviet-American contacts in the arts. A revival in the exchange of performers has resulted in audiences in both of the countries gaining a much better idea of each other's artistic endeavors and pursuits.

Many guests from around the world attended the Seventh USSR Congress of Composers, which was held in Moscow not long ago. Among the guests were prominent musicians from the United States, including composer George Crumb and the artistic director of the Opera Company of Boston, Sarah Caldwell.

"It's like a breath of fresh air," said Caldwell, describing her impressions of the congress. "Not that I had prepared myself for a purely routine meeting where everybody agrees on everything. But I've got to admit that part of me was very surprised, pleasantly surprised.

"The complete freedom of each composer, of each participant to say whatever he or she really thought . . . , the atmosphere of sincerity, of businesslike concern for urgent problems—that was the spirit of the congress. There was a great deal of debate and discussion, a certain amount of disagreement, even some sharp remarks, but all that, in fact, made for a free exchange of opinions in a good spirit of healthy criticism, in a friendly, sympathetic and refreshing atmosphere."

The main focus of the congress was a discussion of the work of Soviet composers and concert organizations, of ways to instill love for the great musical heritage of the past, and of musical trends in the world.

"The disagreements we have aren't of paramount importance. They are only natural," said Caldwell. "The things that are significant are the general tone of our agreement in spite of minor controversies, our unity of purpose and task, our general concern that the music life of our countries should be lively and interesting, expressing an air of contemporaneity."

Sarah Caldwell: "Through communication, through getting to know one another, we'll begin to get a sense of the problems we share . . . and many misunderstandings . . . will be swept away."

Sarah Caldwell is familiar with Russian and Soviet music. As the artistic director of the Opera Company of Boston, she has staged Glinka's *Ruslan and Lyudmila*, Moussorgsky's *Boris Godunov* and Rimsky-Korsakov's *Kitezh*. She maintains that the production of Prokofiev's opera *War and Peace* was one of the more significant events staged at the Boston Opera. Shchedrin's music for the ballets *Anna Karenina*, *The Seagull* and *The Lady with the Dog* has not gone without her notice either. She expressed much enthusiasm for Alfred Schnittke's music for the ballet based on Gogol's short stories, which she had seen at the Bolshoi Theater.

The foreign guests of the USSR Congress of Composers gathered a multitude of impressions attending the concerts that were held throughout congress deliberations. A variety of musical works by different composers were highlighted. Some pieces were performed for the very first time, for instance, Andrei Eshpai's Fifth Symphony and Tikhon Khrennikov's Concerto for Cello and Orchestra.

"Listening to the works of contemporary Soviet composers, I could see how different they all are in style. Each piece has its own identity, which is of immense importance," said Caldwell.

"I made another interesting observation during the congress. Walking through the halls, I often happened upon composers from different areas and republics of the Soviet Union. Was I surprised to see with what great warmth and affection they greeted one another, how eagerly they met and talked! I'll surely tell my colleagues about this when I get back home."

Asked if she thought Soviet and American musicians had the same types of worries, Caldwell replied: "Absolutely. In his speech to the congress, composer Rodion Shchedrin mentioned that in the USSR there's almost 'a lost generation' of young people who aren't that familiar with serious music. That's certainly a problem in the United States. Much work has to be done, particularly for children, in the areas of the ballet, opera and symphony in the hope of bringing a new generation into the world of serious music. That's why I believe Natalia Satz, the founder of the Children's Musical Theater in Moscow, the only one of its kind in the world, is doing a very distinguished job."

Some contemporary composers and artists consider music the prerogative of a small circle of experts, an art existing outside time and events. Conductor Sarah Caldwell holds a different view.

"True," she said, "there are people who feel that way, but I don't. Music is such a wonderful means of communication. I guess the most important thing that could happen in the world today is for people to understand each other. I believe, through communication, through getting to know one another, we'll begin to get a sense of the problems we share, the things we have in common, and many misunderstandings, even those of a political nature, will be swept away."

Sarah Caldwell pins great hopes on the festival of Soviet music, "Making Music Together," held this spring in Boston. The festival's program was ambitious and diverse, and included Soviet and American singers and dancers appearing on stage side by side. For the festival the Opera Company of Boston timed its première of Shchedrin's opera *Dead Souls*, which is based on Gogol's novel of the same name. The production was directed by Caldwell, while the sets were designed by the Bolshoi Theater's Valeri Leventhal, who has previously worked with an American theater. (Leventhal did sets for plays by Soviet director Anatoli Efros, which were staged at the Tyrone Guthrie Theater in Minneapolis, Minnesota.)

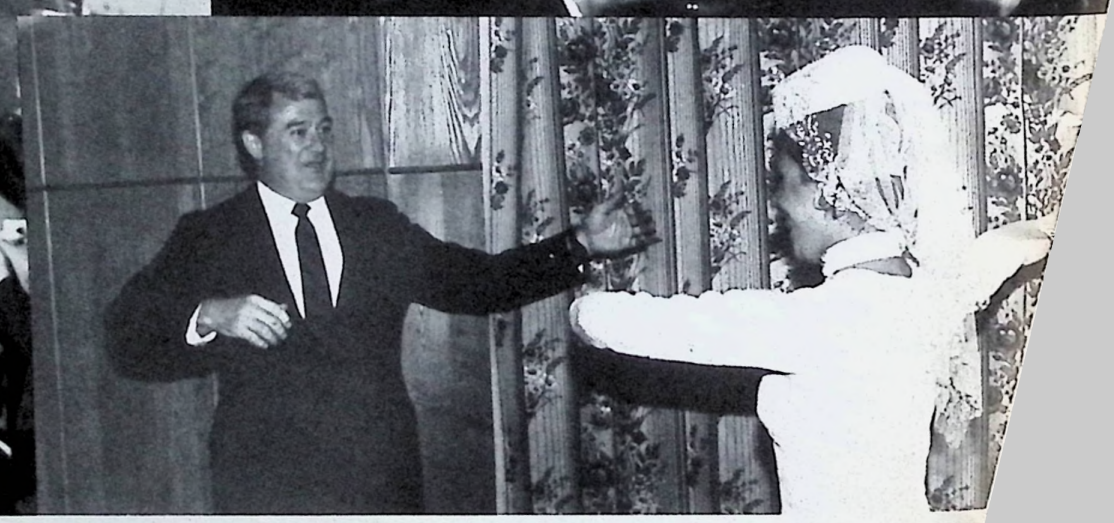
Besides *Dead Souls*, three ballets with music by Rodion Shchedrin—*Anna Karenina*, *The Seagull* and *The Lady with the Dog*, staged by the celebrated Soviet ballerina Maya Plisetskaya—were performed for the first time in the United States. In addition to Plisetskaya, 65 dancers from the Bolshoi Theater were featured in the ballets. All in all, American performers were joined by more than 100 Soviet singers and dancers from the Kirov Opera and Ballet in Leningrad and the Bolshoi Theater in Moscow.

The Boston festival program also included 12 concerts of contemporary Soviet music, including the première of Alfred Schnittke's *Requiem Mass* conducted by Caldwell. The Boston Symphony Orchestra offered audiences three programs, including the U.S. première of Schnittke's First Symphony and Sophia Gubaidulina's *Offeratorium* for violin and orchestra. Gennadi Rozhdestvensky and Charles Dutoit conducted.

Plans for a festival of American music to be held in Moscow this coming fall are currently in full swing. In this way, music lovers in both countries will have the opportunity to become acquainted with the current trends of contemporary Soviet and American music.

"GLASNOST is not just a word. It's a reality," say attorneys general.

Right: Robert Abrams shows his appreciation for a Georgian dance—American style. Right center: Delegation head Steve Clark (left) presents the book A Day in the Life of America *to Alexander Rekunkov, Procurator General of the USSR, who organized the visit. Right below: An American partners a Georgian dancer. Below: A visit to the cruiser* Aurora, *symbol of the October 1917 Revolution.*



Right: The American jurists in Tbilisi, the capital of the Georgian Republic.

A delegation of jurists from the National Association of Attorneys General visited Moscow, Leningrad and Tbilisi last fall to learn about the workings of Soviet law enforcement bodies. SOVIET LIFE correspondent David Imedashvili talked with some of the American guests during their stay in the capital of the Georgian Republic.

By David Imedashvili
Photographs by V. Moshiashvili, Alexander Kurbatov and Mikhail Makarenko

I caught up with the American jurists when they were inspecting a penitentiary in Soviet Georgia. The inmates there are serving sentences ranging from 18 months to 15 years, the longest term of imprisonment in the Soviet Union.

Such a visit would have been unthinkable just a couple of years ago. *Glasnost* (openness) has certainly affected Soviet law enforcement bodies. But while the Americans, accompanied by their hosts, had no problem getting onto the penitentiary grounds, the prison was off limits to journalists. "We were expecting only American visitors," we were told.

I had a funny feeling: I had to remain outside, though it was my duty to be inside with the American jurists. Luckily, the matter was settled quickly, and we were allowed to enter.

In the prison yard, two teams of inmates were playing soccer to the loud cheers of their fans. True, the presence of the guards most likely inhibited the crowd. According to prison rules, the afternoon is set aside for rest and relaxation for the inmates. The prisoners can either participate in sports or go to the library. The penitentiary has a very good library containing works of fiction, law books and numerous magazines and newspapers. Prisoners can also subscribe to periodicals on their own. They receive wages for the work they do in the local workshop, which has a contract with a nearby factory. The inmates work eight hours a day, six days a week.

Steve Clark, the Attorney General of Arkansas and the leader of the visiting delegation, talked with one of the inmates: Merab Koguashvili, a 38-year-old engineer who is serving an 11-year term for embezzlement.

"I took a two-month crash course," Koguashvili said, "and now I'm working as a lathe operator. Work helps me to keep fit physically and mentally. I'm doing my best in the hope that I might someday be transferred to a minimum security facility. There's also a chance that my sentence may be reduced."

"In the United States it's very difficult for a prisoner to get a job. In this sense, your system is more humane," noted Linley Pearson, the Attorney General of Indiana.

The guests could not conceal their surprise when they were taken to the prison's general education school. Even though the inmates in this facility are over the age of 18 (juvenile offenders are housed in special youth institutions), everyone who hasn't finished school must attend evening classes.

"I liked what I saw, and I liked our counterparts with whom we met during our visit. They are very experienced and dedicated people. Their main concern is justice," Steve Clark told me. "Supervising the observance of rules and regulations at places of confinement is one of my duties at home. So it's easy for me to compare. I was very impressed with the fact that the penitentiary in Georgia provides inmates with paying jobs and an opportunity to study. This, in my opinion, gives the people a better chance of returning to a normal life when they get out of prison and reenter society. Besides, by good work and model behavior, prisoners earn additional visits from their relatives and friends.

"Naturally, prisons and penitentiaries are not the best places in the world to be. But we must be humane and give the sentenced a chance to reform.

"Our Soviet hosts met all our wishes. In Georgia we saw that *glasnost* is not just a word. It's a reality. We received answers to all of our questions, and each of our smallest requests was fulfilled. I think many of our previous conceptions about the USSR have changed for the better."

The American guests also had time for sightseeing in Tbilisi, the 1,500-year-old capital of the Georgian Republic. It's a city of more than a million people and three traditionally coexisting religions: Christianity, Islam and Judaism. Robert Abrams, the Attorney General of the State of New York, took time to visit the local synagogue.

The visiting delegation was also received by Pavel Guilashvili, President of the Presidium of the Supreme Soviet of Georgia. He explained to the guests how the Supreme Soviet works and what role the local Soviets play in *perestroika* and in the social and cultural life of the republic.

At the Supreme Court of Georgia there was a frank exchange of opinions between the guests and their hosts. Akaki Karanadze, chairman of the Supreme Court, told the visitors about the system of electing judges and the work of the courts.

Both sides agreed that broader professional contacts could help the jurists of the two countries to work even more productively. ■

All quotations were retranslated from the Russian.

NOT JUST NUMBERS

Continued from page 17

than 95 per cent of the Soviet nuclear potential remains, we can confidently say that an approximate balance is maintained. It will also be maintained if the strategic arsenals are halved.

The following objective factor must also be taken into consideration: The Soviet Union has more medium- and shorter-range missiles than the United States. If the treaty provided for a partial (but equal!) rather than a complete elimination of these missiles, that would be tantamount to leaving a "nuclear splinter" in the very sensitive body of European security, that is, maintaining both political and military tension.

Therefore, the arithmetic aspect of the nuclear balance should not be simplified. As a matter of fact, by no means is this aspect left unaccounted for. Evening the balance in the nuclear and conventional armaments alike is a political task of the negotiations. Eliminating the numerical imbalance in Europe, which results from the presence of the American forward-based weapons and the British and French nuclear arsenals, is all the more important in conditions of the planned sharp reduction of the USSR's and the U.S.'s strategic offensive weapons.

The existing parity can be undermined if NATO goes ahead with its so-called compensatory buildup of nuclear forces in Europe. Such a "compensation" is as dangerous politically and militarily as it is absurd in its very essence: What's there to compensate for if the Soviet Union is eliminating more nuclear weapons than the United States?

On the whole, the INF Treaty is a happy example of a balance of military and political interests. The treaty is even more meaningful and important for its political and psychological results than for its quantitative aspect. It has made an unprecedented breakthrough by starting the process of nuclear disarmament. The broad verification measures it provides lay the groundwork for building up mutual trust. The conclusion of the treaty is a tangible step toward mutual and universal security in keeping with the principles of new political thinking. There are clear signs for improvements in Soviet-American relations, which naturally lead to a better international climate. Thanks to the treaty, seven European countries, along with the Soviet Union and the United States, have pledged to contribute toward easing nuclear confrontation on the continent.

The experience gained by the sides in drafting the INF Treaty is an unprecedented plus-factor for concluding another, much more significant agreement on a 50 per cent reduction of the two countries' strategic nuclear arsenals under the stringent observance of the ABM Treaty. The prospects for signing it have been further improved as a result of talks in Moscow with U.S. Secretary of State George Shultz. Even though a radical change has not yet taken place either in the disarmament drive or in Soviet-American relations, the tendency toward such a change is obvious. This tendency must be consolidated by the ratification of the INF Treaty.

Courtesy of the newspaper *Izvestia*

Grand Opponents—Kasparov Versus Karpov

By Victor Vasiliyev
Photograph by Dmitri Donskoi

It would have taken a remarkable fortuneteller to predict the course of events of the four matches between Garri Kasparov and Anatoli Karpov from 1984 to 1987. What we recently saw in Moscow, London, Leningrad and Seville turned a new page in chess history.

Never have two men played 120 games for the crown (they've met only four times elsewhere)! And never has there been a world championship match where the contender won the penultimate game but the champion saved his title by making a comeback in the very last game.

What a wealth of events! The relieved champion said after the final drama in Seville: "You just can't sum up a match like that! It was the culmination of a grueling marathon that began on September 9, 1984, and ended on December 19, 1987."

Consider the first match, which lasted from September 1984 through February 1985. Forty-eight games were played, twice as many as in conventional title matches. The chess duel should have continued until one player gained six wins, but Florencio Campomanes, president of the International Chess Federation (FIDE), suspended the match with the score at 5:3 in Karpov's favor. Campomanes said that he intervened for humanitarian reasons. We must presume that it took as serious a reason as complete exhaustion for Karpov, the defender, to agree. And FIDE promised the champion a return match in the event of defeat.

Kasparov won the next match spanning September-November 1985. A convincing victory, 13:11. The return match in 1986 confirmed Kasparov as the new champion. True, the difference was just one point, 12.5:11.5, but in Spain, Kasparov availed himself of the champion's right to retain the throne in a tie.

Kasparov told a *Pravda* newspaper reporter the following about his play: "I'm ashamed of the first 23 games. I didn't get anywhere near my best form. . . . Karpov battled better than I did throughout the match."

What happened then to the young champion, who might have been expected to improve with each new match? Kasparov, the champion, lacked confidence in his creative individuality, the confidence that was his hypnotic charm.

Said Kasparov: "I somehow got away from what was going on. I lost my concentration. . . . I had always tried to play best-move chess, and here I betrayed myself."

There are at least two reasons why we did not see the maximalist, wizard and innovator in Kasparov at the Seville match. First, there was Karpov, who plays to suit the occasion. Indefatigable pride drove him in his duel with Kasparov. The way Karpov confidently performed in Kasparov's best areas indicated an immense will to prove to the world his superiority over an impudent and over-lucky opponent.

But this fire in his soul cost Karpov the dramatic culminating game. Experience and instinct led him to believe that Kasparov, having nothing to lose, would begin a desperate siege. Instead, he played his opening move phlegmatically and was just as gradual about his maneuvers. The former champion, anticipating dynamic play, was faced with calm deliberation.

Karpov, to all appearances, was not expecting this turn of events. The position from which he began browsing was not so complex, but the perfectionist Karpov suspected some crafty continuation and ventured to remove every factor of risk. Who knows? Perhaps if Karpov had been less careful about every move, he might have gotten the draw he needed. Therein lies the tragic paradox.

The second reason is Kasparov himself. Sure, there is the prejudice of FIDE, which forced the champion, as he expressed it, to play a second return match. There can be no justification for the way in which FIDE has expended the creative and physical strength of the two grandmasters. This sense of injustice impeded Kasparov, put his nerves on edge and made it impossible for him to focus on the mighty task at hand. He himself admitted that he experienced psychological weariness during the match.

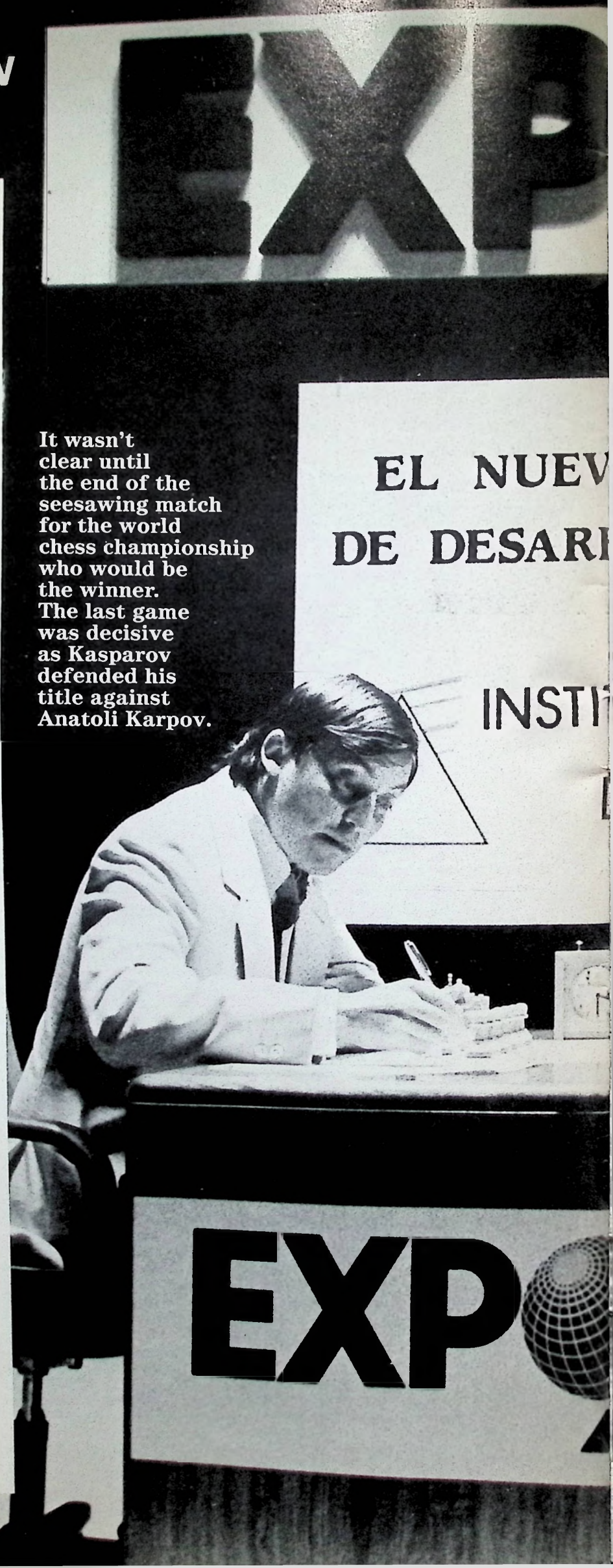
Well, Kasparov has a point. After all, the world champion is human too. There was one thing, though, that Kasparov could not afford in this match. He could not ignore the personal qualities of an opponent with a fanatical fighting spirit. Could he ever have believed that Karpov was broken?

Karpov told an *Izvestia* newspaper reporter: "Kasparov played erratically. He has lost his lightness, and chess is now heavy work for him."

Nothing can console an unsuccessful contender, but, regardless of the result in a battle of great passions, Karpov will go down in chess history as a fine champion. And not just for twice defeating Victor Korchnoi, but for the drive and vigor with which he has aspired to regain the title.

How will posterity remember the thirteenth champion? At age 20 Kasparov managed to save his first match with Karpov after a terrible battering in which he lost five early games without response. Yet he held on and then won two matches. This time around, at the very end, he snatched back Karpov's grim grasp on the crown. By tying the score at 12:12, Kasparov managed to save his title. And that is something!

It wasn't clear until the end of the seesawing match for the world chess championship who would be the winner. The last game was decisive as Kasparov defended his title against Anatoli Karpov.



NEXT ISSUE

TELEVISION PROGRAMMING

A Tribute to *Glasnost*

The theme of the May issue is the new face of Soviet television. *Perestroika* has inspired frank and pointed programs touching on all levels of society. Gone are the dull broadcasts of the past, with their "good news only" philosophy of journalism. An example of the new breed is "Problems-Quests-Solutions," a viewer-participation program hosted by political commentator Lev Voznesensky. Read about this dynamic show next month in SOVIET LIFE.

RADIO MOSCOW

Broadcasts to the United States

Some of our readers listen to the English language service of Radio Moscow, which broadcasts in the United States in the 16-49-meter frequency band. Our readers can meet the people behind this program in the next issue.

VLADIMIR POZNER

He Needs No Introduction

Vladimir Pozner has become popular in the United States as a co-host of USSR-U.S. telebridges. "Telebridges," says Pozner, "help build up trust among people of different countries. And only trust can save the world." A profile of Pozner will appear in the May issue.

COMING SOON

Sumy: A Ukrainian Town Of National Renown

UNDERGROUND TREASURES OF TURKMENIA—

The Flower Room of the New Cave (above) and a group of small stalactites resembling a moonscape (below).