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# USSR

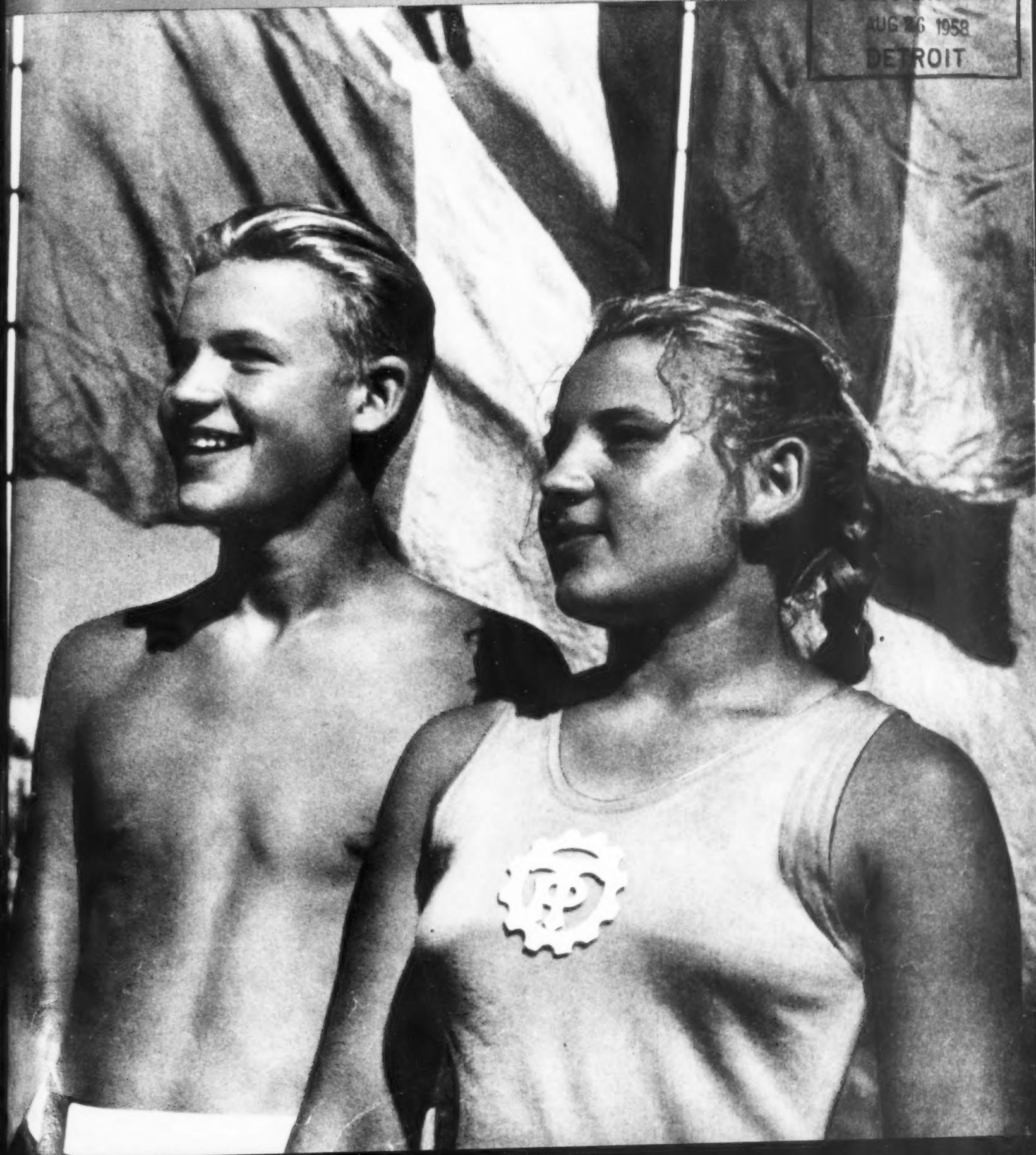
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# USSR

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**Front cover:** Athletes of Labor Reserves Sports Society during an annual parade.

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VOCATIONAL SCHOOL GRADUATE ALEVTINA GOLUBEVA HAS JUST BEGUN TO WORK IN A TEXTILE MILL.



MINING SCHOOL STUDENT ALEXEI KOZMIN (RIGHT) STARTS HIS APPRENTICESHIP IN A COAL PIT UNDER THE EXPERIENCED GUIDANCE OF VETERAN MINER IVAN VESNYANKO.

# EDUCATION FOR A JOB

By GENRIKH ZELENKO

Head of the USSR Vocational School Administration

VOCATIONAL training in the Soviet Union is more than training in a narrow skill. It is training the future craftsman as a rounded person who can contribute to the industrial or agricultural life of the country both as skilled worker and as educated citizens. Teaching of the skill is, of course, the primary function of every vocational school, but the job training is built around a solid core of general subjects and extracurricular activities.

The nationwide vocational school system was set up in 1940. Now it covers in 3,200 schools, at least one in every town of any considerable size, with a total student body of one million. These schools train boys and girls for 700 different trades in industry and agriculture, transport and construction.

As new skills are required by modern de-

velopments in technology and farming, they are added to the vocational school program. Among the newest are those which have grown out of developments in electronics, automation and other relatively new areas.

Last year the vocational schools graduated 696,000 skilled workers. In the 18 years since these schools were founded they have equipped more than 9.5 million young workers for jobs in industry and agriculture. Everywhere in the country they rate high for efficiency, skill and originality.

There are many plants where vocational school graduates form a large proportion of the workers in the skilled trades. At the Magnitogorsk iron and steel works, to cite one example, 80 per cent of the blast furnacemen, steelmakers and rolling mill operators learned their trades in vocational schools.

## From Six Months to Four Years

Prerequisite for admission to the vocational schools is graduation from the seven- or the ten-year school. The course of study varies in length. Some of the simpler trades do not require more than six-months of training. Others, which train skilled operators for modern machine units, senior technical personnel, or craftsmen in the applied arts, offer courses from one to four years long, depending on the previous schooling of the student and the character of the trade.

For seven-year school graduates vocational training usually lasts from two to four years. Mining schools, for example, offer a two-year course. They train operators for coal-cutting machines and coal combines, drillers and tun-

*Continued on next page*

## EDUCATION FOR A JOB

Continued



VALENTINA VASENKO LEARNS GILDING IN HER CLASS.



CLASS IN LENINGRAD VOCATIONAL SCHOOL NO. 2 HEARS GRADUATE LATHE OPERATOR YEVGENI SAVICH LECTURE.

nelers, maintenance mechanics and mine electricians. In the engineering industries the course of vocational training for the workers in the basic trades is no less than two years, while for such highly skilled jobs as regulating automatic and semi-automatic equipment it is four years. Some 800 of the vocational schools specialize in the training of farm machinery operators with the course of study taking one or two years. The training in the applied art schools lasts three or four years.

With the introduction of compulsory ten-

year schooling during recent years, more and more high school graduates have been entering all branches of the country's economy. To equip them for the jobs they choose, a special type of technical school was established, where the program of training takes into account a good background in the sciences and polytechnical subjects received in general school. The course of study in these schools is one or two years, and they train highly qualified workers for the leading trades and also senior technicians.

Besides the nationwide vocational school system, there are on-the-job training courses and schools at each of the big plants. Apprentices are taught either individually or in groups by skilled workers and foremen. This apprenticeship system is used for the less demanding trades which can be taught fairly quickly.

Both the vocational schools and on-the-job training courses are maintained entirely at state expense and are free to everyone. There are special provisions within the country's system of vocational training for children brought up in orphanages. Beginning at the age of seven they may attend a twelve-year school which provides them with a general education and trains them for a skilled trade as well.

### Course of Study

The course of study in the vocational schools, although varying with the skill taught, is built on the principle, common to all, of integrating theory with practical training. Major teaching emphasis and major teaching time—from 50 to 85 per cent, depending upon the type of school and complexity of future occupation—is devoted to production training.

The instructors are men and women who combine teaching ability with a background of experience in the particular area of industry

SCHOOL SHOPS HAVE ALL THE EQUIPMENT NEEDED TO TEACH FUTURE MACHINISTS LATHE OPERATION.



or farming. There are teacher-training schools in many industrial centers especially designed to prepare instructors for vocational school teaching.

Teaching methods stress the use of such visual aids as slides, films, and working models of instruments and machines. Laboratories and shops are equipped with the modern tools and appliances used in actual production. Students move from construction of simple devices to those increasingly more complex and are stimulated to think imaginatively and creatively as they shape metal, wood or whatever material they may be working with into the functional finished product.

In these school shops students each year turn out many thousands of tools and machines which are used in industry. All work is done by the student with only consultative help from the teachers. The best are sent to the National Vocational School Exhibition in Moscow. Work done by vocational students is now displayed in the Soviet Pavilion at the Brussels Fair.

After students have achieved reasonable mastery of the skill in the school workshops, they get actual production training in factories, mines and farms. This is an intrinsic part of the course of study, with on-the-job teaching done by veteran workers. Following a period of production training, students are prepared to take the examination to qualify for the trade.

Should a student decide, while at vocational  
*Continued on next page*



GRADUATION EXAMINATIONS ARE OVER—AND VOCATIONAL SCHOOL STUDENT YURI KOROCHKIN GETS HIS DIPLOMA.

MANY GRADUATES ARE ATTRACTED BY CONSTRUCTION PROJECTS.



ANATOLI BABLO (LEFT), IS NOW SHOP FOREMAN.



ANATOLI BABLO IN 1940, STARTING TRADE SCHOOL.



THE NATIONAL VOCATIONAL SCHOOL EXHIBITION IN MOSCOW DRAWS MANY JUNIOR HIGH STUDENTS WHO CONSIDER LEARNING INDUSTRIAL SKILLS AFTER THEIR GRADUATION.

school, that he would prefer to change his trade or to try for entrance to some other type of school—a medical institute, or one of the technical colleges, for example—there is no difficulty about his making the changeover if he qualifies for admission.

#### Future of Graduates

After graduating from vocational school young workers may go on with their education on any level they wish. Money presents no difficulty since all schooling is free. Many graduates of vocational schools are now first-rank engineers and plant directors. Some have won a distinctive and honored place in the country's industrial history.

Ivan Antseshko, a Byelorussian construction worker, helped build the street in Minsk which now bears his name. He learned his trade at a building trades vocational school.

Vasili Kucher is another vocational school graduate. He is famous throughout the Donbas coal basin as the miner who contributed many improvements which were incorporated into the coal combine.

Jan Grejtan came to the Riga shipyards straight from vocational school only five years ago. He very recently received a telegram of thanks from sailors on the steamship *Kooperatsia* cruising Antarctic waters for the fine work he did as leader of a team of mechanics in preparing the ship for its long trip.

The graduates of the vocational schools are young people with a broad cultural and technical background. They have a grounding in their native and the Russian languages and

## EDUCATION FOR A JOB *Continued*

AS PART OF THEIR COURSE IN VOCATIONAL SCHOOL, STUDENTS VISIT VARIOUS HISTORICAL AND ART MUSEUMS.





GATHERED IN A COMBINED CHORUS, VOCATIONAL SCHOOL STUDENTS OF THE SOVIET UNION'S 15 REPUBLICS APPEAR IN AN ANNUAL MOSCOW PERFORMANCE.

literature, in a foreign language, in history, geography, biology, mathematics, physics and chemistry, besides their vocational training. The combination gives them a flexibility and mental breadth which makes for resourcefulness and inventiveness.

This versatility is further stimulated by extracurricular activities which center in school clubs and stadiums. The Labor Reserves Sports Society is one of the leading in the country, with members participating in every conceivable sport. There are music groups, amateur theater groups, dance groups—some 10,000 of them in the vocational schools—to meet a wide diversity of young people's interests.

These groups have developed and fostered talents in many of the arts. Valentina Klepatskaya sang in a vocational school chorus in Sverdlovsk. Today she is a soloist at the Moscow Bolshoi Theater.

Vasili Savin, one of the dancers of the Moiseyev Ensemble, first learned his dancing in an amateur group at the vocational school where he was learning the trade of lathe operator.

Zoya Kusik and Sergei Naumov first displayed their talents as acrobats at one of the sports and art festivals held periodically for vocational school students. Now they are nationally known circus performers.

Once the vocational school graduate has learned his trade, he has wide horizons open before him. His skill is in high demand in any of a number of enterprises. His livelihood is assured and the speed with which he moves upward is determined by his own ability. ■

POLONAISE AS IT IS PERFORMED BY THE DANCE ENSEMBLE OF ONE OF THE VOCATIONAL SCHOOLS.





FOREIGN GUESTS TOUR STALINGRAD TO SEE ITS RECONSTRUCTION.

# CITIES, TOO, CAN BE FRIENDS

**L**AST spring John B. Hynes, the mayor of Boston, voiced his view that it would be a useful and advantageous thing if delegations of mayors of the principal cities of the United States and the Soviet Union exchanged visits.

Mayor Hynes' statement was made during an interview he gave a correspondent of *Soviet Russia*, and soon afterward the same paper carried an open letter of reply.

The answer, signed by Nikolai Smirnov, chairman of the Executive Committee of the Leningrad City Soviet, was addressed to Mayor Hynes under the headline: "We Are Willing To Receive Your Delegation."

Leningrad's chief municipal executive said his city "is ready to receive a delegation of the mayors of the major cities of the United States during the current year. This would be a very good thing." Nikolai Smirnov added that the Americans would "receive a most ardent welcome."

"Besides," he continued, "we are willing to establish steady contacts with the municipal authorities of any American city. Just as you have never been in Moscow or Leningrad, I have never visited Washington or Boston. Frankly speaking, I would like very much to visit American cities and get acquainted with their large and intricate municipal activities. Mayors should be aware of what other cities have that is interesting and instructive. Only in that way can the needs of city folk be more fully and better satisfied—by creating maxi-

mum comfort in all the world's large cities.

"I personally am ready at any time to join a delegation of the representatives of the cities of our country to make a trip to the United States. I have no doubt at all that representatives of other Soviet cities, such as Moscow, Kiev, Minsk and Stalingrad, would gladly agree to take part in this trip.

"I am confident that reciprocal visits of the mayors of American and Soviet cities will lead to better understanding between our peoples and will contribute to the cause of establishing good relations between the USSR and USA."

In May the Moscow City Soviet played host to Fredric R. Mann, a member of the Philadelphia City Council. Interviewed during his stay, he said:

"This is my first visit to Moscow. The capital's City Soviet has given me the opportunity to become acquainted with the municipal economy, its various establishments and the city's cultural facilities. Your capital is a very large and beautiful city, and very well kept. The city transport operates with great precision, and especially the subway."

Mann spoke of the cultural advantages of Moscow, its theaters and opera, and declared himself very grateful for the invitation to visit there. He said he expected to speak about Moscow on his return to the United States and then extended an invitation for the Mayor of Moscow to visit Philadelphia and become acquainted with its activities. He indorsed the

the mutual contacts as beneficial to both countries.

The idea of inter-city exchanges also carries the authority of the Soviet-American cultural exchange agreement signed earlier this year. The document says:

"Both parties will promote the development and strengthening of friendly contacts between Soviet and American cities."

There actually is a much longer history to the idea of inter-city friendly contacts. It was perhaps ten years ago that two of the most terribly damaged cities of World War II, Britain's Coventry and Russia's Stalingrad, first established friendly relations. It all started through correspondence and its purpose was for the two to become better acquainted and to exchange experiences.

Then a delegation from Coventry, headed by its Lord Mayor, was received by Stalingrad's officials. The British delegation was given a most hearty welcome. A year later a delegation of the Stalingrad City Soviet made a return visit to Coventry. And not long ago the two cities exchanged photo exhibits showing the progress of their postwar restoration and the life of their citizens.

Stalingrad has been especially active in its exchanges. Among its friends are such cities as Kemi in Finland, Ostrava in Czechoslovakia, Egypt's Port Said, Warsaw and Poznan in Poland, and the Japanese cities of Beppu and Hiroshima. Stalingrad is also developing

connections with Saint-Etienne in France and the Belgian city of Liège.

There is no end to the foreign delegations and tourist groups which visit Stalingrad. Alexander Dynkin, its Mayor, has on more than one occasion expressed the opinion that visits in which Russians and Americans meet face to face are invaluable in fostering mutual understanding. He has often spoken of the city's wish to see that friendship and unity which played so great a part in the common war extended also to the common peace.

Leningrad, too, has established extensive contacts with foreign cities. A delegation of the Leningrad City Soviet visited the British city of Manchester and later the visit was returned by a delegation from Manchester headed by its Lord Mayor Regan. In both cases the visitors were given tremendous welcomes and shown the sights, the industry and the life of the people.

The Urals city of Sverdlovsk and Birmingham, England, have a friendship that is growing stronger with time. And in this case the contact was made not only by the municipal authorities of the two communities, but also by the labor movements of each—the trade union councils of Birmingham and Sverdlovsk also exchanged visits.

Among other Soviet cities maintaining contacts with British cities are the Black Sea ports of Odessa and Novorossiisk, and the Ukrainian city of Stalino, center of the Donbas coal fields. Visitors to the history museum in Novorossiisk are sure to see the colorful albums with views of Plymouth, England, and a golden warder, the symbol of authority of this historic British port. These are souvenirs presented by the Lord Mayor of Plymouth and his party when they were guests of the city.

The Finnish city of Lahti and Zaporozhye in the Ukraine are also old friends, exchanging delegations and New Year's greetings as well as friendly cables on the occasion of national holidays.

These contacts are not confined to Europe, but embrace other continents as well. Tashkent, capital of the Uzbek Republic, has warm ties with the Indonesian city of Bandung.

In the case of the United States, there are many interesting possibilities for the development of inter-city contacts and visiting. Pittsburgh might send its steelmakers to the Ukrainian metallurgical center of Dnepropetrovsk. Miners from the Birmingham region could well visit the cities in the Donbas coal fields. Furniture makers from Grand Rapids might invite their counterparts from the Western Ukrainian center of Uzhgorod to show how things are done in Michigan. Textile loom fixers from Charlotte, N.C., might be interested in seeing the weaving machinery in Ivanovo. Fish processors of Gloucester, Mass., would be quite at home in the Caspian port of Astrakhan. Philadelphia radio and TV workers could see the assembly lines of plants in Riga, the Latvian capital.

The friendly ties between Soviet cities and those of other countries result in mutual benefits and, in the end, serve the interests of all mankind. The Soviet people are ready to expand these contacts immediately, and especially so with American communities. ■



MAYOR LADVISHCHENKO OF ODESSA GREETES LIVERPOOL'S LORD MAYOR JOHN SHEEHEN AND HIS PARTY.



MR. AND MRS. FREDRIC R. MANN OF PHILADELPHIA (LEFT) VISIT WITH MAYOR BOBROVNIKOV OF MOSCOW.

AT TASHKENT'S AIRPORT, MAYOR TURSUNOV HAILS MAYOR RADEN PRIATNAKUSUM OF BANDUNG, INDONESIA.



# ROCKETS EXPLORE

## *the Upper Atmosphere*

**E**XPLORATION of the upper atmosphere by means of rockets is an important part of the International Geophysical Year program. Coupled with the investigations carried out by artificial earth satellites, it essentially helps to encompass the entire mass of the air ocean that envelops our planet and to provide a correct idea of the various processes and phenomena in the top layers of the atmosphere and in the neighboring regions of outer space.

### From the Early Thirties to the IGY Program

Rocket investigations of the atmosphere in the Soviet Union date back to the early thirties. The first rocket with a liquid-fuel engine was launched in 1933. Beginning with 1949, instrument-equipped rockets became one of the principal means for study of the upper atmosphere.

The first vertically-launched rocket, in May 1949, reached an altitude of 68 miles and was followed by a series of rockets of the same type. The instruments carried by these early rockets weighed some 265-285 pounds all told, as compared with 3,300 pounds carried by rockets launched within recent years.

A new type of rocket launched in May 1957 carried a pay load of 4,850 pounds and climbed to an altitude of 132 miles. Both instruments and experimental dogs were brought back safely to earth from that height. This launching and similar flights made after it marked a new advance in the exploration of the upper atmosphere.

The main questions that Soviet scientists have been studying with the aid of rockets as part of the IGY program cover determination of the temperature, pressure and chemical composition of the atmosphere at different altitudes; investigation of the properties of the ionosphere, such as concentration of ions and electrons and electronic temperature; research on cosmic rays, on the short-wave ultraviolet part of the solar spectrum, and on micrometeors. To conduct these studies, rockets of various types and designs have been launched.

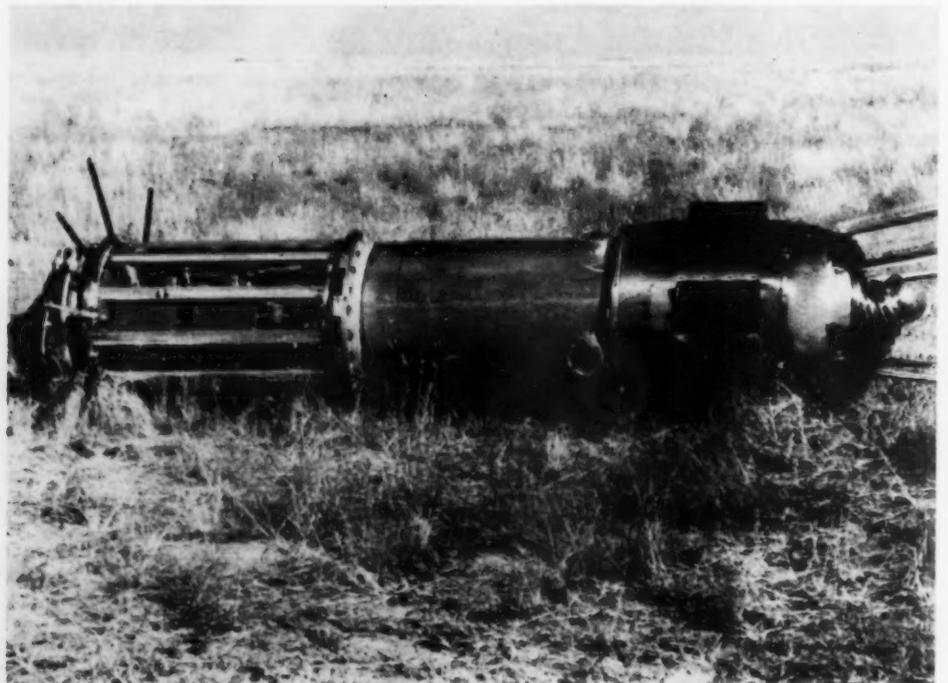
Rocket launchings under the IGY program are made from three points: from Franz Josef Land in the Arctic, from the middle latitudes of the European part of the Soviet Union, and in the Antarctic from a site near the main Soviet scientific base Mirny and from the ship *Ob* along the Antarctic coast.

A total of some 165 launchings are planned from these three points. The launching sites of rockets as well as the orbits of the sputniks are chosen with a view to obtaining data from different regions of the earth, and primarily in different latitudes.

### Record Launching on February 21, 1958

On February 21 of this year a one-stage geophysical rocket launched from the middle latitudes of the European part of the Soviet Union ascended to the height of 294 miles. Both for height reached and for range of research, this ascent set a new world record for rockets of this class.

CONTAINER WITH GEOPHYSICAL INSTRUMENTS AFTER ITS DESCENT FROM A ROCKET FLIGHT 132 MILES HIGH.



February 21, one-stage rocket rose 294 miles with 3,350 pounds of scientific equipment.

The rocket carried a bank of scientific instruments weighing 3,350 pounds. Ionization and magnetic manometers measured air pressure. Piezoelectric gauges recorded the energy and numbers of micrometeors which collided with the rocket. Dynamic electrometers registered the tension of the electric field on the rocket's surface. A radiofrequency mass-spectrometer measured the ion composition of the rarefied gases in the upper atmosphere. Ion traps measured the concentration of positive ions. The electronic temperature was measured by the method of probing. The concentration of electrons in the different regions of the ionosphere was measured with a dispersion interferometer. A spectrometer photographed the solar spectrum in the short-wave ultraviolet region.

The rocket flew up at a small vertical angle in the preset direction and came down exactly in the area it had been designed to land in. Throughout the flight, including the time it was flying by inertia, it was kept stable by devices which prevented it from rotating around its vertical and horizontal axes. This made for greater accuracy of measurements. Findings were transmitted to ground recording stations by radiotelemetry or were recorded on board the rocket on tape which was later brought down to earth.

#### Air Pressure and Composition of Atmosphere

Until recently rocket studies measured air pressure up to an altitude of 100 miles. As for higher altitudes, scientists had only very general knowledge, much of it contradictory.

In the February 21 experiment, air pressure was measured up to an altitude of 162 miles. The measurements were taken while the rocket was ascending and again when the container with the instruments was parachuted back to earth. A pressure as low as  $10^{-7}$  mm. on the mercury column has been registered.

The composition of the atmosphere had previously been studied from samples of air which were trapped in special cylinders sent up to altitudes of slightly more than 60 miles. For various reasons it is difficult to trap an air sample at higher altitudes that is large enough to be analyzed. Therefore, the composition of the atmosphere at these altitudes with respect to either neutral or ionized molecules has been unknown.

The February 21 rocket measured ion content at altitudes from 65 to 128 miles. The data indicated the predominance at these heights of ions with mass number 30, presumably those of nitrogen oxide. At the upper part of the rocket's path the instruments registered ions with mass number 16, presumably those of elemental oxygen.

#### Micrometeors

The study of micrometeors which enter the atmosphere from the cosmos is of more than theoretical interest to geophysicists. Involved is the practical problem of collision with rockets and artificial satellites in outer space.

What the February 21 experiment tried to determine was the concentration of meteoric particles and their energies. The instruments took reliable measurements of the movements of micrometeors up to an altitude of 185 miles.

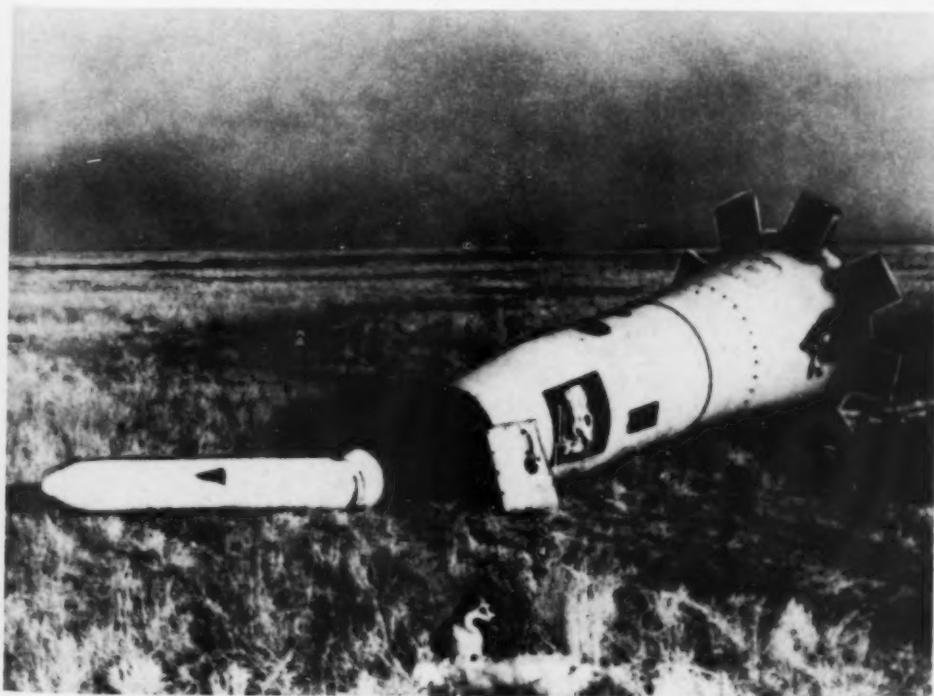
During the rocket's ascent from 75 miles to 185 miles the instruments registered 268 collisions of micrometeors with the surface of the gauges. While between 75 and 155 miles there were 44 collisions per square meter of surface, at higher altitudes to 185 miles, there were nine collisions per square meter.

#### Radio Waves

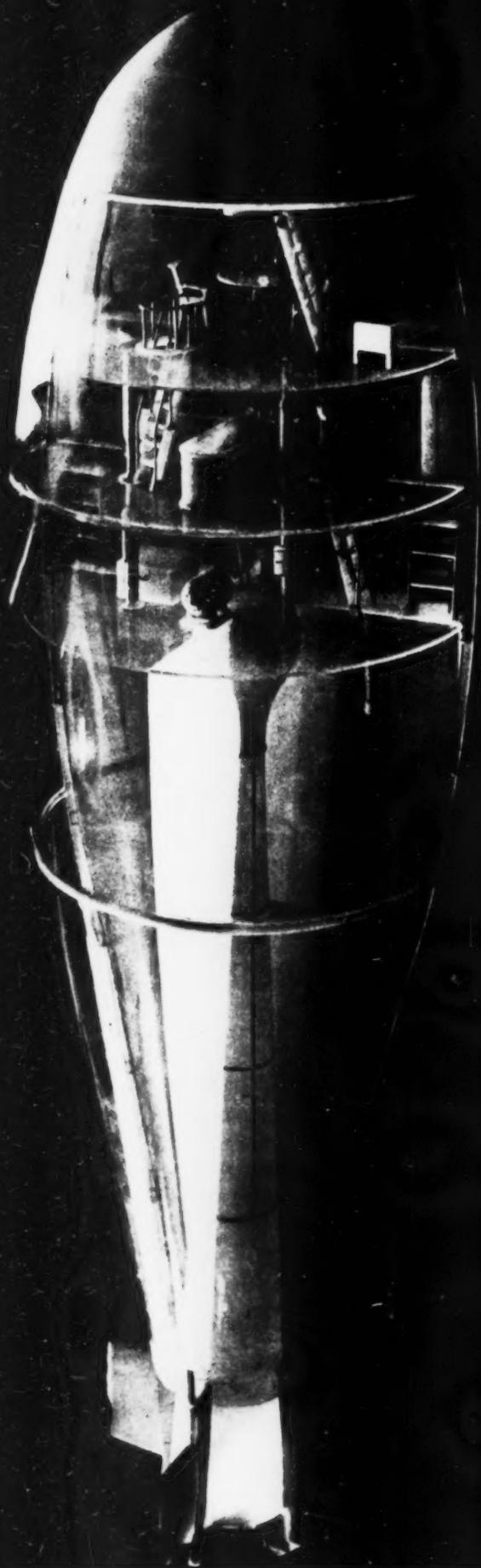
In the region of the atmosphere lying 30-40 miles above the surface of the earth, there

*Continued on page 12*

ANOTHER CONTAINER SAFELY BACK FROM UPPER ATMOSPHERE WITH INSTRUMENTS AND A DOG (IN FOREGROUND).

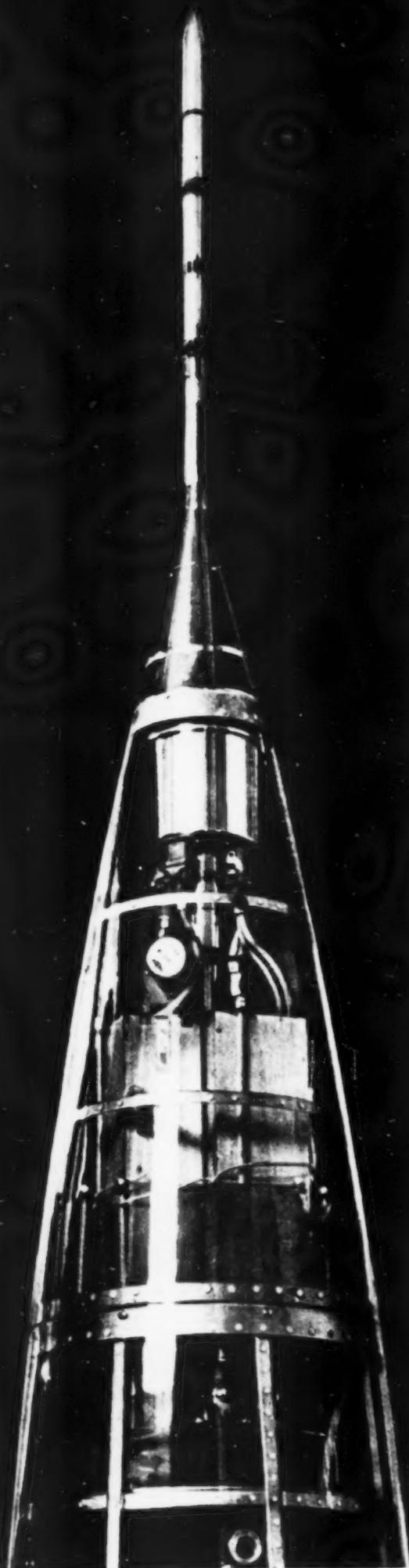


Earlier rocket sent up 132 miles in one of a series of upper atmosphere studies.



SPACE SHIP MODEL MADE FROM DESIGNS OF ROCKET THEORIST TSIOLKOVSKY.

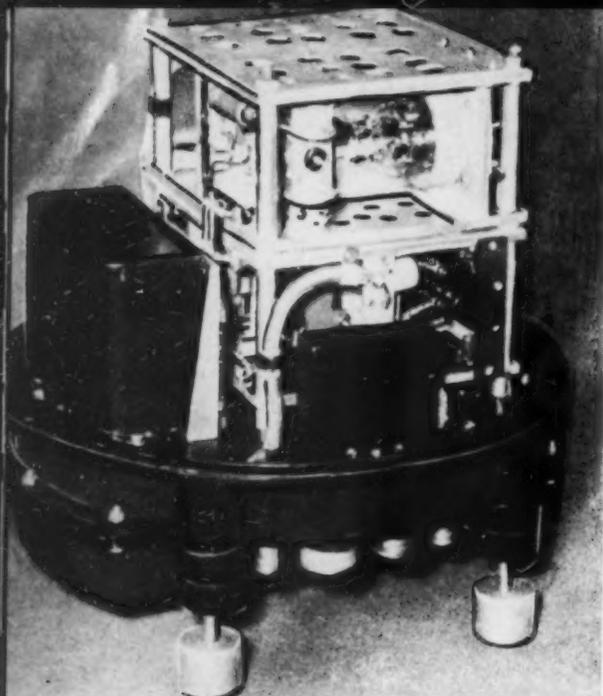
THE FIRST SOVIET RESEARCH ROCKET LAUNCHED IN 1933 (LIQUID FUEL POWERED).



HEAD OF TODAY'S STANDARD METEOROLOGICAL ROCKET WITH ITS EQUIPMENT.



ROCKET CONE SCARRED BY METEOR PARTICLES DURING UPPER ATMOSPHERE TRIPS.



DEVICE FOR MEASURING ELECTRONIC CONCENTRATION.

## ROCKETS EXPLORE the Upper Atmosphere

*Continued*

are large quantities of free charged particles, which affect the propagation of radio waves. One of the main characteristics of this region, which is called the ionosphere, is electronic concentration, or the number of free electrons per cubic centimeter. The velocity and path of propagation of the radio waves change in accordance with the magnitude of electronic concentration. Long-distance radio communication is possible only because radio waves are reflected from the ionosphere.

Prior to rocket studies of the upper atmosphere, electronic concentration at different altitudes was determined indirectly by the reflection from the ionosphere of radio waves of different frequencies emitted from the earth. These measurements showed that at altitudes in the neighborhood of 65-75 and 155-185 miles, there are areas of maximum ionization.

It was concluded that the ionosphere was composed of a number of strata. The stratum at roughly 60 miles was labeled E, and that at roughly 155 miles was labeled F. However, with this indirect method it was rather difficult to study the region between stratum E and stratum F, and it was altogether impossible to study the region above stratum F.

The problem is that for radio communication in outer space flights and for radio measurements connected with such flights, the characteristics of the entire mass of the ionosphere must be known. With instruments carried in rockets into the ionosphere it became possible to take measurements directly.

Most of the measurements made heretofore with rocket-launched instruments have been at altitudes of up to 125-150 miles. This is below the maximum ionization of stratum F. These measurements substantially changed previously held views of the structure of the ionosphere in this region.

The view that there is a sharply defined ionospheric stratum E at altitudes of 65-75



THESE IONIZATION AND MAGNETIC GAUGES ARE BEING TESTED PRIOR TO THEIR INSTALLATION ON ROCKETS.

miles is now considered erroneous. In fact, above the maximum electronic concentration at these altitudes there is a region in which the ionization changes are insignificant. The increase begins evenly in the area of stratum F.

### American and Soviet Studies

These conclusions were drawn from results obtained with a number of geophysical rockets launched by the USSR Academy of Sciences between 1954 and 1957, and with rockets launched in the United States by the Naval Research Laboratory.

As for the region of the ionosphere lying above the maximum of stratum F, in what is called the outer ionosphere, the only known data on the distribution of electronic concentration previous to the February 21 experiment had been obtained by Berning in the United States. In his experiment, a two-stage rocket, made up of a German V-2 and a Wac-Corporal, rose to an altitude of some 235 miles. According to the Berning data, electronic concentration above the maximum of stratum F, which was at an altitude of 185 miles during the experiment, declines rapidly, shrinking to practically zero at an altitude of roughly 235 miles. These results are now cited in all geophysical literature.

Data from the Soviet rocket of February 21 supply a picture of electronic concentration at altitudes of up to 290 miles. The results obtained in this experiment considerably differ in principle from those of Berning's, although the time of day, season of the year and phase of solar activity cycle during which the measurements were taken make the two experiments quite comparable.

At an altitude of 290 miles the electronic concentration was found to be one million electrons per cubic centimeter, while in the American experiment it was already insignificant at an altitude of 235 miles. The results obtained with the Soviet-launched rocket are quite new—they point to a very slow decline in electronic concentration above the maximum of stratum F.

According to existing ideas, the concentra-

tion of neutral particles at altitudes in the neighborhood of 310 miles only slightly exceeds the concentration of free electrons found at these altitudes. Therefore, it must be assumed that there is an intensive diffusion of charged particles from the lower and denser regions of the ionosphere. This is of considerable interest for understanding the physics of phenomena in the outer ionosphere.

The experimental method through which these results were obtained are based on the principle of the dispersion interferometer suggested by Soviet scientists Mandelstam and Papaleksi in 1937. Phase-coupled radio signals emitted from the rocket are picked up by receiving stations on earth. The continuous registration of the differences in the phases of the signals and the simultaneous measurements of the rocket's coordinates make it possible to determine the distribution of electronic concentration in the ionosphere at various altitudes.

Both the American and the Soviet experiments were conducted in much the same way. The Soviet experiments, however, used shorter radio waves, which helped reduce the influence of the earth's magnetic field on the results of the measurements.

### The Biology of Space Flight

The studies of the upper atmosphere, besides their more immediate purely theoretical implications, are a prelude to man's goal of outer space travel. But there are many biological and medical problems to be solved before this becomes a reality. Research in these directions has been going on in the Soviet Union since 1949.

During the first stage of study scientists experimented with dogs rocketed to altitudes of 60 to 130 miles. Hermetically sealed compartments in which the air was regenerated were used in test launchings. It has been proved that throughout the flight, the required barometric pressure, temperature and normal composition of the air can be maintained in the compartment with two dogs staying there for a total of three hours.

When the preset altitude was reached, the compartment automatically separated from the rocket and descended by parachute, thus bringing the dogs safely to earth. Specially designed instruments registered the condition of the animals during the flight—both ascending and descending—blood pressure, respiration, pulse, bio-currents of the heart, temperature, as well as air pressure within the compartment and other pertinent factors.

Such flight factors as accelerations on the rocket's take-off and during the descent of the detached compartment, and the zero-gravity state which lasted from 3.5 to 6 minutes, resulted in no noticeable changes in the condition of the test animals. Even when the dogs were rocketed into the upper atmosphere repeatedly, their health did not suffer, as shown by the examinations immediately afterward and during the long period of observation which followed the flights.

During the second stage of study scientists investigated the possibility of returning the animals and instruments from the rocket to earth by catapulting with subsequent parachuting. Special space suits were used to ensure satisfactory conditions for the dogs while they stayed in the rocket and during their descent. The catapulting devices ensured safe departure from the rocket at altitudes of up to 70 miles and at flying speeds of about three-fourths of a mile a second.

To perfect the rescue operation means, tests were made under the most critical conditions—on the descending path when the rocket's flight was not stabilized. In some cases the parachute systems were put into play immediately after catapulting the experimental dogs, at altitudes of 53-47 miles. In other cases the dogs were catapulted at altitudes of 29-24 miles and the parachute opening was delayed until the animals had dropped to about 21½ miles from earth. When the animals left the

rocket at the higher altitudes, their descent to earth took more than an hour.

The experiments conducted in greatly varied conditions have demonstrated the dependable operation of systems that guarantee safety of flight and landing of the dogs—space suits, catapulting devices, parachutes and automatic gear. No harmful effects were observed either during the catapulting and the parachuting or during the flight in the upper atmosphere. Methods have been worked out to ensure the best conditions in rocket flights, and to effect emergency rescues.

By now scientists have gathered valuable data on the biology of high-altitude flights based on observations carried on over a period of years. The results of the rocket investigations were further verified by data on the dog carried in Sputnik II.

#### Greater Pay Loads

A distinguishing feature of the Soviet geophysical rockets and earth satellites is the large pay load they carry. In Sputnik II, for example, the scientific equipment weighed more than 1,100 pounds.

If the weight were cut down to a few pounds, it would be possible to launch an artificial satellite to the moon. But the scientific value of such an experiment would be small, since weight considerations would not permit carrying instruments of any importance necessary to measure and to transmit observations back to earth.

Rapid development of rocketry gives reason to believe that this difficulty will be resolved in the near future. Further advances will make it possible to launch sputniks with greater pay loads to expand the studies of the upper atmosphere and outer space. This will mean a new stride toward the goal of interplanetary travel. ■



This little dog dressed for cosmic travel has just landed from a hop and seems a bit hungry.

Another space traveler, back on earth after a trip, rests amid instruments in his compartment.



MALYSHKA, LINDA AND KOZYAVKA SEEM UNIMPRESSED BY THEIR FAME AT A PRESS CONFERENCE AFTER THEIR FLIGHT IN A ROCKET TO A HEIGHT OF MORE THAN SIXTY MILES.



# VOLUNTEERS FOR SPACE TRAVEL

**H**ISTORY did not leave us the names of those who offered to sail with Columbus when word went round that he was outfitting ships to venture into unknown seas. There must have been many hundreds—sailors and landmen, geographers and mapmakers—all of them pioneers looking to break past old horizons.

Our 20th century unknown is the cosmos. When Sputnik I was launched, we pushed our horizon out into space.

There is an agency of the USSR Academy of Sciences whose name is a curious combination of fantasy and rather businesslike phrasing—the Interdepartmental Committee for Interplanetary Communication. Its

THESE STUDENTS OF MOSCOW'S MINING INSTITUTE ARE SET TO FLY INTO OUTER SPACE—TOGETHER OR SEPARATELY, DEPENDING UPON THE SIZE OF THE COSMOS-PIERCING ROCKET.



function is to coordinate research data—technological and biological—on future space flights.

Since the day Sputnik I was launched, the Committee has been flooded with phone calls, telegrams, letters from thousands of volunteers who want to man the first space ship launched. Most of the volunteers are young—very naturally. They are typical of the Soviet youth who volunteered for work in the barely habited virgin farmlands of Siberia, those who helped build power stations on the Volga and pushed railroads through dense forest regions.

#### Letters from Future Explorers

Of all the letters which the Committee receives, only a few come from those whose reasons for volunteering are obviously personal or romantic. The overwhelming majority are motivated by the same urge for pioneering exploration, the same desire to be of service to science that is expressed in a letter from Gennadi Nikolayev, 20-year-old worker from the Ural city of Berezniki.

"I followed the news on the flight of Sputnik," he writes, "with a feeling of tremendous pride. As it sped through the sky it opened wide the gateway to an unexplored road. I have complete faith in the success of Soviet science that has set itself the goal of space travel. It is this faith that has prompted me to write to you. I ask you to enroll me in the ranks of those men who will be the first to set foot on the Moon and Mars. I would be happy to learn that I can be of benefit in this glorious and truly fabulous mission."

Or this letter from serviceman Victor Kabalin:

"If there is room for a human being in the next Sputnik, please reserve it for me. If a person with technical knowledge is needed, I promise you that I will on your instructions acquire it in a very short time."

There are no heroics in most of these letters sent to the Committee. For the most part they are as matter of fact as Victor Kabalin's. Some of them mention the hazards and dangers, but the mention is incidental. There is youth in the letters and eagerness and even some impatience that it is likely to be a while before the first manned space ship is launched.

Technically Soviet rocketry is already prepared to launch a manned rocket, but there are other considerations that are involved. Before man travels out into space, there must be a guarantee that he will return safely.

The problem of re-entry of a man-carrying rocket to earth has not yet been solved. Nor has there been sufficient research in the medical and biological problems that are involved. The flight of Laika, the Sputnik dog, furnished important information. However, space travel still has many questions which science must find answers to.

There is no predicting exactly when the first manned rocket will be launched. But that it will be launched in a future not too distant there is no doubt. And when it is, it will very likely be manned by young men like these letter writers who are volunteering to explore the future. ■



The morning mail at the Interdepartmental Committee for Interplanetary Communication is filled with applications of space flight candidates.



Lev Rudovsky, a factory technician, is ready for the sputnik's take-off. Like many others, he filed a written application asking to be included.



Lydia Skugorva, who has a master's degree in engineering, wrote the USSR Academy of Sciences of her dream of taking the first space trip.



# SOVIET TOURS

# ATTRACTIV

Edward Stern and Joseph Brandle, announcers of an American TV company, arrived in Moscow to see the city's TV center in operation.



"Your success proves the importance of our music exchange," Soviet composer Aram Khachaturyan told U.S. conductor Eugene Ormandy.

Leopold Stokowski said in Moscow: "If our peoples could meet, I am sure they'd understand each other well—they have so much in common."



# ETMORE AMERICANS



Professor John McClellan of Columbia University's Teachers College visited a children's club in Moscow with other Americans. The usual group of rooters stand by while he matches skill over the chess board with Alexander Repansky, a member of the club.

Leonard Warren, eminent American operatic star, was highly acclaimed at the Bolshoi Theater after he had sung the title role in *Rigoletto*.



Students of Kansas State University on a visit to the Soviet Union are shown through Moscow Radio Center's broadcast studios.





Russell Mahoney (center), president of a plastics corporation, was head of a chemical group which visited the Soviet Union.



American physicians are shown around the Institute of Epidemiology and Microbiology, one of the country's leading research centers.

## SOVIET TOURS

### ATTRACT

### MORE AMERICANS

*Continued*



Robert Condon of New York was interested in seeing as much of the country as he could squeeze into his two-week tour. He plans to make his own film and write a book about his experiences.





These American tourists have just arrived to look at the large new housing developments that are going up in the southwestern outskirts of Moscow. Visitors have a choice of tours across the country that gives them a chance to see places in which they are most interested.

A delegation of women medical workers inspected the country's public health system.



Before leaving Moscow, American guests usually stop at the souvenir shop of department stores to pick up mementos.

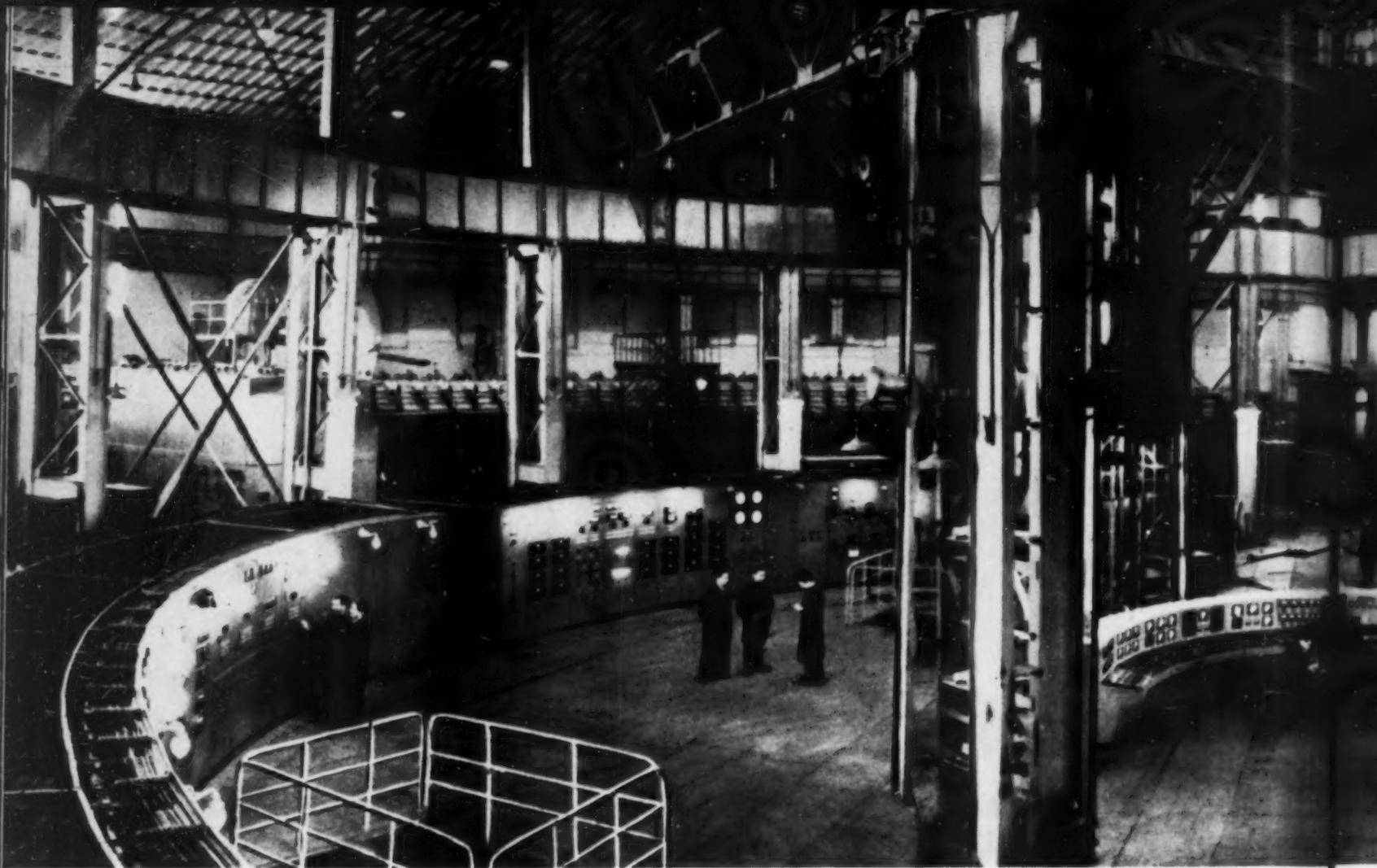


Sightseeing tours take American guests to all parts of the Soviet Union. This group visited the Armenian countryside and took a trip on Lake Sevan.



The Rev. Paul Godill, pastor of a church in Memphis, Tennessee, addresses the congregation of a Leningrad Evangelical Christian group.





# TRILLION ELECTRON-VOLTS

**PROFESSOR VLADIMIR VEKSLER, one of the world's outstanding nuclear physicists, is a member of the USSR Academy of Sciences and Director of the High Energies Laboratory at the Dubna**

*Nuclear Research Institute. This article is based on his report at a recent meeting of the Academy in which he reviewed the progress that has been made in the field of accelerating atomic particles.*

**By Vladimir Veksler**

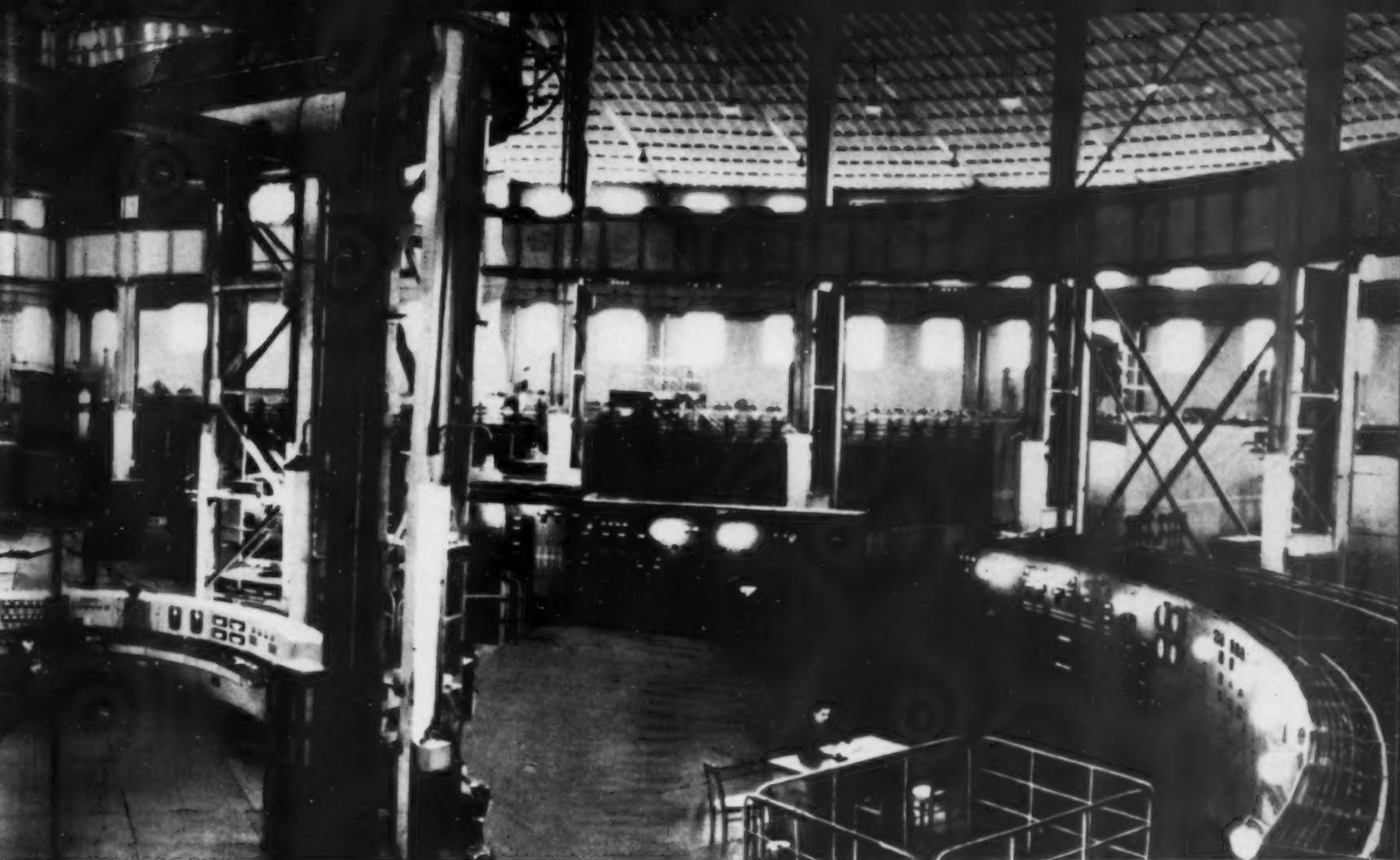
**I**N recent years experimental science has entered on a competition with nature. It has built accelerators—atom smashers—that artificially impart the energy of many billions of electron-volts to elementary particles—electrons and protons.

With these accelerators we have been able to investigate phenomena of fundamental importance in the physics of the atomic nucleus. Out of these investigations, which discovered the existence of heavy neutral mesons, anti-protons and antineutrons, a most promising field of modern nuclear physics has developed—the physics of high-energy particles.

There are various types of accelerators of charged particles. Among them are synchrotrons used for accelerating electrons; and phasotrons used for accelerating protons, deuterons and alpha particles, and for obtaining mesons. About a dozen phasotrons are in operation in the world today, the largest of them in the Soviet Union.

**PROFESSOR LINUS PAULING OF THE USA AND HIS WIFE (LEFT) ARE SHOWN WITH VLADIMIR VEKSLER IN DUBNA.**





THE SYNCHROPHASOTRON AT THE NUCLEAR RESEARCH INSTITUTE IN THE TOWN OF DUBNA, RATED AT 10 BILLION ELECTRON-VOLTS, IS THE WORLD'S LARGEST ATOM SMASHER.

# N-VOLT ATOM SMASHERS

Synchrophasotrons are another type of accelerator. They include the American cosmotron of 3 billion electron-volts; the American bevatron of 6.3 billion electron-volts; and the Soviet synchrophasotron of 10 billion electron-volts at the Dubna Nuclear Research Institute. Experiments with the Dubna accelerator are proceeding on a rapidly growing scale.

### Boosting Energies

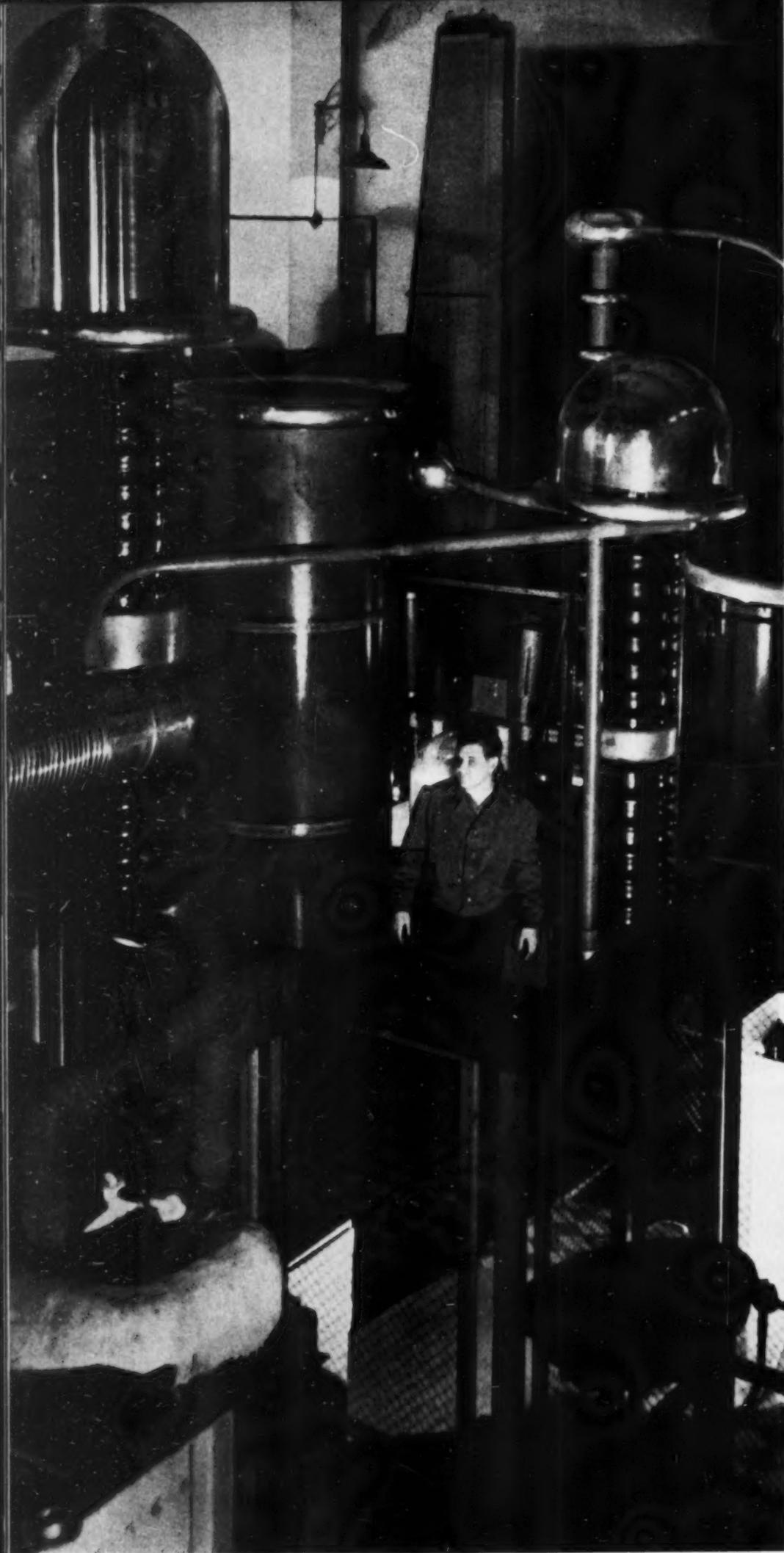
To boost the energy produced by accelerators to a still higher level presents certain difficulties. Boosting the energy of the particles and the corresponding expansion of the radius of the accelerator's orbit would make it necessary to increase the height and width of that part of the space in which the particles move. To accomplish this, the weight of the electromagnet would have to be increased.

In the Dubna synchrophasotron the width of the "path" in which the particles move is about 1.5 meters. If we were to increase the maximum energy of the particles to 30 billion or 50 billion electron-volts, using the same principle on which the synchrophasotron is

*Continued on next page*

FRANCIS PERRAIN, FRENCH HIGH COMMISSIONER ON ATOMIC ENERGY, HAS ALSO BEEN AMONG DUBNA'S VISITORS.





THE ACCELERATION OF HYDROGEN IONS BEGINS IN THIS SECTION OF THE HIGH ENERGIES LABORATORY AT DUBNA.

## TRILLION ELECTRON-VOLT ATOM SMASHERS

*Continued*

based, its electromagnet would have to weigh close to a million tons. This approach is obviously unreal.

Some few years ago a group of American physicists proposed a clever way around the difficulty. The method they developed is called rigid focusing. Accelerators using this principle are now being designed and built in a number of countries. Switzerland and the United States are building 30-billion-electron-volt accelerators of this type and the Soviet Union is building one of 50 billion electron-volts.

But despite the ingenuity of this new method, its use will allow for only a several-fold increase in the maximum energy of the accelerated particles. To solve the problem of sharply increasing the intensity of their beams and to obtain particles with energies of hundreds and thousands of billions of electron-volts new methods must be found.

### New Approaches

There are several new approaches which are being suggested. One of the suggestions links the problems of obtaining high currents to those of obtaining high energies of accelerated particles.

Ordinarily an experimenter will use an accelerated particle as a missile directed to collide with a resting particle used as a target. But, the question is asked, why must the target necessarily be at rest? Why not have the target move at high speed toward the beam of particles used as missiles?

If two protons—each with an energy of, let us say, 10 billion electron-volts—collided, the process of interaction would be the same as though one of them had been at rest and the other had moved with an energy of some 200 billion electron-volts. We would then have an accelerator with ultra-high energy equal to double the product of energy of the colliding beams of particles.

But to use this method of counter-beams we must boost the instantaneous currents produced by our present accelerators 500- to 1000-fold. Ingenious methods to get around this problem were advanced in 1953 by Soviet physicists Petukhov, Rabinovich and Kolomensky, and somewhat later by Kerst, Simon and other American physicists. Suggested were new magnetic systems with a magnetic field constant in time which would make possible a considerable boost of the current of the accelerated particles.

### Veksler's Own Method

Another new principle for accelerating atomic particles has come to be known as the coherent method. This method makes it possible to accelerate the blobs of plasma which are large bunches of particles. In theory, particles may be accelerated to energies of a trillion electron-volts and more.



PROFESSOR FRANCIS LOW OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY (AT THE BLACKBOARD) TOOK PART IN MANY SUCH CONFERENCES WITH SOVIET PHYSICISTS.

The important part played by plasmatic processes in nature has become clearer in recent years. Scientists believe that there is the possibility of generating electromagnetic radiation of the same type as is conditioned by the movement of plasma in the magnetic fields of stars. In astrophysics, the problem of accelerating charged particles is very closely

connected with the peculiar properties of plasma.

The fascinating problem which physicists and engineers are now grappling with is to attain the enormous energies of thousands of trillions of electron-volts generated in outer space by stellar accelerators, whose mechanism is still unknown to us, and to use the artificial

missiles thus obtained for the study of the elementary particles.

In a short span of time physicists have traversed the long way from hundreds of thousands of electron-volts to thousands of millions. Now day by day they come closer to enormous accelerations of trillions of electron-volts in their competition with nature. ■

THE INSTRUMENT PANEL OF ONE OF THE NEWEST TYPES OF PARTICLE ACCELERATORS IN DUBNA. MANY FOREIGN SCIENTISTS STUDY THE WORK DONE AT THIS INSTITUTE.



# A SON

# IS BORN



Photos by Alexander Agapov

**A**LTHOUGH statistics show that the world birth rate is so high that the number of sons and daughters greeted daily is an astounding figure, each birth is always the biggest and most important event of the year to at least two persons.

So it was to Yuri and Tonya Andreyev when their first son was born. Yuri is employed in a Moscow watch factory, while his wife works for a post exchange. Their story began when she told him the big news while they walked in a Moscow park last fall.

At the maternity center, Tonya was examined periodically by her physician before and after delivery of her baby. There is no charge for the service.



Buying the layette at a department store, the young couple looked over practically everything that the pre-school age section had in stock.





It was a big moment for Tonya when her son was brought in by the nurse. Somewhat earlier a flower basket sent by the infant's father had arrived.



Little Alyosha goes home. The pediatricians and nurses from the child consultation center will help Tonya keep her son healthy and strong.

At the watch factory the proud father was the recipient of a long series of congratulations and handshakes from the coworkers in his department.



Three months have passed and the boy can already stand—courtesy of his dotting grandmother. He is the center of attraction at this family celebration.





ALTHOUGH STUDENTS SPEND QUITE A LOT OF TIME EACH DAY ON STUDY, THERE ARE ALWAYS AMPLE OPPORTUNITIES FOR FUN-MAKING, SPORTS AND OTHER ACTIVITIES.

## AFTER CLASSES

By Adolf Antonov

Photos by Yuri Chernyshov

NOVOSIBIRSK, with its dozen colleges, has a student colony of 50,000. This is equal to the total population of the city four decades ago. Each student thinks his college the most important, but there may be a good case for those who put the Construction Engineering Institute at the top of the list.

Novosibirsk is situated in Siberia, a rapidly growing part of the country. The city itself is one long construction site, where new communities are cropping up all along a 25-mile stretch down the Ob River.

No one would dispute the importance of learning construction engineering. But it is not only lectures, lab studies, calculations at drawing boards and homework that make up life at the institute. When the bell rings announcing the end of the day's classes, the



Felix Grachov's saxophone provides him with all the extra-curricular activity any student needs.

Where one's husband is an architect, study becomes much easier. Graduation will find her entering the field that he has chosen.



Art students everywhere are very close to their work. This girl is happy at her easel for hours.



students are not particularly anxious to leave.

The day we visited there we saw groups of excited boys and girls clustering around the latest edition of the wall newspaper. They were all interested in the results of a poetry contest. Each poem evoked lively comment, and the pen names set everybody guessing at the true identity of the aspiring poets.

Literature is not the only rage with these budding builders. Nearly all the students closely follow the activities of the amateur movie studio called NISI Films (NISI is the Russian abbreviation for Novosibirsk Construction Engineering Institute). When the tryouts were announced for the first film, *Spring, Love and Exams*, each girl secretly hoped she would be picked for the lead.

The film turned out to be a lively comedy,

and it was even shown in Moscow. The studio is now preparing to shoot another comedy entitled *In Love with a Theodolite*. It also makes newsreels of institute current events.

The institute has better than its quota of jazz fans, both listeners and players. As a matter of fact, there is nothing passive about this group. Everybody wants to perform. Since no band is big enough to include them all, an elimination contest had to be held to whittle the number down. A giant band of 60 was finally settled on, and now it plays at all student gatherings. Strong rivals of the jazz band, in the number of participants, are several folk instrument orchestras and a dance group of 120.

The institute's auditorium seating 600 is

*Continued on next page*

## AFTER CLASSES

*Continued*



Graduates of the institute write back news of their progress to students left behind. Sometimes, as in this case, the letter is so important it must be shown to a friend.



Yuri and German Koval are off to hunt birds. Other students prefer fishing nearby waters.

often the scene of concerts given by amateur groups from other colleges. There is a kind of exchange program in this field—the hosts always return the performances.

Music and the theater are great favorites. Attend any performance at the local conservatory, the Philharmonic Society, drama theater or opera and ballet house and you are sure to run into students—couples, small groups and even hundreds at a time. They very often buy a block of tickets for a theater party. And whenever pianist Svyatoslav Rikhter or violinist David Oistrakh appear in the city, you can always count on the students for the most enthusiastic response in the audience.

Painting is another much loved hobby. Many future builders sketch on the banks of the Ob, or right in the streets of the city. Some of them are inspired by the austere Siberian landscape, others by the modern skyline of their city in construction.

The students go in for sports, too. The institute has its own stadium, gyms, sports fields and tennis courts. Its track and field teams, swimmers, basketballers, volleyballers and soccer players vie successfully for first place at city competitions, and their star sportsmen take part in countrywide contests. The meditative and philosophically inclined prefer the more ancient forms of sport—fishing and hunting.

It is a truism that students are the most argumentative segment of any population. As for the construction engineers, they argue about everything under the sun—architecture and building, music and psychology, Homo sapiens and sputniks. The whole senior class recently took part in a debate entitled “Real and Pseudo Culture.”

No picture of student life would be complete if it omitted the “quiet type,” the students who

prefer to read a book in solitude after class or lock themselves in their room to cram for exams, or those who spend half the night in the labs testing, experimenting, questing. There are a great many in this category.

But to be absolutely accurate, it is almost impossible to draw the line between the student engaged in scientific research and the student who sits listening spellbound to music or whirls in a gay Russian dance. They are always changing places. ■

Wedding party is a big event. The couple, Anatoli and Zoya Shestopalov, are in the rear.





This player has just scored with a sizzling shot. Table tennis ranks high with students along with soccer and ice hockey.

Music of symphony concerts, always drawing large audiences, has deeply entranced this student couple listening closely.



WHILE HIS FRIENDS FROLIC, VICTOR UFIMTSEV FINDS HE MUST PREPARE FOR AN EXAMINATION.



RUSSIAN FOLK ART OBJECTS GO FAST AT BRUSSELS FAIR.

# Russian Folk Art

By Tamara Mitlyanskaya

**R**USSIAN painted wooden dolls called matryoshkas, Vyatka clay toys, Palekh jewelry boxes, Khokhloma decorative bowls, Vologda carvings on birch bark and Kholmogory bone carvings are among the souvenirs eagerly sought by the foreign tourist. He regards them as exotic objects of his trip abroad, although for the Soviet people they are articles long familiar and ever beloved.

First created in the distant past to make household things needed in daily life, these handicrafts have long since lost their utilitarian value. Today they flourish as a unique branch of Russian national art. The artisans have carefully preserved both the historic traditions of their crafts and the old methods of painting.

Gorky Region produces wooden bowls decorated with Khokhloma paintings. It is a complicated process. The bowl requires two priming coats, then it is covered with linseed oil and powdered aluminum on which the pattern is painted in oil and lacquered. After being tempered in an oven under temperatures up to 212° F., the metal background under the lacquer turns gold, and makes the traditional black and red tones seem particularly festive and decorative. Into an arbitrary pattern of sprigs, flowers and herbs, the Khokhloma artists weave images of birds and fish.

The village of Bogorodskoye, near Moscow, is widely known for its

statuettes carved of wood. The material used is the linden or aspen tree. The outline of the object is of a general character, details being added through a few apt and accurate cuts. These statuettes, as a rule, are not painted. The favorite theme of the Bogorodskoye artists, the dashing troika (three-horse sleigh), has become traditional.

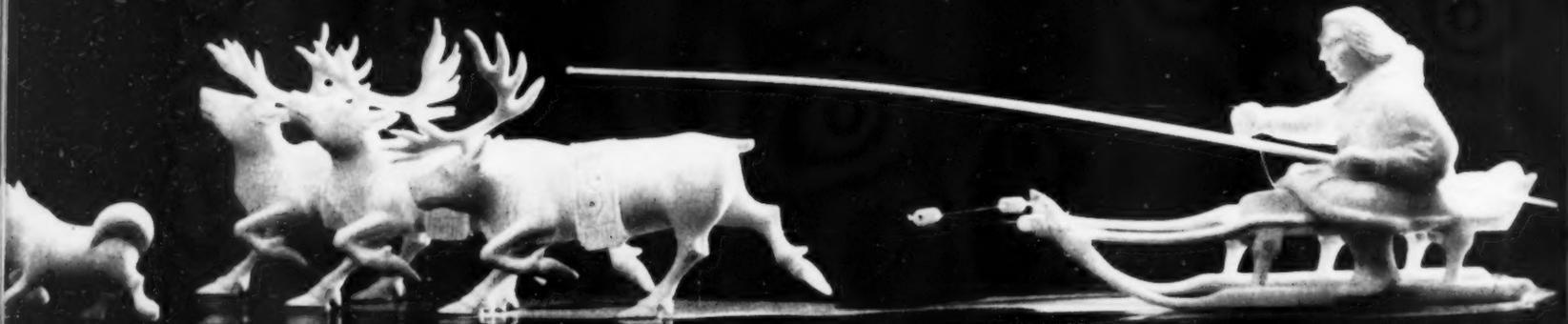
The famous matryoshkas are made by handicraftsmen of the Moscow suburban village of Babenka. Each of these toys, hollow inside, dismantles into an upper and lower section. The largest matryoshka contains a smaller one, which holds a still smaller doll, and so on. Some contain up to 24 matryoshkas. Painted in bright colors and covered with lacquer, the dolls depict Russian peasant women in their vivid national costumes.

Vying with the matryoshkas for color and brilliance of execution are the clay toys of Vyatka. The technique for their production is quite simple. The toy is molded of plain red clay, then baked and covered with a coat of mixed chalk and milk. The white background is painted with aniline dyes mixed with egg. The colors of these paints are astonishing for their brightness. Bits of gold tinsel are frequently added to a pattern for even greater attraction.

Birch bark carving has long been practiced about the town of Veliki

*Continued on page 32*

RACING REINDEER—A CARVING FROM WALRUS TUSK BY Kholmogory Craftsmen.



DUCK BOWL AND MATCHING LADLE WITH KHOKHLOMA PAINTING.



MATRYOSHKA DOLLS MADE IN BABENKA VILLAGE.

# Russian Folk Art

*Continued*

Ustyug in Vologda Region. Since the olden days birch bark has served to make bast baskets decorated with prints or simple geometrical carvings. The artist first outlines his drawing with a dull knife and then carves the details with a shaper instrument. The finished pattern is glued to previously prepared jewelry boxes or casks. The designs of these carvings are rhythmic and harmonious compositions of waving grass, leafy plants and flowers. They resemble Russian laces and recall the images traced on windows by wintry frosts.

The art of the bone carvers of Kholmogory village, in Northern Russia, was mentioned as far back as 1650, when the czar invited some of the craftsmen to work in Moscow's Armory Chamber, then the center of Russian decorative and applied art. Walrus tusks from the White Sea

were the chief material employed, and the Kholmogory artists still make graceful toilet articles, frames for mirrors, goblets with filigree work of amazing delicacy. They usually carry images of northern animals—the marten, reindeer, sable and squirrel.

Bone carving is also practiced in the town of Tobolsk, in Siberia, where the craftsmen use excavated mammoth tusks instead of walrus. These Tobolsk carvers depict the life and customs of the peoples of the North. Their favorite theme is the reindeer race.

As far back as the eighteenth century, artistic castings in iron were made in the Urals town of Kasli. Cast iron provides an excellent medium for the reproduction of the tiniest details, and the foundrymen of Kasli still cast statuettes that serve as handsome table ornaments.

The Urals is rich in semi-precious stones and artists of these mountains have cut jewelry boxes, small chests and trays from such hard materials as malachite, rhodonite and jasper. The natural beauty of the stones is brought out by the work of these masters.

The painting of miniatures on papier-mâché holds a special place in Russian folk art. The best masters in this field are the craftsmen of Palekh village, whose art has deep roots in ikon painting of the old days. Now the subjects of their miniatures are drawn mostly from fairy tales, folklore and heroic legends. They inherited most valuable traditions of ancient Russian painting: smooth and harmonious lines, clear and bright colors, and a feeling for rhythm and ornamentation.

The Palekh artists use distemper mixed with egg yolks to produce especially clean and ringing colors. The black backgrounds of their pictures as well as their delicately gilded borders lend a colorful fairy effect to their works. On a disk no more than an inch and a half in diameter, they can portray a historical scene with numerous figures in full color.

A unique craft of painting metal trays has long been practiced in the village of Zhostovo near Moscow. These masters cover their black, red and blue backgrounds with vivid oil paintings of bouquets, garlands and wreaths, doing their work in free, bold strokes.

There have been new sources of folk art developed in recent times. They include bone carving in Khotkovo, near Moscow, and in Kislovodsk, in the Caucasus, as well as the production of glass art objects in the



CLAY FIGURES FROM VYATKA.



RUSSIAN LEGENDARY THEME PAINTED ON A PALEKH TRAY.

village of Krasnaya Ushna near the old Russian town of Vladimir.

The works of the folk artists are assembled in museums throughout the country and annual contests are held by the Museum of Folk Art in Moscow to find the best masters of each field. Special courses of training have been established for them in the Institute of Applied Art Industry.

Each of these folk arts has developed amazingly during Soviet times. The economic position of the artists has been immeasurably improved. The once isolated, lone artists completely dependent on speculators are now united in specialized cooperatives belonging to a national association of craftsmen. Once relatively ignorant people, they now receive not only a general education but also special art training. There is a folk art that unerringly follows the ancient traditions but at the same time is constantly enriched by modern life and carefully developed by new generations of artists. ■



CAST IRON DEER FROM KASLI.



DECORATED TIN TRAY FROM ZHOSTOVO.



TROIKA WOOD CARVING DONE IN BOGORODSKOYE.



# LATVIA TODAY

Factory mechanic Woldemar Bus designed an automatic line to make relay springs.



Paper mill worker Emma Kulite at the republican song festival during the traditional Latvian holiday Ligo.



August Kirchenstein, Vice-President of the Latvian Academy of Sciences, has developed new vitamins for bread.



## By VILIS KRUMIN

Vice Chairman  
Council of Ministers, Latvian Republic

THE phrase, "The Thousand Blue Eyes of Latvia," figures in song and legend to describe the innumerable aquamarine lakes of this lovely country washed by the Baltic Sea. It is a clement land of mild winters and pleasant summers, with a third of its area covered by forest. Wooded hills alternate with deep valleys inland, and on the coast the sand dunes, overgrown with scrub pine, rise and fall like gently swelling waves.

Two million people live in Latvia. In 1940 they proclaimed a Socialist Republic and joined the Soviet Union. Much has been done since that time to improve the standard of living of the people. Workers without jobs in the cities and farmers without land in the villages, once a characteristic feature of Latvian life, are no more than a sad memory.

Jobs are constantly looking for people to fill them, and that is the best assurance that the workers' right to a livelihood is guaranteed. Village life, too, has undergone a transformation. Former peasants who worked individually with primitive implements formed co-operatives and are now prosperous collective farmers with high personal incomes.

Villages have become modern communities with well-equipped schools, libraries and social and recreation centers. More than 40,000 new houses will have been completed in the republic's farm villages by 1960, and in the towns and cities some 30,000 new apartments will be built within the next three years.

Medical services are financed entirely from the national budget and are free to every citizen. They include the attending physician, hospitalization, maternity care and surgery as well as convalescent treatment—every possible medical need with professional emphasis placed on preventive care. In the past decade the number of clinics and hospitals have increased three times over. Compared with twelve doctors for each 10,000 people in 1940, there are now twenty-two.

Laima confectionery factory kindergarten has nurses and teachers to care for youngsters.



## Education for Every Citizen

The school system has been largely expanded, as it has been in every one of the Soviet Republics. Tuition in all schools, from the elementary grades through the university and graduate work, is free, the cost borne by the national government. In addition to free tuition, all students who do satisfactory work receive a state stipend.

Seven-year schooling is compulsory. The ten-year combined elementary and high school has been introduced in big cities and will soon be general throughout the republic's rural and urban areas. There are any number of evening schools on all levels for adult workers and vocational training courses of both long and short duration offered by factories and collective farms.

New schools on the college level have been founded and the old ones enlarged to admit more students. Higher education was once the privilege of the well-to-do; now the only requirements for admission to a college or university are the educational prerequisites and the willingness to study.

The republic's concern with making the world's heritage of culture available to every citizen can be gauged by the public libraries which are situated everywhere—15 times as many libraries as existed in 1940. Theaters, concert halls, motion picture houses are to be found in towns large and small, with audiences in the many hundred thousands.

The national arts of Latvia have been experiencing a renaissance in music, in painting and sculpture, in the dramatic and the movie arts. The high esteem in which Latvian culture is held throughout the country is evident from the success of the festivals of Latvian art and literature in Moscow, the capital of the Soviet Union. Latvian film workers have attracted large audiences everywhere in the Soviet Union and in countries abroad. Dozitra Ritenberg, a young film actress, was awarded a prize at the Venice Film Festival for the best performance of a female part.

Latvian scientists working in the republic's sixty research centers have made major contributions in many fields of study. The Latvian Academy of Sciences with its institutes

*Continued on next page*

Scrubbing down the ship. Woldemar Kakste and Nikolai Petrov are young deck hands of the republic's growing merchant fleet.



Candy plant worker Mirdza Rosenthal and her family find gardening a good hobby.

The prominent Latvian author Andrei Upit whose works are out in a 22-volume set.



Vases, china and metal work are among the items produced by Latvian craftsmen.





The Riga railway car building works. Latvia's industrial output is eight times more than in 1940.



Land improvement is a continuous process on Latvian collective farms. In the past two years some 100,000 acres were drained, a total equal to all land drained during 1900-1940.

## LATVIA TODAY *Continued*

is the main body for research in the theoretical and applied sciences.

### Economic Growth

Latvia's economic growth has been remarkable within the past eighteen years. Not only have the living standards of the people increased far beyond the 1940 level, but light

and heavy industry, deep-sea fishing, agriculture and commerce have made swift and solid advances.

A year after Latvia joined the Soviet Union, the invading Nazi armies ruined its factories and farms, towns and villages. It was a calculated policy of material destruction that resulted in a loss equivalent to five billion dollars.

All Soviet Republics pooled their efforts to rehabilitate the devastated areas of the country. Leaning on this help, the Latvian people restored their economy within a short space of time. Ruined plants were reconstructed, new ones built and farm lands were considerably expanded.

Compared with 1940, the total industrial *Continued on page 38*

Latvian-made electric trains are used throughout the Soviet Union. The republic also produces radio and telephone equipment, textiles and furniture.

Farmers of Latvia have always raised fine pigs. Here Jan Zarins, a Riga packing plant worker, examines porkers' carcasses to be cured for bacon.





THOUSANDS OF RESIDENTS OF RIGA SPEND THEIR SUMMER HOLIDAYS AT THE SEASHORE. THE FAMOUS BEACHES RUN SOME TWENTY MILES AND MAY BE QUICKLY REACHED BY TRAIN.

A scene from Andrei Upit's play *Green Earth* on a Riga stage. There are ten legitimate theaters in Latvia for opera, ballet, drama and comedy.



When Latvia joined the Soviet Union, some 11 per cent of its population could neither read nor write. Today the republic has universal literacy.



## LATVIA TODAY *Continued*

output of Latvia has increased eight times over. In certain areas—machine building and metal working are examples—the growth has been phenomenal, a 42-fold increase. Many industries new to Latvia have been developed.

In pre-Soviet Latvia the major branch of the economy was light industry. Now it is principally machine building and electro-technical industries, and the chemical industry producing fertilizers, plastics and artificial fiber.

Latvian industry is an integral part of the entire country's economy, and it has profited greatly from cooperative relations with the other Soviet Republics. It gets coal from the Ukraine's Donbas, oil from Bashkiria, cotton from the Central Asian Republics, materials for its machine-building plants from the Urals, industrial equipment, farm machinery and consumer goods from Moscow, Leningrad and other manufacturing centers of the country.

While expanding the basic industries, Latvia has developed a definite specialization. One of the main lines is the manufacture of

railway cars, including electric trains for suburban lines. Both are now widely used in the rail system of the Soviet Union.

Another important specialization is radio and telephone equipment for the domestic market as well as for export. Many of the hydropower stations in Byelorussia, Moldavia and Georgia are equipped with turbines manufactured in Latvia, and Latvian-made electric motors can be found both in industry and agriculture in every part of the country.

Latvian factories have won nationwide recognition for such consumer goods as furniture, textiles and footwear. Latvia is also famed for its bacon, dairy products, canned and smoked fish. And there are people who think that the best candies in the world are produced by the Laima factory in Riga.

### Collective Farming

Large-scale agriculture with its attendant benefits of farm mechanization was made possible only after Latvian peasants decided to work collectively. Twenty years ago a tractor was something a peasant traveled miles just to see. Now all field work on col-

lective farms is done by tractor. The difference can be measured in crop and livestock yields.

On lean, boggy soil Latvian farmers have developed large-scale dairy farming and hog breeding. The Latvian brown cow is a breed famous for its high milk yield with rich butterfat content. Milk production throughout the republic has increased by 24 per cent in the past two years, and the average yield for grain crops has increased by 3.5 to 4 bushels per acre.

Reclamation of bog land by pipe drainage has been receiving concentrated attention. In the past two years almost 100,000 acres were drained—as much acreage as had been drained in the 40-year period of 1900-1940. At present, reclamation work is in progress on another 170,000 acres.

For 18 years now Latvia has been governed by its own people, the average citizen, and the republic's economic and cultural development during this time fills the Latvians with pride. They believe they have done a good job and look forward to even greater successes in the future, secure in the knowledge that they hold the key to a better life in their own hands. ■

AMATEUR ART GROUPS NUMBERING 3,000 IN LATVIA HAVE A MEMBERSHIP OF ABOVE 100,000. THE BEST GROUPS APPEAR IN LATVIAN ART AND LITERATURE FESTIVALS.



# RIGA

## Latvian Capital

By Jan Vanag

**R**IGA is an old city, one of the oldest in Europe, but it has been growing younger with each day, especially in recent years. Since the time Latvia joined the USSR, the new Soviet Republic began to reshape its capital to meet the growing needs of the city's population of 565,000.

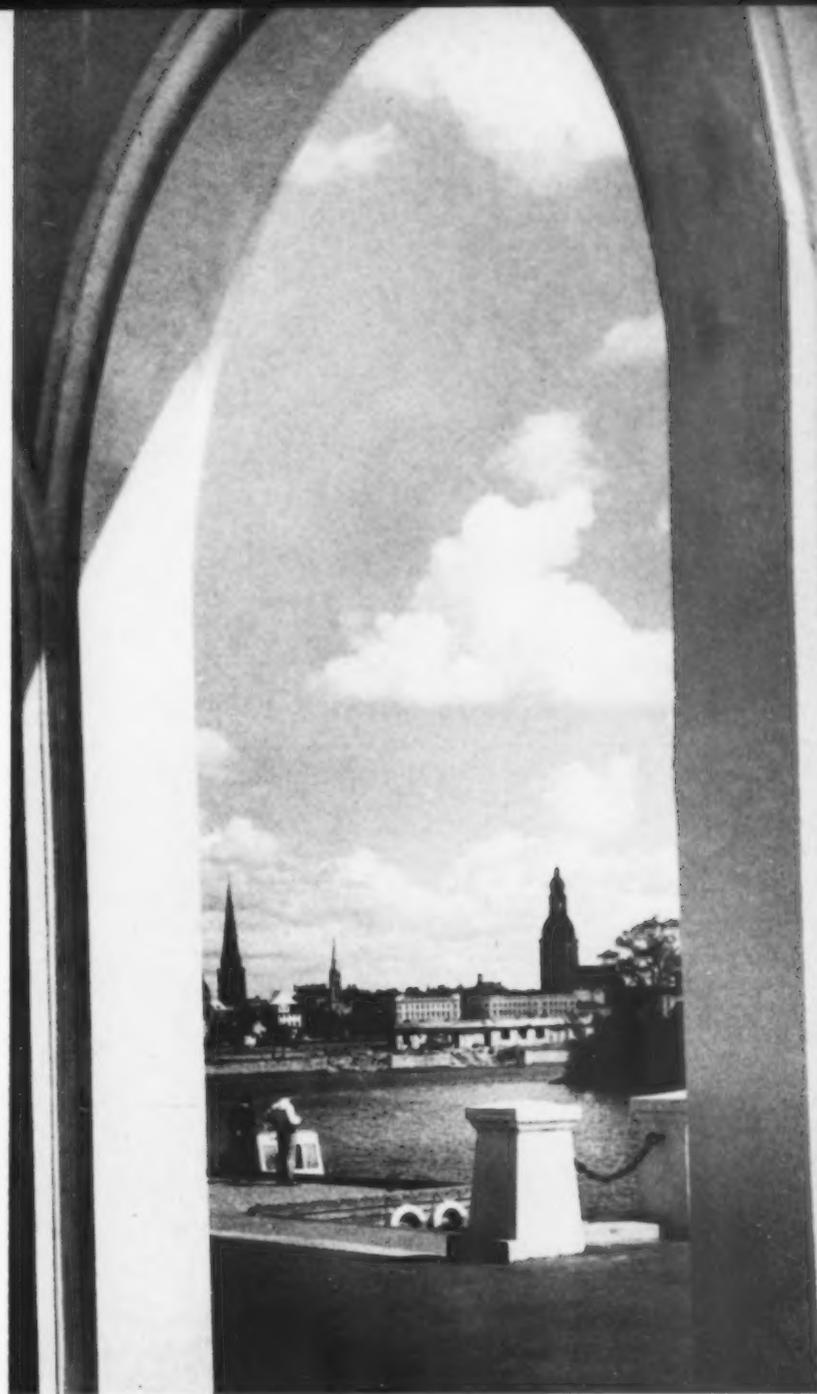
This is a city where straight avenues alternate with crooked lanes and modern buildings shoulder ancient houses with gabled roofs. The history of the Latvian capital can be traced by the many medieval structures concentrated mostly in what is known as Old Riga, a part of the city adjacent to the Daugava River. The farther you go from the river, the more modern are the streets.

The landmarks of the city's latest history are new apartment houses and public buildings. Some were finished in postwar years and many are still under construction. In 1958 the amount of new housing will have more than doubled the number of apartments built last year. Just outside the city proper are one-family cottages built by industrial workers on streets so new that some of them have not yet been named.

But with all this new construction, the century-old landmarks, the graceful cathedrals and splendid castles, are carefully preserved. They tower over the silvered surface of the Daugava River, with its new embankment and bridge designed to blend harmoniously with the old Gothic architecture. Part of the city skyline as viewed from the river front is the tall building of the Palace of Science built recently to house the Latvian Academy of Sciences.

Riga's green boulevards and shady parks give portions of the city an almost rural air. It is a rare square that does not have its flocks of pigeons. They are almost a tradition in Riga, but recently the black and white swans on the canal, new feathered additions to the city's attractions, have been stealing the show. *Continued on next page*

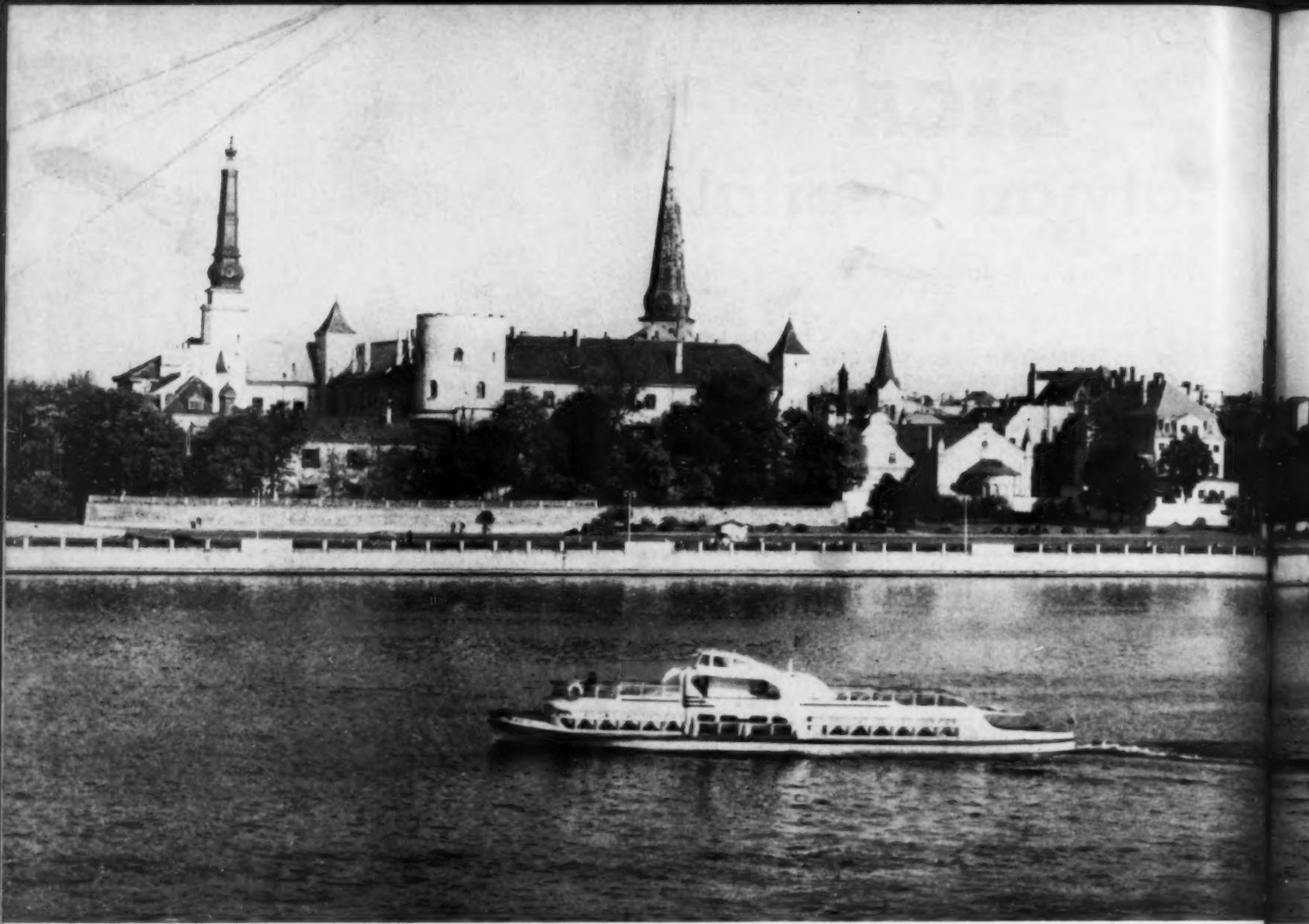
FREIGHTERS FROM SOME FIFTY COUNTRIES DOCK AT RIGA'S WHARVES ANNUALLY.



THE CAPITAL OF LATVIA IS AMONG EUROPE'S OLDEST CITIES AND A BUSY PORT.

THIS THEATER IN RIGA IS HOME OF LATVIA'S BEST OPERA AND BALLET COMPANIES.





THE SKYLINE OF RIGA AS SEEN FROM THE DAUGAVA RIVER INCLUDES BLOCKS OF MODERN APARTMENT HOUSES ALONG WITH THE DOMES OF ANCIENT CATHEDRALS AND CASTLES.

## **RIGA** *Continued*

THE CITY'S BIG SPORTS STADIUM IS USUALLY PACKED WITH ATHLETES AND FANS.



A characteristic feature of postwar Riga is its rapid industrial development. More than thirty new plants have been built within the past few years and many old ones have been expanded and modernized. As a result, whole new industrial sections have grown up on the city's outskirts.

As new plants are constructed, residential communities with every convenience of a modern city are built around them to accommodate the workers. From the very beginning trees, shrubs and landscaping plans are as carefully thought out as the weight loads of the foundations and rafters of the structures. Electric trains and highways connect the suburbs with the city, and the residents are within easy reach of downtown Riga while enjoying all the beauties of life in the countryside.

One of the new communities is built around the big Electrical Machinery Plant which stands on the ruins left by the Nazi invaders after they retreated from the city. This is a modern plant manufacturing electric motors and other equipment for domestic use and for export sale. Its neighbor is a diesel engine plant completed in 1950. Although it is also a relatively new plant, its trade mark is known at home and abroad.

Riga's electrotechnical plant VEF, famous throughout the Soviet Union and many foreign countries for its excellent radio sets and telephone equipment, was likewise rebuilt on the rubble left by Nazi destruction. This big modern and thoroughly equipped plant in no way resembles the small workshops which existed before the war. The same radical transformation characterizes the postwar expansion of the plant producing railway cars, the shipyards, textile mills and shoe factories.

Riga today produces many goods which were never before listed in the catalogues of its factories. Among them are electric trains and streetcars, turbines and marine tugboats, grab cranes and mobile electric



power plants. Also new is the production of synthetic fibers and plastics which are used on a growing scale in manufacturing a variety of products, ranging from women's stockings to children's toys. Riga's 2,500 exhibits on view at the World's Fair in Brussels offer only a small sampling of the rapidly developing potential of Latvian industry.

Riga is a busy seaport, with merchant ships flying as many as 45 to 50 foreign flags moored at its docks within a single shipping season. Goods from many parts of the Soviet Union arrive here in an endless stream for shipment abroad. In reverse direction, cargoes of all kinds pass through the port of Riga marked for a long list of Soviet cities.

Riga has an active and stimulating cultural life. Its theaters are immensely popular, rarely playing to less than full houses and standing room audiences. There are drama theaters, a theater for musical comedies and operettas, a children's theater, puppet theater, the Latvian Opera and Ballet Theater and a Philharmonic Symphony Society.

Performances are given in Moscow, Leningrad and other cities by traveling casts from Riga's theaters, and guest performances are regularly offered by visiting troupes from other republics. For those who prefer their entertainment at home, Riga has a TV center that devotes a large portion of its broadcast program to dramatic productions.

The people of Riga, friendly and hospitable, welcome visitors both from other republics of the Soviet Union and from abroad. They love their city and are justly proud of its neat, green appearance. They are also proud of the famous bathing beaches, some 20 minutes from the city's center by electric train. Vacation and health resorts, stretching for 20 miles along the seacoast, attract people from every corner of the country.

The new and yet old capital of Latvia wants more visitors to see its beauties, get to know its life and become friends with its citizens. ■

RIGA MEDICAL STUDENTS. LATVIA HAS TWICE AS MANY DOCTORS AS IN 1940.



# LATVIAN FISHERMEN



COOPERATIVES LIKE THE RED BEACON HAVE CHANGED FISHING INTO A LUCRATIVE OCCUPATION FOR LATVIANS, WHO HAVE AN OLD REPUTATION FOR BEING GOOD FISHERMEN.

Arvid Anderson and other Red Beacon fishermen use motor vessels and modern gear. The days of dangerous open boats are just a dimming memory.



The most common Baltic fish are sprats, cod, flounder and salmon. These fishermen display salmon caught by their cooperative's fleet.





Arvid with his friends. The Baltic gives their coop an annual income of above twelve million rubles.



Fleet leader Janis Steinberg and skipper Arvid Anderson chart the course for their next trip out to sea.

After spending long days on the open sea, Arvid is eager to return to his family with a present for his little daughter, Anita.



Traditional good-bye to a fisherman. "Have a safe trip and come home soon," says Arvid's wife.



Secondary school No. 7 in Tallinn, like all the schools of Estonia, has domestic science courses.

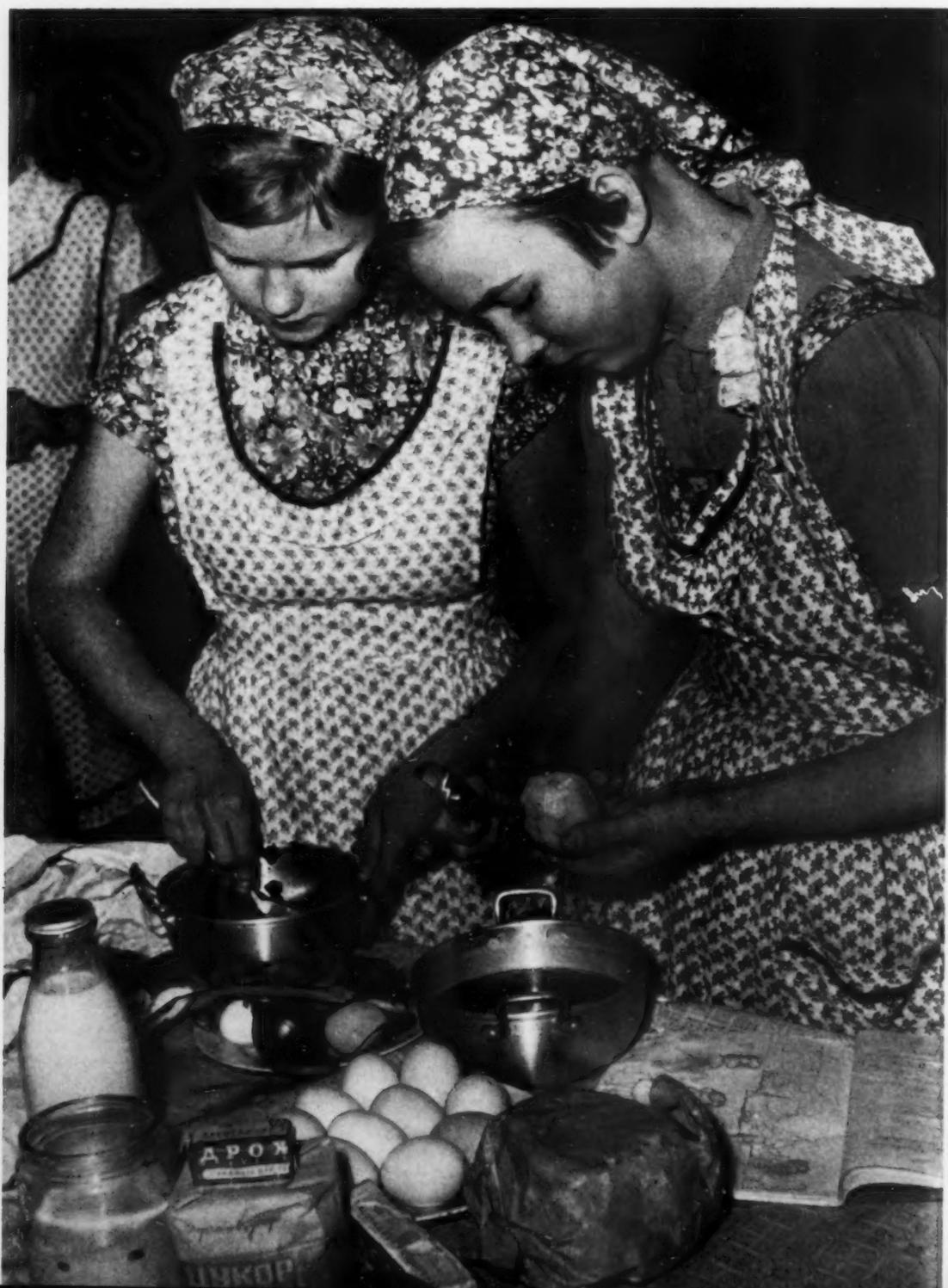
By Nina Khrabrova

FOR two hours a week the girls of the seventh grade of High School No. 7 in Tallinn, capital of Estonia, "adopt" a family of four or five—their classmates—and learn how to feed and care for its home needs. They take turns at being the mother and mother's helpers. Here is a family where no one escapes her rightful share of responsibilities.

All of Estonia's schools have introduced domestic science as a required course. The youngest pupils begin by working with paper, modeling clay, cardboard and needle and thread in the lower grades of elementary school. In the fifth grade the girls, as well as the boys, are taught to work with metal and wire. The boys then go on to workshop courses and the girls to housekeeping courses.

The future housewife learns how to knit and embroider, sew aprons, pillow cases and other simple things. In the seventh grade the girls are taught how to shop for food, cook and set the table, how to furnish a comfortable home and keep it clean.

## DOMESTIC SCIENCE CLASSES IN SC



Twice a week these girls become "housewives" and feed a "family."

From the eighth grade until the young miss completes her high school course, she learns to prepare more difficult dishes and make clothes. She is also instructed in the care of clothes and shoes, in proper laundering and ironing methods of various fabrics and in simple gardening techniques.

This is not training for a housekeeping career. The girls all have more ambitious plans for the future. But each one also dreams of a family of her own some day, and the many skills learned in the school's domestic science classes will help her slip into the role of wife and mother naturally, with understanding and ease. ■

## INSOVIET SCHOOLS



Ulve Samm, who is the domestic arts teacher in charge of the culinary department, keeps her eye on her charges as they mix and blend dishes for lunch.

While the girls are busy whipping up a menu, the boys peek to find out what they will eat.



"It's rather good, but I believe you haven't added quite enough salt," Hele Johanson advises Merike Pigel after sampling a bit of her soup.

# Sketches From M

A Thousand-Mile Drive For

By Alexander Chernomordik



"Remember, old friend, *you* insisted that the luggage compartment of this car would hold everything we needed on the trip. Maybe so. But now we have to toss to see which of us shall walk to the Crimea."

Our idea was to rest awhile and drop our lines into this promising stream, but actually we stayed for most of the night. Somehow, the fish just laughed at our efforts to get something for dinner.



When we were stopped by a properly vigilant highway patrolman, I was artfully honest in face of emergency, and said: "Sorry, officer, I missed the sign."

# From My Motor Trip

Drive For A Crimean Vacation



About a hundred miles from nowhere, the motor stopped again. Gas tank and spares were empty. Gloomily, we waited hours.



Difficulties, as the old saying goes, often come in pairs. We proved this correct when the motor conked out in a village, and some enthusiastic kids shoved us to a mechanic.

We made good time to Yalta. Picking up our little car easily, a dockside crane readied us for Sochi.



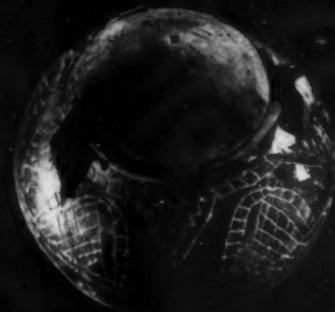
After a day's run we pitched our tent in one of the picturesque mountain tourist camps. Thus, the second phase of our vacation was off to an encouraging start.



# DIGGING UP TWENTY-FOUR CENTURIES



HEAD OF A QUEEN SCULPTURED IN CLAY.



KHOREZMIAN BOWL OF 4th CENTURY B.C.

By Sergei Tolstov

*USSR Academy of Sciences*

**F**OR twenty years our archaeological expedition has been digging up ancient Khorezm, buried for 24 centuries under desert sand, an empty dead world that was once a flourishing center of Asian civilization.

This mighty state with its towns and villages once stretched along the lower reaches of the great Amu-Darya River and on the southern coast of the Aral Sea. What data we have is fragmentary, but the fragments tell a story of feudal wars, of a country destroyed and rebuilt, of a proud people whose life was transformed and altered by successive conquests, and of a culture incredibly old. Attesting to the state's hoary age is the fact that the oasis has been called Khorezm since the first millennium before our era.

## Signposts of Ancient Civilization

In these past twenty summers our expedition of 100 archaeologists and assistants has been uncovering a chapter—perhaps one of the most revealing, certainly one of the most interesting—in all of ancient history. We have been digging up walled cities of fortresses, towers and castles, roads which once connected them, farmlands and irrigation canals long since dead.

Our expedition has been using the most modern of 20th century tools and machines to uncover these buried signposts of an ancient civilization. We use bulldozers to clear the sand and electric belt conveyors to carry it away. We use trucks and planes for our desert explorations.

From the air one can trace the outline of ancient Khorezm. These windswept low mounds that stretch for dozens of miles amidst the desert are the ancient canals that

once irrigated fields, orchards and vineyards.

Just as the civilization of ancient Egypt was built around the annual flooding of the Nile, so the Khorezm civilization was dependent on the waters of the Amu-Darya River. In times of peace Khorezm extended its system of irrigating canals and the state bloomed and prospered. In time of war the canals were destroyed and flourishing oases and farmlands reverted to the desert.

As long ago as the second millennium before our era the people of the Bronze Age strove to make use of the capricious waters of the Amu-Darya River. We found fields and small canals along the side channels of the Amu-Darya delta.

As experience accumulated and with the development of Khorezm as a state in the 7th century before our era, great trunk canals leading directly from the Amu-Darya were built. Much later, some time in the 2nd to the 4th centuries A.D., a new and much im-



CLAY WATER JUG WITH ANIMAL FIGURE.



BAS-RELIEF FIGURE CARRYING WINE JAR.



HOUSEHOLD FIGURES ON WOODEN TABLET.



ANAHIT, KHOREZM FERTILITY GODDESS.



CERAMIC GOBLET FROM A PALACE PANTRY.



FRAGMENT OF VESSEL HAS STAR DESIGN.

GRACEFUL ORNAMENTED WATER FLASK.

WARRIOR'S HEAD, 2nd CENTURY A.D.

proved type of irrigation system was in use. The trunk canals were narrower and deeper and were not connected directly with the delta channels. In the 3rd or 4th centuries A.D. the intricate and varied pattern in which the irrigated fields were laid out attests to an advanced system of farming.

The towns of ancient Khorezm were built on the branches of irrigation canals and on river banks. The later feudal stage was characterized by the construction of large walled towns. The ruins of towns, castles and fortresses built of mud brick that have withstood the ravages of time witness a remarkable knowledge of building materials and of architectural planning.

#### The Arts of Khorezm

In the last ten years our expedition has been excavating two buildings which are of prime  
*Continued on page 51*





THE FORTRESS OF KOI-KRYLGAN-KALA (TOP) AND THE PALACE OF KINGS IN TOPRAK-KALA (BELOW) WERE BURIED FOR 24 CENTURIES BY THE DESERT SANDS OF CENTRAL ASIA.







## DIGGING UP TWENTY-FOUR CENTURIES

*Continued*



WOMAN PLAYING HARP—FRAGMENT OF MURAL FROM TOPRAK-KALA PALACE.

importance in filling in our very scanty knowledge of the Khorezm culture. One is the palace in the ancient town of Toprak-Kala which we excavated in 1945-49. It dates back to the 3rd century A.D. The other is the circular fortress Koi-Krylgan-Kala, built at the end of the 4th century B.C., which we worked on from 1950 to 1957.

Among other things we found a number of flasks decorated with intricate and colorful reliefs. They picture a group of armed horsemen, a warrior with a helmet adorned by a bird's head, a mother carrying a child, a man holding a cluster of grapes and carrying a wine jug strapped to his back.

In Koi-Krylgan-Kala we found terra cotta sculpture of Anahit, the goddess of fertility; the patron god of wine, the Khorezm version of Dionysius; the mother goddess and some other Khorezm gods.

The unusual shape of Koi-Krylgan-Kala and its unique layout together with the sculptured figures we found there point to the use of the structure as a temple where the heavenly bodies were worshipped—an interesting relation here between religious worship and the material needs of the society. Khorezm needed to gather astronomical knowledge to develop its irrigation system. Dependent on the mercies of the Amu-Darya, the Khorezm people identified the river with the fertility goddess Anahit.

Toprak-Kala palace is representative of the golden age of Khorezmian painting and sculp-

ture in the early centuries of our era. In the palace we found multicolor mural paintings and monumental clay sculpture which reflect connections with Indo-Hellenic art.

Murals covered the walls of most of the rooms. One of the large ceremonial halls, a great room with a flat ceiling supported by four columns, is decorated with a mural brightly and elaborately designed. Against a background of dark yellow stripes ornamented with hearts, rosettes and leaves are musicians at their instruments. One shows a woman harp player, the oval of her face and the curve of her shoulders reproduced with great skill. The murals are quite unique and would seem to indicate that Khorezm was an important artistic center of the ancient world.

We found the sculptured clay statues in one of the halls of Toprak-Kala that must have served as a portrait gallery for a dynasty of Khorezm kings. They are done with extraordinary realism and artistic skill.

The portrait sculptures were identified by the lucky discovery of two pieces of headgear. They proved, on comparison, to be identical with the personal crowns worn by two Khorezm kings of the 3rd century A.D. which had been pictured on coins of the period.

### A Most Ancient Inscription

But where we found numerous specimens of painting and sculpture, it was many summers before we came on our first inscription. The

oldest inscription we found—oldest not only for Khorezm but for all Central Asia—is carved on a water jar and is evidently a proper name.

One of the most important of our finds was a collection of about a hundred records inscribed on leather and wood. Some of these, principally household records, are unfortunately in a poor state of preservation. The documents inscribed on leather provide dates by which we can confirm certain of our deductions. We found the collection in Toprak-Kala palace.

The town of Toprak-Kala is representative of feudal Khorezm of the 4th to 8th centuries of our era. This was the time when the irrigation network was greatly reduced as a result of the influx of nomad tribes.

Khorezm was at its zenith during the 11th to 13th centuries, when its dominance extended from the northern coast of the Caspian Sea to the Persian Gulf, and from the Caucasus to the Hindu-kush. But after the invasions of Genghis Khan and Tamerlane, it declined into the backward Kiva Khanate and remained a region altogether removed from the mainstream of modern life, until the October Socialist Revolution in 1917.

The progress made in the forty years since can be measured by the important contributions which the Uzbeks, Turkmenians and Kara-Kalpaks, the descendants of the ancient Khorezm people, have made in every area of the country's life. ■

# ESPERANTO

By Yevgeni Bokarev

Assistant Director  
Institute of Linguistics, USSR Academy of Sciences

AMONG the many artificial languages created—the list includes Volapük, Ido, Mondolingue, Kosmos, Myrana, Idiom Neutral—Esperanto is the only one which has become internationally popular. It is studied and spoken in a majority of the countries of the world.

The universal language was conceived in Warsaw 70 years ago. The first textbook was published in Russian in 1887. Two years later, Henry Phillips, secretary of the Philadelphia branch of the Esperanto Association of North America, published the first American textbook. At present dictionaries and text-

books are put out in more than 50 languages and some 100 magazines appear regularly. Esperanto is used for original and translated fiction and for technical and political literature.

The language has had many noted champions in Russia. Leo Tolstoy was highly appreciative of the value of Esperanto, and the composer Sergei Taneyev spoke actively on its behalf. Konstantin Tsiolkovsky, who formulated the theory of rocket propulsion, the physiologist Ivan Pavlov, the writer Maxim Gorky—all advocated Esperanto as an international language.

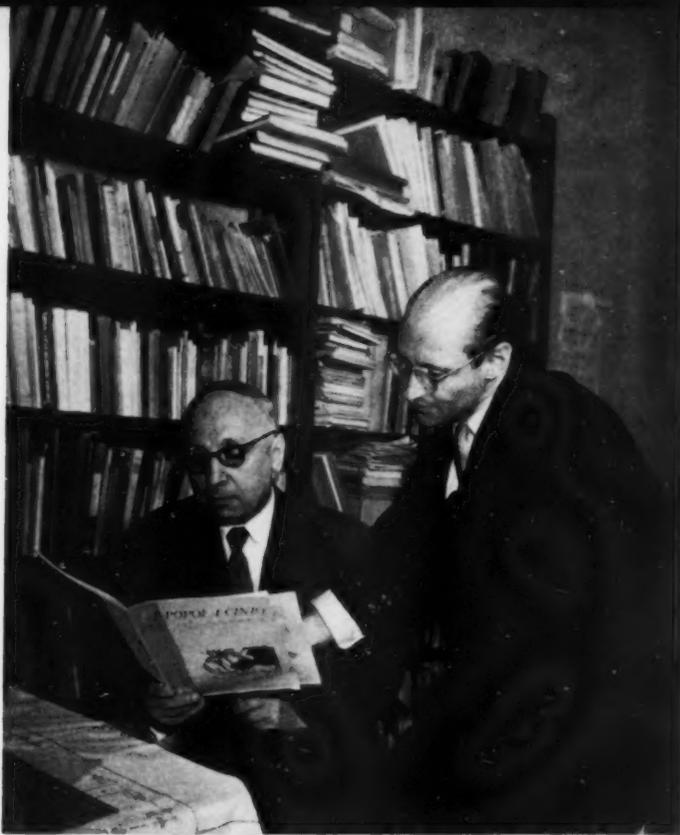
Many of the Russian classics—the fables of Krylov, the poems of Pushkin and Lermontov, the sketches and stories of Gogol, Turgenev and Chekhov—have been translated into Esperanto. Among modern writers the poems of Mayakovsky, the stories of Alexei Tolstoy and Ilya Ehrenburg and novels by Dmitri Furmanov and Mikhail Sholokhov are available in Esperanto.

One can read in Esperanto the verse of the Ukrainian poet Taras Shevchenko, the Byelorussian classic Yanka Kupala, the Latvian writer Janis Rainis, the Armenian poet Avetik Isaakyan—to cite only a few examples. In this way Soviet Esperantists acquaint their foreign colleagues with the best works in the treasury of the country's literature.

There is a rapidly growing interest in Esperanto in the Soviet Union attested by the very quick sale of a 95,000-copy edition of a textbook by Nikolai Andreyev. Esperanto dictionaries have been printed for Lithuanians and Estonians. Russian-Esperanto and Esperanto-Russian dictionaries are being prepared for publication. The new magazine *Armenian Esperantist* has a considerable following. Many clubs for the study of the international language are actively functioning in Soviet cities.

Linguists are interested in Esperanto from the theoretical point of view. The use of this artificial language on a large scale makes it possible for philologists to observe the methods by which a language develops. The vocabulary of Esperanto is constantly being added to as current needs make additions necessary, and even popular expressions have begun to be used and to circulate.

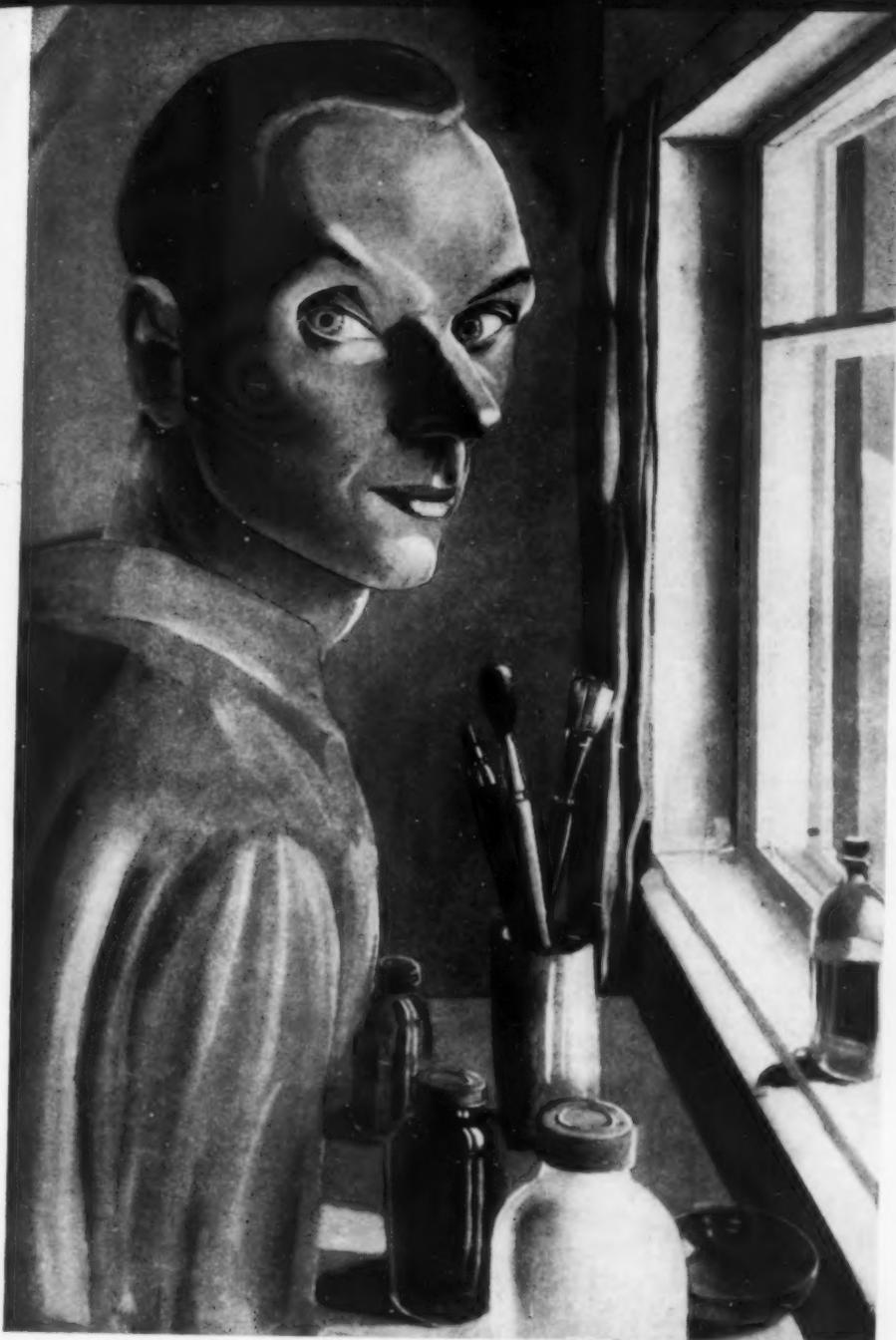
More and more, Esperanto is becoming a medium for international contact. It facilitates international communication and can be a helpful instrument in fostering understanding between nations. ■



Dr. Yevgeni Bokarev (left) and Victor Grigoryev of the Linguistics Institute are looking through a magazine that was published by Chinese Esperantists.

GROUP OF MOSCOW YOUNG PEOPLE DEVOTED TO SPREADING ESPERANTO ISSUE A PAPER IN THAT LANGUAGE.





A SELF-PORTRAIT BY NIKOLAI AKIMOV. HIS FIRST CHOICE AMONG ALL THE ARTS HAS REMAINED PAINTING.

**NIKOLAI AKIMOV** is one of many experimenters who have won for Soviet stagecraft the applause of audiences and the commendation of dramatic critics the world over for the creativity and originality of its productions. He doubles as producer and scene designer.

*Akimov was born in the Ukraine in 1901, the son of a railway office worker. The family later moved to St. Petersburg where he studied painting at the Society for the Encouragement of the Arts and at the New Art Studio.*

*Akimov the scene designer began to work in the theater in 1920, ten years sooner than Akimov the producer. His stage sets and posters are distinguished for their subtle shadings and imaginative texture. There are critics who disagree strongly with the principles underlying Akimov's work and with his insistence upon experimentation. They object to the fantasy and inordinate foreshortening of his sets and would prefer more lyricism in his painting. But whatever the disagreements, there is no denying Akimov's thorough knowledge of the theater, his talent or his originality.*

*As producer, Akimov is particularly successful with satire. This is the perfect vehicle for his exaggerated and caricatured portrayals that have the feeling of cartoons. His best productions—The Case by Sukhovo-Kobylin, Saltykov-Shchedrin's Shadows, Lope de Vega's Widow of Valencia and Dog in the Manger and Yevgeni Schwartz's Cinderella—are extraordinarily moving. They convey profound social overtones—the work of a gifted artist who will not compromise with hypocrisy and pretense.*

*In his 38 years of work in the theater Akimov has designed the sets for 200 productions and has produced 50 plays. For the past 23 years he has directed the Leningrad State Comedy Theater.*

# Pages from an Unwritten Autobiography

By **NIKOLAI AKIMOV**  
*Producer and Scene Designer*

**H**OW did I become an artist and play producer? What are my thoughts on the theater, on painting? I have had to answer these questions more than once.

When I was still a boy, my mind was firmly set on becoming a painter. And to this day painting remains my favorite among the arts. Or perhaps I should put it this way—a bad painting annoys me more than poor work in any of the other arts.

By chance, however, I began to work in the theater as a set designer. I soon found it almost impossible to work with the producers. It seemed to me that they were all wrong. I was certain I could do better.

In 1929 an old producer for whom I was designing a set showed an unprecedented degree of principle. Before the opening was announced, he told the managers of the theater that credit for the production was due more to me than to him and insisted that we be billed as joint producers. The managers conceded and my name appeared in the program as co-producer.

In 1930 I proposed my plan for a production of *Hamlet* to the then young Moscow Vakhtangov Theater. I produced the play the following year. It created something of a sensation and let loose a flood of controversial comments in the press. With the following results:

Both the critics and the public accepted me as a producer. That was good.

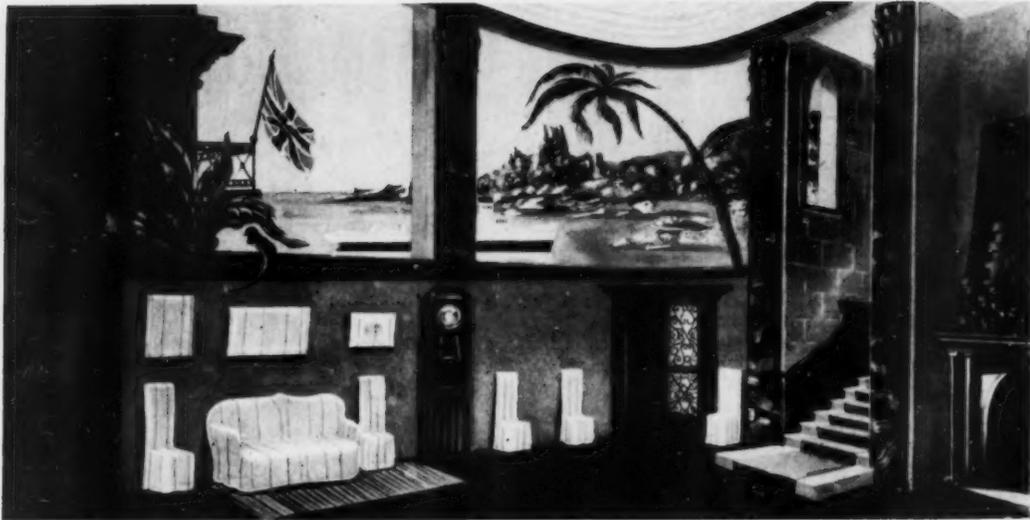
At the same time I was branded a most dangerous formalist. That was bad.

And most unexpected was the reaction of the Vakhtangov Theater managers. They decided that I was useful as a set designer but altogether impossible as a producer. That was worst of all.

Stubbornness, if nothing else, impelled me to win a place as producer whatever it cost.

The Leningrad Music Hall had decided to organize an experimental studio at that time and was willing to have me direct it. I assembled a group of young people with a leaning toward experimentation—actors who

*Continued on next page*



THE SET DESIGN FOR YEVGENI PETROV'S ISLAND OF PEACE DEMONSTRATES AKIMOV'S ABILITY TO CREATE AN ATMOSPHERE.



INTERPRETATION OF A TRIP THROUGH THE PALACE'S PICTURE GALLERY FOR THE FILM VERSION OF CINDERELLA.



COSTUME FOR ONE OF THE SISTERS IN CINDERELLA.

## Pages from an Unwritten Autobiography

*Continued*

could sing and dance, acrobats, jugglers, ballet dancers and an orchestra.

We used as basis for our production an ancient vaudeville sketch, *Doit on le Dire* by Eugene Labiche, and converted it into a luxurious musical performance. It was a success, ran in Leningrad for several months and then in Moscow.

A year later, in 1935, I was called by the director of the board of the Leningrad theaters. "We have the Comedy Theater," he told me. "It's not much of a theater. We shall probably have to close it down altogether. But we're willing to try another season if you agree to make something out of it."

I agreed.

All the young people from my experimental studio joined the Comedy Theater. Since that time I have been directing this theater almost uninterruptedly.

Audience support has been a constant source of gratification for us. We find the



AKIMOV DURING REHEARSALS IN THE LENINGRAD COMEDY THEATER, WHERE HE HAS BEEN DIRECTOR SINCE 1935. HIS LATEST WORK IS CHAIR NO. 16, A SATIRICAL COMEDY.

opinion of the spectators most important, not only their reaction to content, but to theatrical forms of production also. I am inclined to think that Soviet theater audiences were sometimes ahead of critics in approving new forms which only later were accepted by the critics.

Recently I was preparing for publication a collection of articles I had written on the theater during the past 30 years. I found that they were all based on a few fundamental ideas which I should suppose represent my artistic beliefs.

If, after close to four decades of work in the theater, I were to write a book about the principles I think are basic to art, it would be no longer than two or three pages. This is what I would write:

Art is a second language, a special language with which one can speak more eloquently and can explain more completely many very important things which cannot be

expressed adequately in ordinary language.

But there are some ideas—those dealing with science and business, for example—which are expressed with more accuracy in ordinary language. These two languages ought not to be substituted.

Every language, the language of artistic imagery included, is only a means for communicating ideas and feelings to other people. The quality of a language is determined by the accuracy and comprehensibility with which it communicates.

The quality of an art is determined by the degree to which it reflects reality in artistic imagery. The content must rule the form.

If the audience has felt and understood everything that the artist set out to say, we would conclude that the artistic language—his form—has been phrased perfectly.

The artist must bring to his art some new element or quality if he is to make a contribution. There is no value in reinventing the

multiplication table. Ideas which have been repeated *ad nauseam* are rarely thrilling, even though they are put in fine language.

A living art is like a bicycle—it either rides or it falls down, it does not stand still. The academic mind which is determined to maintain the *status quo* in art inevitably makes for retrogression.

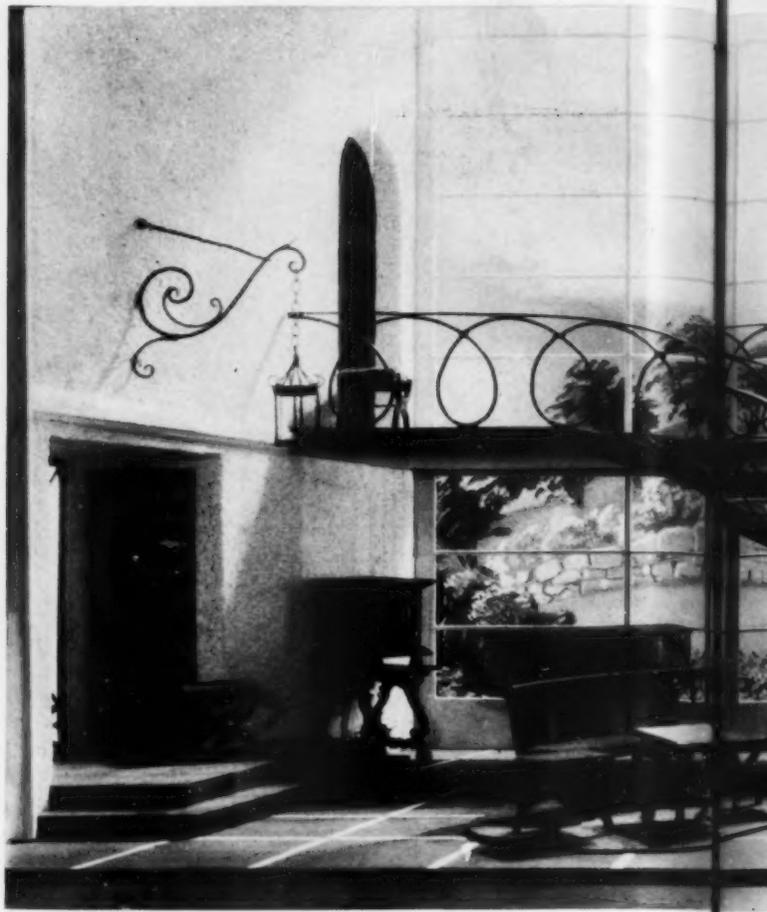
By a study of the great art traditions of the past the artist accumulates the knowledge that will help him move beyond them to create new values. But blind imitation of these traditions can produce no more than second-rate copies.

Traditional to the Soviet theater is experiment with substance and form. This tradition is characteristic of the Soviet theater today. Experimentation is made possible by virtue of public ownership of all theaters and by state subsidies which the theater regularly receives. An unsuccessful theater experiment does not

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THE LISBON EARTHQUAKE—AN ILLUSTRATION BY AKIMOV FOR VOLTAIRE'S CANDIDE.

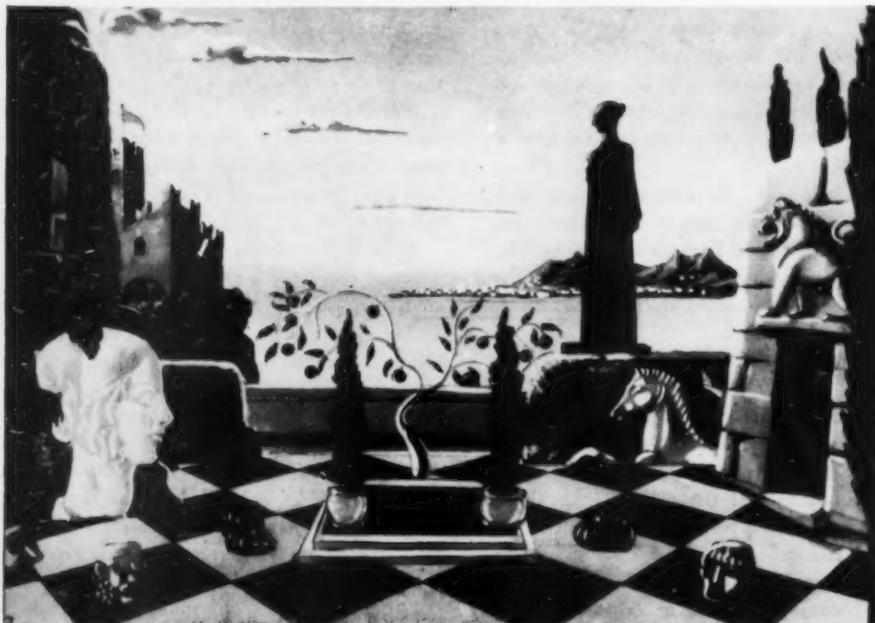


THE SET DESIGN FOR ALEXANDRO CASONA'S PLAY TREES DIE STANDING UP.

## Pages from an Unwritten Autobiography

*Continued*

THE ARTIST'S ORIGINALITY SHOWS IN THIS SET FOR YEVGENI SCHWARTZ'S PLAY, AN ORDINARY MIRACLE.



mean, therefore, the bankruptcy of the theater. This is most important.

The value of one or another creative method must be decided by the effectiveness of the production which has used it. A method becomes apparent once the artist's masterpieces are analyzed. Declarations on one or another method without masterpieces to document and to illustrate it are of small value.

It is interesting to note that importunate insistence on a particular method in art is advocated, as a rule, not by the founder but by his followers. Some of Stanislavsky's followers tried at one time to fix his method as binding upon all theater workers—to the inevitable detriment of the method. They insisted upon freezing it as a code of irrevocable and unchangeable laws in spite of the fact that Stanislavsky himself had warned against rubber-stamping and was constantly in search of new directions.

I think a study of the experience of our great producers—men like Vakhtangov, Meyerhold and Tairov—is as essential as the study of Stanislavsky. An artist must study everything that will open his eyes to new impressions, that will help him grow in his work.

My schooling in the theater was based on elements as disparate as Russian iconography of the 13th to 16th centuries, the writings of Gogol and Dostoyevsky, the works of the serf artists of the 18th and 19th centuries, the vaudeville skits of Labiche, the heritage of Corneille, Voltaire, Anatole France, Botticelli, Pinturicchio, Daumier, Van Gogh, the cartoons of French and British artists, the history of films beginning with Max Linder and fin-



AKIMOV'S POSTER FOR ALEXANDER SUKHOV-KOBYLIN'S PLAY THE CASE.

ishing with the latest Italian films shown today.

I have learned more about composition and production from all of this than I have from a basketful of theories.

There is one more element I should have added—perhaps the most important—observing life around me in all its enormous diversity. But neither these observations nor these books and pictures will be the same for some other person. Another producer will be learning from other books and pictures and will be observing other things around him that I do not.

The theater is built of two components. The first is made up of actors, producer, designer, playwright, etc. The second—which usually receives much less attention—is the audience.

A vitally important though often neglected element in the producer's art, to my way of thinking, is a close study of audience reaction after a production has been staged. One of the most fascinating aspects of the work on the production comes when changes and refinements are being made as a result of this study. There can be no greater compliment for a producer than an understanding and approving audience.

There are many naive people who think that there are ready recipes for art. There may be recipes, but they have never done anyone any good. Search and dare! New epochs bring new substance, and new substance demands new forms.

This is what I would write in the first two or three pages of my book—the rest of it I would fill with the work I have done. ■



COSTUME DESIGN FOR SALTYSKOV-SHCHEDRIN'S SHADOWS.



# Making CIRCUS STARS

By Mikhail Dolgoplov  
Photos by Georgi Petrusov

**T**HIS is where the unusual is normal, the odd is expected. Here is a group of boys and girls standing on their heads. Above, a young girl dangles head first from a frail trapeze. Below, and off to one side there's a young man in front of a large mirror. He squints as he daubs his chalk-white face with curious lines and spots of bright color. And sounding over all comes the raucous blare of trombones blasting through closed doors.

This is the Circus School in Moscow. Everything that would seem out of place in the customary art school is absolutely approved and normal here, and perhaps even a part of the regular curriculum.

As we moved into the training ring, we saw a large, highly polished table in its center. Three boys in eccentric costumes, Victor Féroni, Victor Tolkachov and Yuri Lyubimov, were putting the finishing touches to their diploma number for the graduation exams. Their teacher, Nikolai Bauman, an accomplished circus acrobat and juggler, was looking on.

The future artists went through their comedy juggling act. Tossing their clubs nonchalantly, two jumped up on the table over which a cloth had been thrown. Immediately the third performer jerked it from under them and they went crashing to the floor. A comic quarrel followed, but they soon made up and resumed exercising with the clubs. Then one of the performers "accidentally"

pushes his partner, starting another melee.

At this point the teacher stepped in and stopped them. He demanded more grace and greater speed in their tossing the twirling clubs.

A trapeze was next lowered from the rafters of the circus building. Two young blondes linked arms and legs in an aerial act, wheeling around the trapeze in lithesome slow-motion. Beneath them, a third blonde stood watching. All three looked amazingly alike.

"Those are our triplets—Vera, Nadezhda, and Lyubov Podlesnykh," we were advised by their teacher, Georgi Arkatov. "They're sophomores and very capable girls. I'm going to stage an aerial number for them, in which each will do independent figures on her own trapeze."

Every available spot in the arena and foyer was the scene of action as training groups worked out at an exciting pace.

Most of these young people had come to the Circus School from various sports societies. And here, under the friendly guidance of experienced teachers, all famous circus performers of the past, they are being taught to become acrobats, gymnasts, jugglers, high-wire artists, clowns, eccentric musicians and dancers.

This school counts among its many famous graduates the popular comedians Karandash (Pencil), the thin clown whose real name is Mikhail Rumyantsev, and another stellar

clown Oleg Popov, who has been highly acclaimed not only at home, but in Britain and other countries. And there are also the Bubnov sisters, whose aerial performances and gymnastic skill has won them world fame.

The course of study, we found, is four years. The first two are devoted to training in acrobatics, gymnastics, juggling and equilibristics. During the third year the student turns to specializing in the type of performance for which he has shown the most inclination. In the senior year he prepares for his final examination with the teacher's aid.

The teacher is assisted by a stage director, costume designer, composer and sometimes an engineer. The student then demonstrates his diploma number, prepared completely at the school's expense, including costly technical equipment and sets.

There is a good deal of friendly competition between the students in the various "courses," and along with it comes a spirit of helpfulness in which the students themselves suggest improvements in acts and generally cooperate with one another. Additionally the great stars of the circus drop in frequently to lend a hand with the novices, to encourage them in their circus studies.

Over and above the special circus course, all students take the subjects which are taught in general schools, such as the Russian language, mathematics, physics, biology, geogra-

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INNA BOGATAYA, SENIOR, WILL SOON BE AN AERIAL GYMNAST.



ANATOLI AND BORIS SHULYAKOVSKY LEARN BALANCING FROM TEACHER SERGEI CHEBULOV.

NOVICE ACROBATS PRACTICE INTRICATE BALANCING WITH THE TOP MAN PROTECTED BY A SAFETY BELT.

TRAINING COURSES IN ACROBATICS ARE VARIED.



10/2/32

# Making

## CIRCUS STARS

phy, history and literature. The school also offers courses in the fine arts, stagecraft, make-up and classical dancing. Thus trained, the circus performers graduate as persons intelligent of mind, plastic and graceful of body.

All circus school students receive state scholarships or stipends, the size of which depends upon their progress, and all tuition is free.

There are always plenty of jobs waiting for the students as soon as they graduate. Soyuetsirk, the National Association of Circuses, is a clearing house for the profession. It obtains acts for circuses and jobs for performers, obviating the need for agents.

When a graduate joins a circus, he receives payment on the same basis as all other performers—it depends only on the originality, difficulty and attractiveness of his number. As his skill improves and he becomes more inventive, he is paid more.

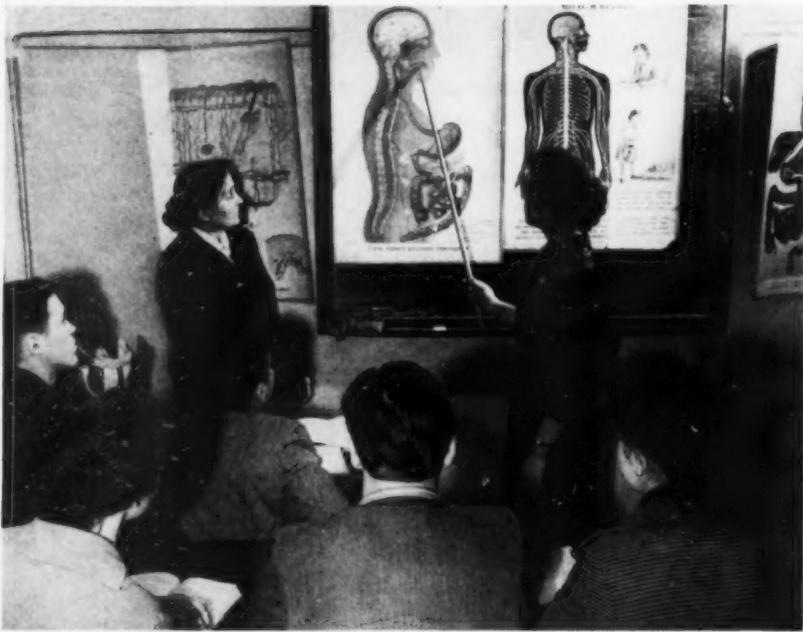
There are 51 stationary circuses in the Soviet Union along with 15 traveling tent circuses. The latter visit more than 150 cities each year, moving across the country and winding up their season in November. In addition to these, there are more than 50 traveling circus companies that perform on variety theater stages. They appear in small towns and collective farms. Altogether the Soviet circus gives tens of thousands of performances every year and is viewed by some thirty million spectators.

Soviet circus performers are also frequently seen abroad. During the past spring alone they did their acts in France, Sweden, Rumania, Czechoslovakia, the United Arab Republic, Belgium and Japan.

PROPER HAND-STAND FORM IS SHOWN A BEGINNER.



FIRST-YEAR CIRCUS STUDENTS LEARN THAT PHYSICS IS A REQUIRED COURSE.



FUTURE STARS ARE GIVEN AN ANATOMY COURSE AS A BASIC PART OF CIRCUS WORK STUDIES.

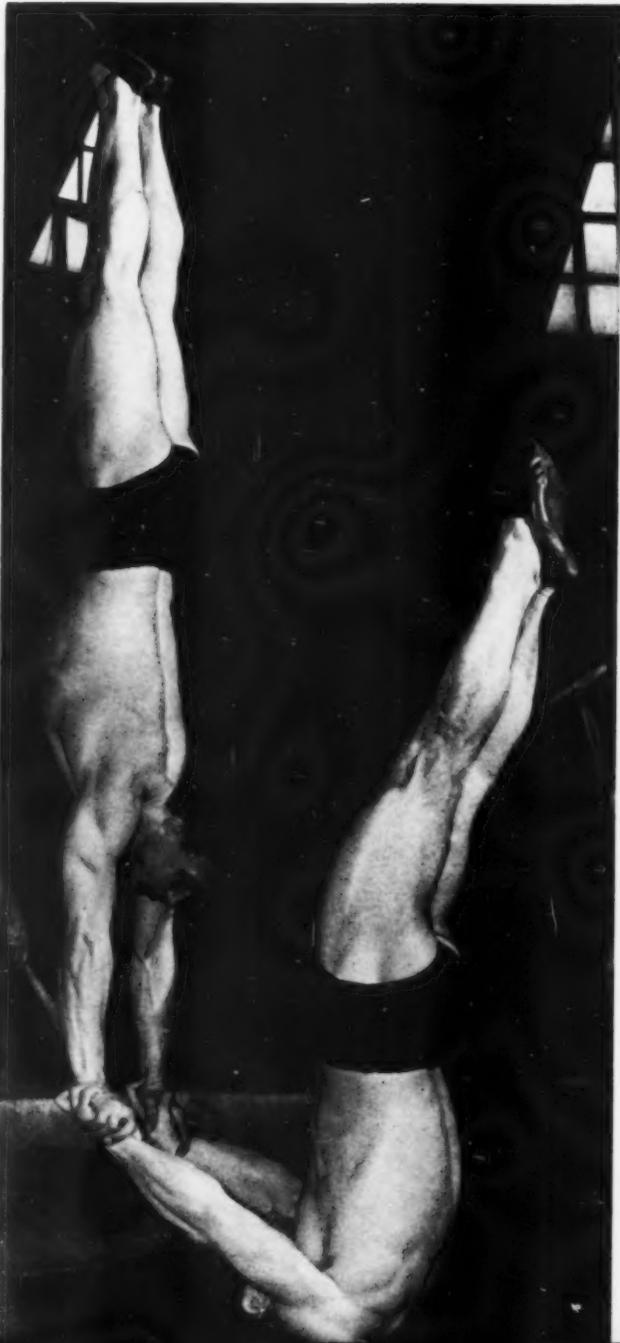
AS A JUNIOR, SVETLANA MOROZOVA IS NOW WELL-VERSED IN WORLD HISTORY.





JUGGLING FUNDAMENTALS ARE DEMONSTRATED HERE BY FIRST-YEAR BOYS.

ACROBATS YURI WOLFSON AND STANISLAV SHABUNIN DO A SPECIALTY ACT.



SENIOR TATYANA VASILYEVA IS TIMED IN DOING A PERFECT TIGHTROPE SPLIT.

TEACHER LEONID LEMPert WATCHES VICTOR ROZHKOV MAKE UP AS ZOOT SUITER.



# VOCATIONAL SCHOOL SPORTS SOCIETY



600,000 ATHLETES  
WITH THE EMBLEM OF  
THE LABOR RESERVES



NOW 15 YEARS OLD, THE SOCIETY IS AMONG NATION'S BEST.

By Yuri Aratyunyan

QUITE like young people in other countries, Soviet boys and girls are intensely sports-minded. Every village, town and city has one or more sports clubs devoted to the needs of youthful athletes and providing them with equipment, facilities and coaching in various sports.

One of the largest sports societies in the Soviet Union concentrates its activities within the country's vocational school system and is known as *Trudoviye Rezervy*, or Labor Reserves in English. Generally its members and sports fans call it *TR*.

In stadiums and on sports fields throughout the country you can always see young athletes whose jerseys bear the white gear-wheel emblem of the society with the letters *TR*. Among them are novices as well as champions.



ANNUAL COMPETITIONS OF THE SOCIETY PRODUCE MANY STARS, SOME FOR THE NATIONAL TEAMS.

It was fifteen years ago, during one of the big sports competitions, that the attention of the spectators was first attracted by young athletes entering the grounds under the emblem *TR*. It was an unknown group until the announcement came over the public address system that the newcomers represented the Labor Reserves Sports Society which had been formed earlier that season.

As time passed *TR* grew in membership and prestige. Today it is the largest and most popular society of its kind in the nation. Although many champions have emerged from its ranks, the principal purpose of the society is physical development of young people studying in vocational schools, to improve their health and build stronger bodies.

The society today has a membership of 600,000. It operates 3,605 basketball and 1,780 volleyball courts along with 591 soccer fields and 1,180 gymnasiums. It also has 104 stadiums and 49 big swimming pools. There is an indoor aquatic station with three swimming pools to be dedicated by *TR* in Moscow later this year. It will be one of the largest of its type on the continent. And within the next year or two, dozens of other sports establishments will be completed in Moscow and elsewhere in the country.

The mass exhibitions of the Labor Reserves Sports Society are an attraction enjoyed by

all who appreciate health, strength and beauty. They look something like this:

At one moment the center of the huge, packed stadium is empty. Then the blue and white banners with *TR* across the gear-wheel appear at the gate leading to the field. Wide streams of young athletes flow onto the field, led by a girls' band playing fanfares. Making a circle in center field, they sound the signal for the participants to begin.

There are many hundreds of boys and girls in formation. The light blue dresses of the girls and the richly bronzed bodies of the youths make an unforgettable sight.

The gymnasts perform many kinds of intricate designs on the field—there is a bed of living flowers aglow with color, next a constellation of stars in whose rays acrobats are performing. The display is a veritable personification of youth itself.

When the society holds its national championship meets in any single sport, the contestants include hundreds of first-class masters, many of whom are champions and record holders of the Soviet Union, of Europe and the world. And in most cases each of them won his first athletic crown as a member of his vocational school team.

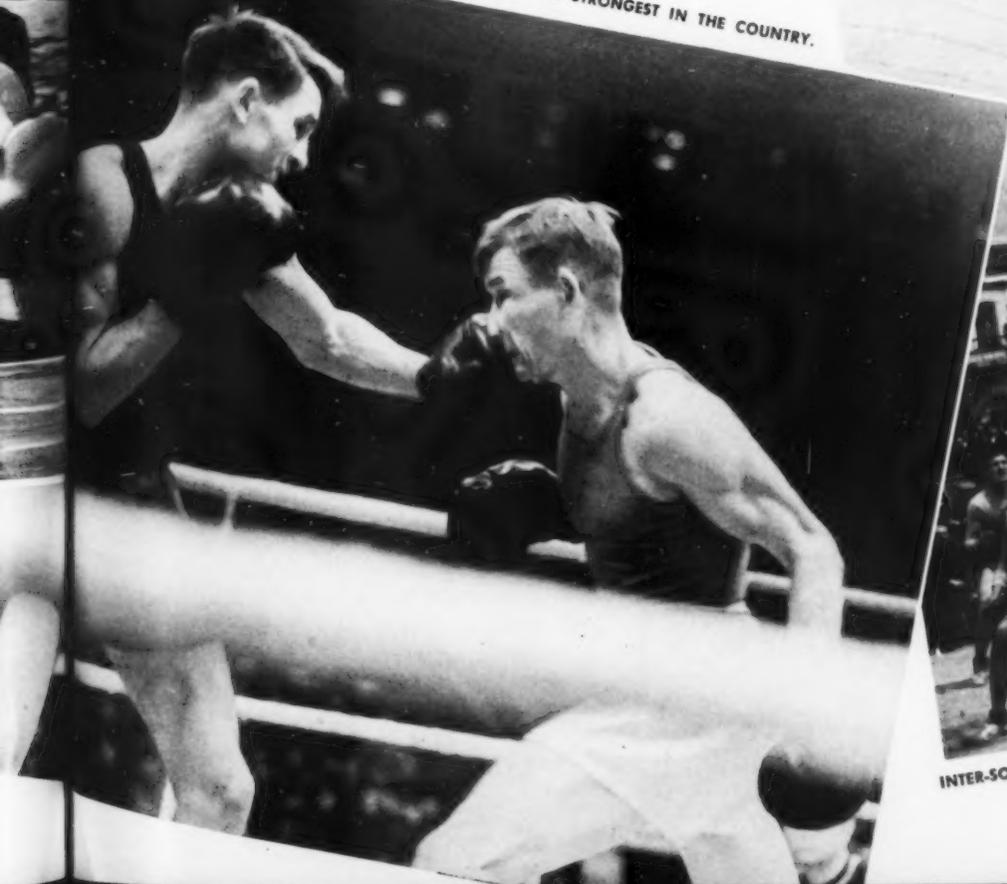
That is precisely the way Vladimir Engibaryan, twice named European boxing champion and an Olympic title-holder in the light-

weight division, began his sports career in his native Yerevan. Many still recall Engibaryan's clash in Melbourne with the then European champion, the Polish boxer Drogosh. In the opening round the Soviet boxer loosed his favorite blow, a sharp left hook that sent his opponent to the canvas. Although the remainder of the bout was about even, Engibaryan's early advantage won him the decision.

Another brilliant success was scored by Nikolai Solovyov, graduate of the Leningrad Trade School of Applied Arts, in the world wrestling championship. Solovyov lost his first match with the Turkish entry, Erbas, but then went on to pin all of his opponents in the remaining encounters. In his final appearance against World Champion Fabre of Italy, he had his man down solidly in 11 minutes flat and became the first Soviet wrestler to win a gold medal.

Vladimir Struzhanov, holder of the world's record in the 400-meter swimming race; Tamara Lomova, the European women's shooting champion; the boxers Adois Tumins and Yevgeni Feofanov, champions of the Third World Youth Sports Games; Anatoli Olizarenko and Alexei Petrov, the winners of a recent international bicycle marathon race in Egypt—are all inspiring examples for *TR* youngsters. *Continued on next page*

LABOR RESERVES' BOXING SQUAD IS ONE OF THE STRONGEST IN THE COUNTRY.



INTER-SOCIETY VOLLEYBALL MEETS ARE ALWAYS DRAWING CRACK TEAMS.



Yacht club members of Riga's vocational school on a week-end outing down the Daugava River.

Labor Reserves are proud of Anatoli Olizarenko and Alexei Petrov who won the bike marathon in Egypt.

## VOCATIONAL SCHOOL SPORTS SOCIETY

*Continued*

When a member of the Labor Reserves Sports Society wins a championship in an athletic event abroad, his clubmates have a triple reason for pride—for their country, for their sports society and for the vocational school in which the new champion received his first training.

This training in sports starts with the first day of school. Every morning begins with obligatory setting-up exercises to limber up. At midday there is another five-minute physical exercise period. After classes almost all



THE SOCIETY MEMBER VLADIMIR STRUZHANOV SETS A NEW WORLD RECORD IN THE 400-METER SWIMMING RACE.

MASS EXHIBITION DRILLS BY THE LABOR RESERVES ATHLETES ALWAYS ATTRACT LARGE CROWDS TO STADIUMS.



students play volleyball, basketball or soccer, go to swimming pools or try out their skill on gymnastics apparatus. At first the youngsters are shy and perhaps a bit awkward. But under the eye of experienced coaches, the novices soon turn into good athletes.

The question most frequently asked after outlining the society's accomplishments is usually how many coaches, trainers and instructors are needed to carry out its program. Of course it requires a great many. They are trained at a special physical culture school set up by the society in Leningrad. Since its establishment twelve years ago, it has graduated 1,700 experts in various sports activities.

Each year as the vocational schools send their graduates into industry and agriculture, the sports society parts with its advanced group with a feeling of having contributed to their over-all health and well-being. And at the same time it gains a group of newcomers who join the sports activities upon enrolling in the schools. They are the challenge and the opportunity for the Labor Reserves Sports Society. ■

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