USSR

COMMUNIST PARTY CONGRESS

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HAPPY NEW YEAR!

USSR

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LENIN SPEAKING ON THE ELECTRIFICATION PROGRAM CHARTED BY THE NINTH COMMUNIST PARTY CONGRESS IN 1920 — THE CORE OF THE FIRST SOVIET ECONOMIC PLAN.

COMMUNIST PARTY CONGRESS

Landmark in the Country's Life

ALL EYES will turn to Moscow on January 27 for the opening session of the Twenty-First Congress of the Communist Party of the Soviet Union. Delegates from all Soviet Republics will represent eight million party members, people from every walk of life. They will gather to sum up the results of more than two months of nationwide discussion on the program for the country's economic development during the seven years from 1959 through 1965 and approve the target figures for this development.

Each party congress is a landmark in the life of the country and its people. All congresses since the Socialist Revolution of 1917 have had much in common—the major item on each agenda has been the welfare of the nation. And yet each congress has had its own distinguishing feature reflecting the specific tasks dictated by the different periods in the country's history.

New Tasks

In outlining the main tasks of the new seven-year plan Nikita Khrushchev, First Secretary of the Party's Central Committee, stressed that the Soviet Union has entered a new and most significant period of its development—the period of the intensive large-scale building of a communist society. This period, prepared by the previous progress in the country's economy and culture, will be the decisive stage of peaceful competition with the capitalist system, the time when the Soviet people will have fulfilled the task of overtaking the most advanced countries of the world in per capita production and achieve the world's highest living standards.

For a long time now the congress has been the big subject in every newspaper and magazine in the country, the central theme of innumer-

PARTY MEMBERS AIR THEIR VIEWS AT PRE-CONGRESS MEETINGS OF LOCAL BRANCHES.

PARTY CONGRESS

Landmark in the Country's Life

THE NEW PLAN'S TARGET FIGURES WILL SUM UP THE NATIONWIDE DISCUSSION.

able radio and television programs. Questions to be presented to the delegates have been discussed and debated endlessly at sessions large and small, at shop meetings, in farm conferences and over family dinner tables.

A congress such as this is of intimate concern to every Soviet citizen, and workers in all fields signalize its opening with new records of production and accomplishment. For Soviet people this is a congress of the party under whose leadership and guidance they have built themselves a richer present, the party that directs the construction of an even richer future.

The plans and goals adopted at previous party congresses are realities of Soviet life today. For proof one need look no further than the Twentieth Congress, held in February 1956.

The plans framed then for the expansion of the economy—industrial and agricultural production, scientific research, education and social welfare—have been translated into tangible realities. These are thousands of newly built factories, farms and housing developments, hundreds of new schools and stadiums. These are also a shorter working day without reduction in pay, lower taxes, higher pensions and longer maternity leaves for working women.

Everything for the people, everything for the man—this is the basic directive of the Communist Party of the Soviet Union.

The Party and Its Program

For the party itself the convocation of a congress is an event of primary importance since this national meeting of democratically elected delegates is the party's highest ruling body, its decisions binding upon every member.

The Communist Party of the Soviet Union is a voluntary association of like-minded people pledged to a program of common action. Its members believe in socialism as a way of life, not as a mere philosophical idea. United in program and in outlook, they are working to build a communist society in the Soviet Union.

Individual Communists are working people—in industry, agriculture, science, the arts and professions, in any other field of endeavor—who are required to be the best producers and most skilled leaders in their own shops because they are party people. As party members, they must demonstrate their right to leadership by their own deeds and their personal example.

The Communist Party is organized on a basis of democratic centralism, a principle developed by Lenin, its founder. Democratic centralism means that all guiding bodies, from the top to the bottom—from the Central Committee to the shop branch committee—are elected by secret ballot. It means that all committees must present regular reports of their work to the membership that elected them; that decisions of higher bodies are unconditionally binding upon the lower bodies; that every member, regardlesss of his position or rank, is obligated to carry out all party decisions.

These principles, in which democracy and centralism combine and supplement each other, make the party a united and mobile organization with collective leadership and at the same time stimulate the activity and initiative of its members.

Before a decision is adopted by majority vote, free and unhampered discussion, whether it relates to a simple shop problem or to a national policy, is the inalienable right of every member. This right is widely exercised and strictly enforced as is evident, for example, from the present pre-congress debates on the country's future being held at party meetings in every branch, party conferences at district and regional levels, and party conventions of all Soviet Republics.

In structure, the party may be likened to a pyramid. The leading body of each local organization is the general membership meeting. These meetings elect delegates to district and regional conferences. These conferences elect delegates to the party conventions in each of the Soviet Republics, and these in turn elect delegates to the national party congress.

How the Congress Is Organized

Party rules require that national congresses be held at least once every four years. Extraordinary congresses may be called by the Central Committee on its own initiative or at the request of as few as one-third of the total number of party members represented at the last previous congress.

DELEGATES AT THE 20th PARTY CONGRESS HELD IN 1956.

The ratio of representation is determined by the Central Committee. For this year's congress, one delegate with a deciding vote is elected to represent every 6,000 regular members of the party and one delegate with a deliberative vote to represent every 6,000 candidate members (a year's probationary period is required of candidate members before they are approved as full party members). The congress, then, is representative of the entire membership.

Since the congress is the party's highest ruling body, it is empowered to change the party rules and programs if deemed necessary. It meets to determine the tactical line of the party on basic questions of current policy; to consider reports of the party's Central Committee, the Central Auditing Commission and other central organizations; to elect the incoming Central Committee and Auditing Commission. One of the most important functions of the party congress is to work out general directives on domestic and foreign policy and to outline the program of economic and cultural development of the country.

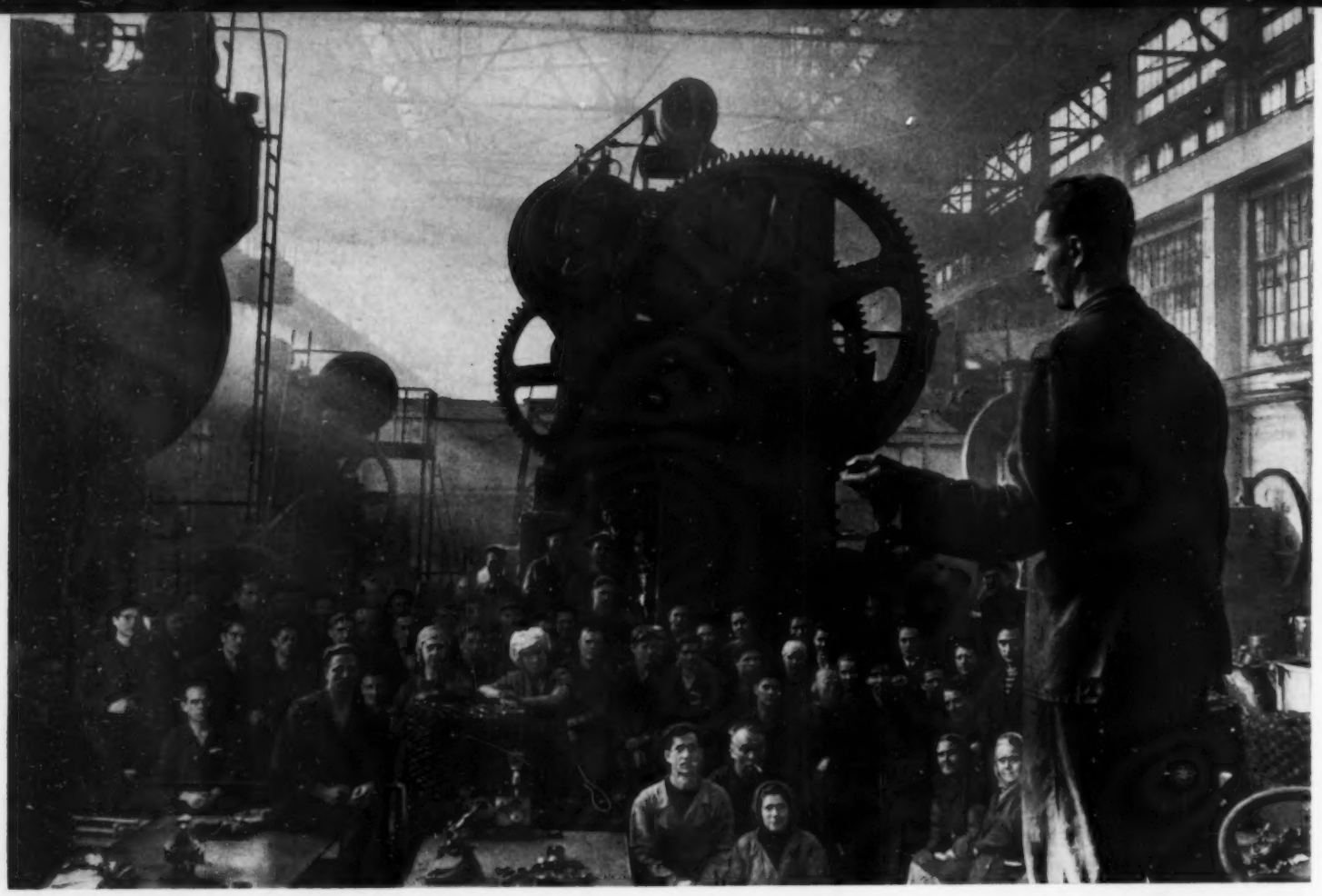
The party's Central Committee called this Extraordinary Twenty-First Congress to consider the target figures for the expansion of the national economy for the next seven years.

Nationwide Discussion

It should be noted here that Soviet economic plans are not speculative forecasts of possibilities but have the force of law, and every component of the economy is required to adhere to it. That is why the plans are drafted by the country's most competent people in each economic area and are discussed at such length and so widely before they are framed into proposals by the party congress and then into law by governmental bodies.

The seven-year plan for 1959-1960, called to life by the rapid all-round development of the Soviet economy since the Twentieth Party Congress, has been worked out, like the previous plans, with the active help of the workers at industrial establishments and local government bodies. Participation of millions of people resulted in many valuable corrections and additions to the original drafts.

Consequently, when the party congress adopts the target figures for the seven-year plan, it will be summing up the vast amount of work that has been done by all the people and will reflect in its decisions the will and interests of the entire nation.



AT MEETINGS HELD THROUGHOUT THE COUNTRY WORKERS ARE DISCUSSING THE 7-YEAR PLAN AND SUGGESTING WAYS TO MEET AND SURPASS PROPOSED TARGETS.

Target Figures for an

THE PLAN PROVIDES FOR HIGHER WAGES AND A CONTINUED DECREASE IN HOURS.

THE target figures for the 1959-1965 seven-year plan to be approved by the Twenty-First Congress of the Communist Party with the amendments suggested during the nationwide discussion envisage an accelerated development of every section of Soviet economic life—industry, construction, transport, agriculture, consumer goods production and social services. The proposed velocity of progress is based upon priority expansion of metallurgy, fuels, chemicals, energetics, machine building and all other divisions of heavy industry. This will help ensure the rapid development of the entire economy with the resulting rise in living standards.

New Geography

Coordinated into the seven-year plan are such factors as the more effective tapping of natural resources and the more serviceable distribution of industry geographically. The intent is to bring manufacturing centers closer to both raw material sources and to consuming areas.

The plan concentrates particularly upon the eastern regions of the country, those to the east of the Volga River, beyond the Urals, in Central Asia, in Siberia and in the Far East. These regions have been developing industrially at an astonishing rate.

In Siberia, Kazakhstan, Central Asia, the Urals and the lands east of Lake Baikal intensive metallurgy is being developed. Here too there are new electric power centers.

The region between the Volga and the Urals is to increase its production of natural gas and oil, and in Uzbekistan a new oil and natural gas center is growing up. The eastern territories, in particular the Cen-

THE FIGURES MEAN BUSY AND EXCITING YEARS FOR THESE CONSTRUCTION ENGINEERS.

DEBATES AND SUGGESTIONS RECEIVE COMPLETE COVERAGE.

PROPOSALS AND DISCUSSIONS RECEIVE COMPLETE COVERAGE.

an Economy of Plenty

tral Asian republics, are destined to take a leading place in the production of industrial chemicals.

In the European regions of the country the plan concentrates on ferrous metallurgy development through use of the iron ore resources of the Kursk Magnetic Anomaly and the Ukraine; on expanding nonferrous metallurgy on the Kola Peninsula; the speedier growth of the chemical industry; and improved extraction and processing of natural gas and oil in the North Caucasus and the Ukraine.

While the target figures for economic expansion in the seven years ahead will be national in scope, they will have been carefully based upon both the needs and the resources and manpower skills of each of the republics that make up the Soviet Union.

Industry to Almost Double Output

In terms of industrial output, the increase called for by the target figures by 1965 will be in the neighborhood of 80 per cent. A daring increase this would seem, but it is estimated very hard-headedly and realistically on present production and capacity potentials.

Production of steel is to be boosted within the seven-year period from 55 million to 86-91 million metric tons a year. Aluminum output calls for a 2.8-fold increase and refined copper production a 1.9-fold boost. Chemical output is to treble and oil output is to be doubled within the next seven years.

In power production the target figures predicate a very long stride toward complete electrification of the country. The output of electricity is to more than double, to reach an annual figure of 500-520 billion kilowatt-hours by the plan's completion in 1965. A part of this enormous output will come from new atomic power stations.

Unified power systems will be created in the European part of the country and in Central Siberia. Joint power systems will be completed for the Northwest and West, the Transcaucasus, Kazakhstan and Central Asia.

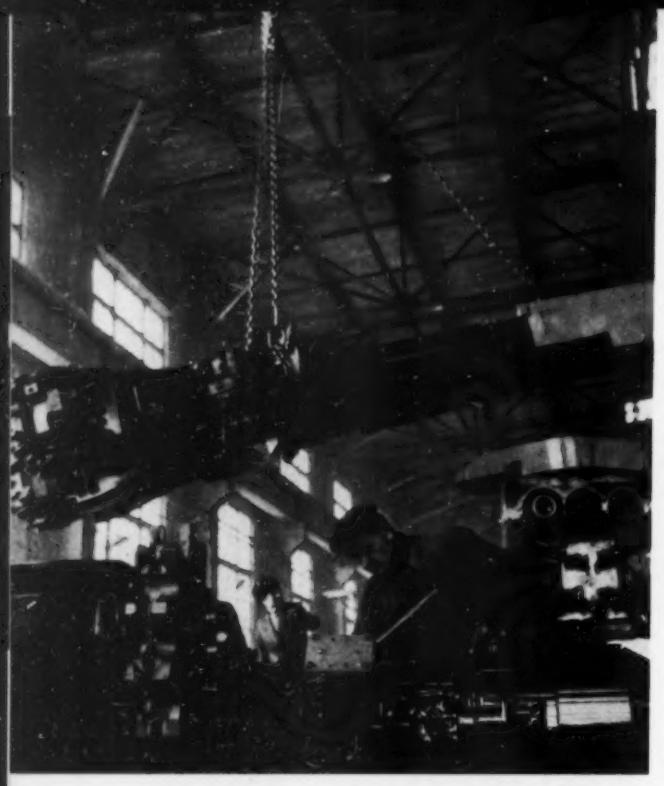
The decisive factor that will make for increased output all along the economic line will be mechanization and automation of production processes. This presupposes larger numbers of machines, machine tools and instruments. The rate of development of the engineering industry is, therefore, to be sharply increased. Its production output within the next seven years is to double.

Transport and Construction

There is to be a very radical shift in railway transport. By 1965 the amount of freight carried by electric and diesel-powered trains is to increase from the present 26 per cent to 85-87 per cent of the total freight turnover.

The length of rail to be changed over to fit electric and diesel locomotives will stretch 60,000 miles. Another 5,600 miles of new main railway track is to be constructed and another 5,000 miles of subsidiary line is to be laid.

The target figures foresee construction on a massive scale in every part of the country and particularly in the eastern regions. The capital investment to be made in 1959-1965 will be 80 per cent greater than that of the past seven years. The sum to be allocated will total close to the



MORE COAL CUTTING COMBINES WILL MAKE MINING EASIER.

AGRICULTURAL OUTPUT WILL INCREASE BY 70 PER CENT TO MEET THE COUNTRY'S GROWING DEMAND.

TARGET FIGURES

PLANNED CONSTRUCTION REQUIRES MANY NEW CEMENT PLANTS LIKE THIS ONE.

entire capital investment the country has made since the 1917 Revolution.

Aside from larger capital investment in heavy industry, the plan requires an investment of 80 to 85 billion rubles in consumer and food industries. This is almost double the amount invested during the seven years previous to the present planning period.

Construction of housing and municipal facilities is to be sharply stimulated by capital investments of 375-380 billion rubles—80 to 83 per cent more than was invested in the preceding seven years. Capital investments for construction in the field of public health and welfare, the medical industry, physical culture and sports will amount to 25.4 billion rubles—an 80 per cent increase.

Boost in Farm Output

For agriculture the target figures set a program that will require an almost 70 percent boost in total farm output. By 1965 the average acreage yield is expected to be higher than the very high figure achieved by American farm production.

The yearly output of grain is set at 165-180 million metric tons. Sugar beet production is to double its present production level of 70-78 million tons. Vegetables are to be grown in quantities sufficient to meet the total consumer need. Production of fruit and berries is to double and grape growing to quadruple.

The figures for livestock and dairy output are similarly high. Meat production is to double with a goal of 16 million tons and milk yield is to increase 1.7 to 1.8 times.

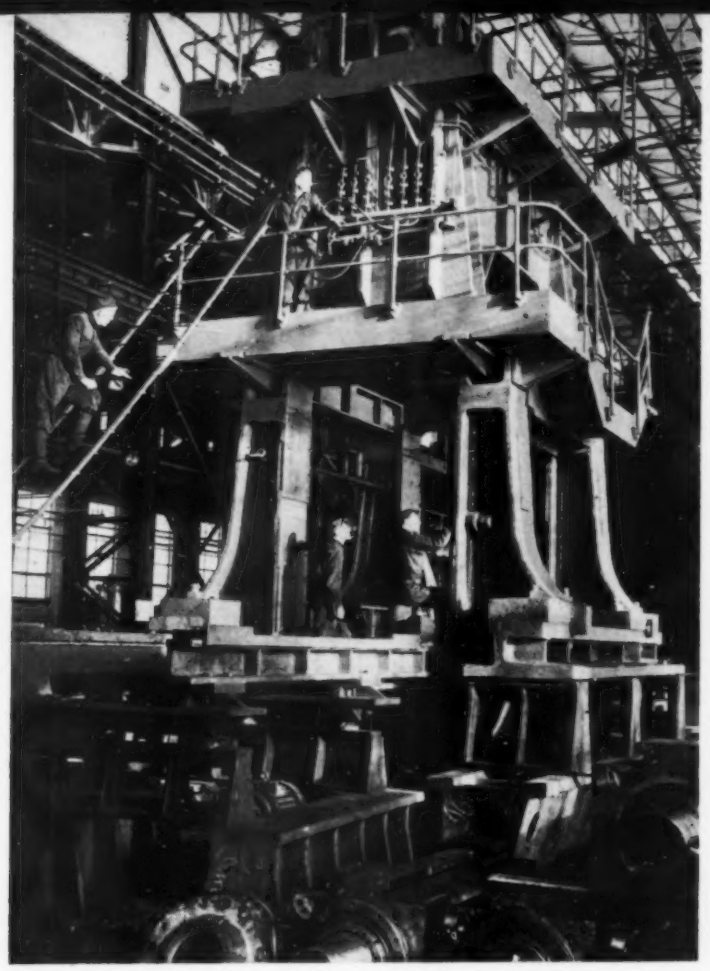
Here, too, the target figures hinge upon industrial growth. The plan for agriculture requires a larger measure of farm mechanization and electrification, and larger output of mineral and chemical fertilizers. It hinges upon large-scale irrigation of arid lands and drainage of swamp areas. It hinges upon education, since larger numbers of trained people in all the farm specializations will be needed.

Rise in Living Standards

The target figures propose new increases in production of consumer goods that will go far to create an economy of abundance. The output of the food industry is to increase 1.7-fold and that of light industries 1.5-fold.

The rate of growth envisaged for manufacture of fabrics, clothing and footwear will bring the Soviet Union very close to American levels, both in terms of total volume and per capita production. As for foodstuffs, the Soviet per capita production of a number of essentials is expected to exceed that of the world's leaders by the plan's end, and perhaps even before then.

There are to be large increases in the production and sale of household appliances—washing machines, vacuum cleaners, refrigerators and electrical appliances generally. As compared with the seven years



NEW ROLLING MILLS ARE NEEDED TO KEEP PACE WITH INDUSTRIAL ADVANCES.

just passed 5.6 times as many refrigerators are expected to be sold through retail trade, 8.8 times as many washing machines, 4.6 times as many television sets and 2.7 times as many motorcycles and motor scooters.

The target figures presume not only more consumer goods available for purchase but a larger consumer purchasing power.

The high rate of economic growth in the Soviet Union has always been accompanied by a rapid growth in national income. During the seven-year plan period it will increase by 62-65 per cent.

Under the Soviet system the entire national income is distributed in the interests of society as a whole. Approximately one-quarter of it goes directly for personal use of the people in the form of wages and social services. Three-quarters is used for further expansion of the economy and for other needs of the nation, which in the final analysis also redounds to the good of the people.

On a solid foundation of growing nationally-owned wealth the target figures for the seven-year plan visualize a vast program for a continued rise in living standards.

The real incomes of industrial and office workers and of collective farmers—the figures which actually measure incomes in terms of what they can buy—will increase by 40 per cent. The plan also provides for further boosts in wages for low and medium paid workers beyond those already instituted. Additional improvements in the pension program are planned to give larger grants to retired workers at the low end of the scale.

The changeover nationally to a seven-hour working day without reduction in wages is well on the way now and it will be general by 1960. By then, too, all underground workers in coal and ore mining will have shifted over to a six-hour working day. Beginning with 1964 there will be a gradual cut in working hours to a 35-hour five-day week, in some industries to a 30-hour week. This will also be effected without a reduction in wages.

To overcome the existing housing shortage, construction everywhere in the country is going on at an unprecedented rate. The target figures for both the budgetary allocations and the scope of the building program provide for further expansion. The 1959-1965 period will see 15 million new apartments built in towns and cities. This is 2.3 times more than were built in the past seven years. Another seven million houses are to be built in rural areas.

TO MEET POWER REQUIREMENTS MANY LARGE AND SMALL STATIONS WILL BE BUILT.

THE PLAN ACCELERATES THE BUILDING OF BIG APARTMENT PROJECTS TO PUT AN END TO HOUSING SHORTAGE.

MORE FURNITURE AND CONSUMER GOODS ARE COMING.

TARGET FIGURES

NEW FACTORIES HAVE BECOME THE HUB AROUND WHICH WHOLE CITIES ARE PLANNED

Education

Of truly great importance for the future of the Soviet Union is the proposed reform for the entire system of education to meet the growing needs of the economy and culture. Along with the nationwide discussion on the target figures for the over-all development of the country there has been a similarly wide discussion on the project to bring schools and colleges closer to the everyday practical needs of the nation.

Forecast for the seven-year plan period is a further development of education facilities for both city and country communities, and a large expansion of evening and correspondence schools.

By 1965 the number of pupils in schools will have grown from the 1958 figure of 30 million to 38-40 million. There will be a substantial increase in the numbers of people attending the vocational schools.

Some 2,300,000 graduates are expected from colleges and universities between 1959 and 1965, as compared with the 1,700,000 graduated between 1952 and 1958. There will be, in addition, no fewer than four million young people studying at the specialized secondary schools during these years.

Long-range Planning

Although the scope of the new plan presently being considered is so much larger and bolder than that of any of the previous plans, the possibilities are also enormously greater than they have ever been. Nor do Soviet planners stop at this projected plan for the seven years to come. They are already working out plans for economic and cultural development for a longer span of time.

Tentative calculations indicate that within a 15-year period the Soviet Union will be producing not its present fifth of the world's industrial goods, but closer to a third of the world's total. Measured by rate of industrial growth, the country confidently expects to overtake and exceed per capita production of the United States some five years after this present 1959-1965 plan is completed.

By the seventies, and it may be sooner, the Soviet Union will have moved to first place in both total and per capita production, a position which will provide the Soviet citizen with the highest living standard the world has ever seen.

PLANS become REALITY

By ANATOLI YEFIMOW

Director, Economic Research Institute, USSR State Planning Committee

YEAR by year the Soviet Union's growth has been charted by a master economic plan. The first of these plans was outlined in the spring of 1920, at the Ninth Congress of the Communist Party.

It was at a time when the Civil War was still raging but the outcome was already predictable. The young Red Army was pushing back the counter-revolutionary and interventionist forces on one front after another. Many of the delegates had come to the party congress in Moscow straight from the battlefields.

At Lenin's suggestion a uniform economic plan for the whole of the country was discussed. It forecast the reconstruction of the war-shattered country around an almost impossibly ambitious electrification project. Appointed to head a committee of economists, engineers and scientists who were to draw up a detailed plan was Gleb M. Krzhizhanovsky, a prominent engineer and scientist who had taken part in the revolutionary movement since the nineties.

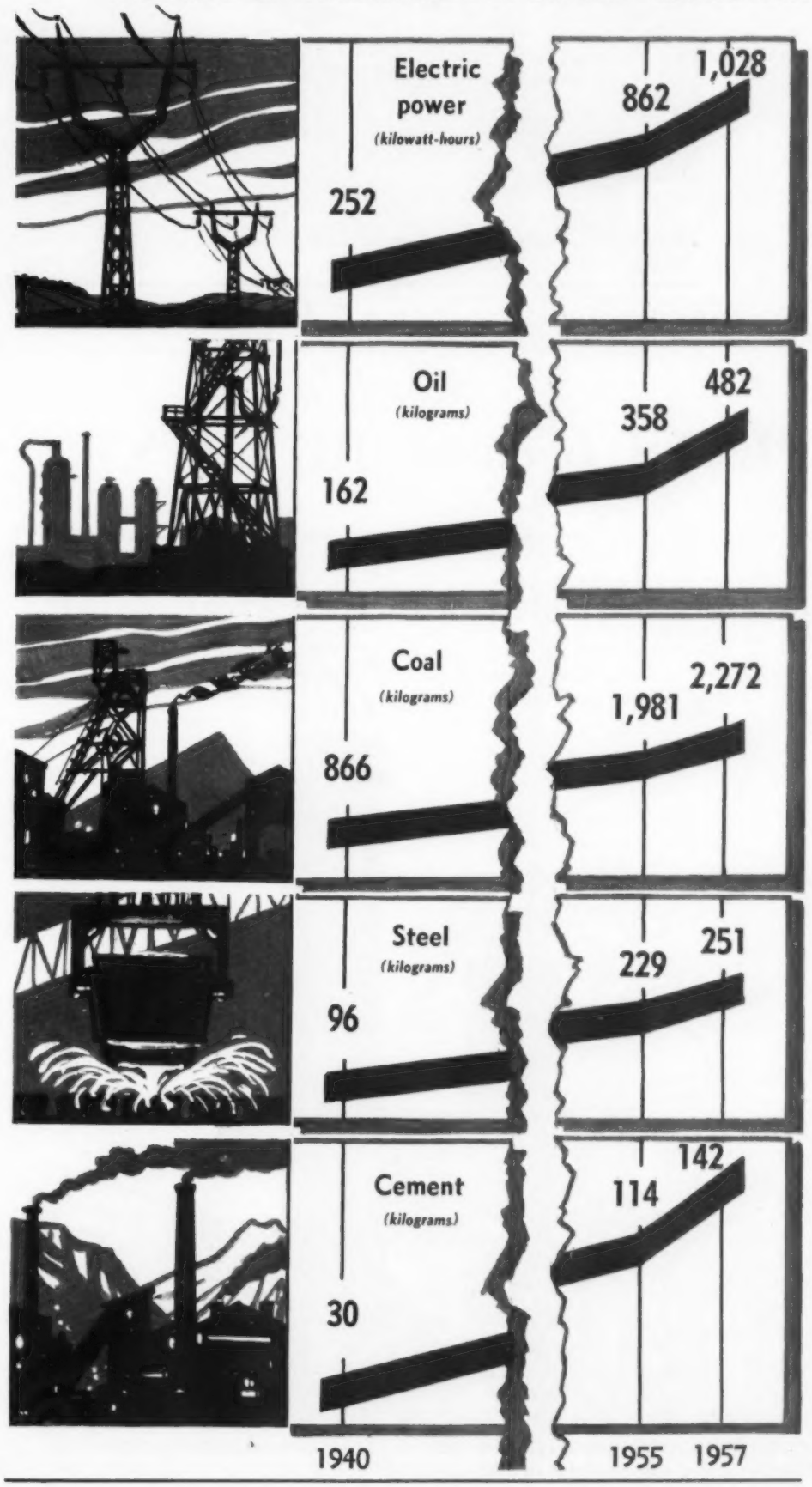
It was at the Fifteenth Congress of the Communist Party in December 1927, that the now familiar Russian word *pyatiletka—pyat* means five and *let* means years—was coined to denote the five-year plans for industrial and agricultural development by which the Soviet Union has guided its economic growth. By then the shattered economy of the country had been rebuilt and the industrialization program which Lenin had envisioned in 1920 was under way.

Five-Year Plans

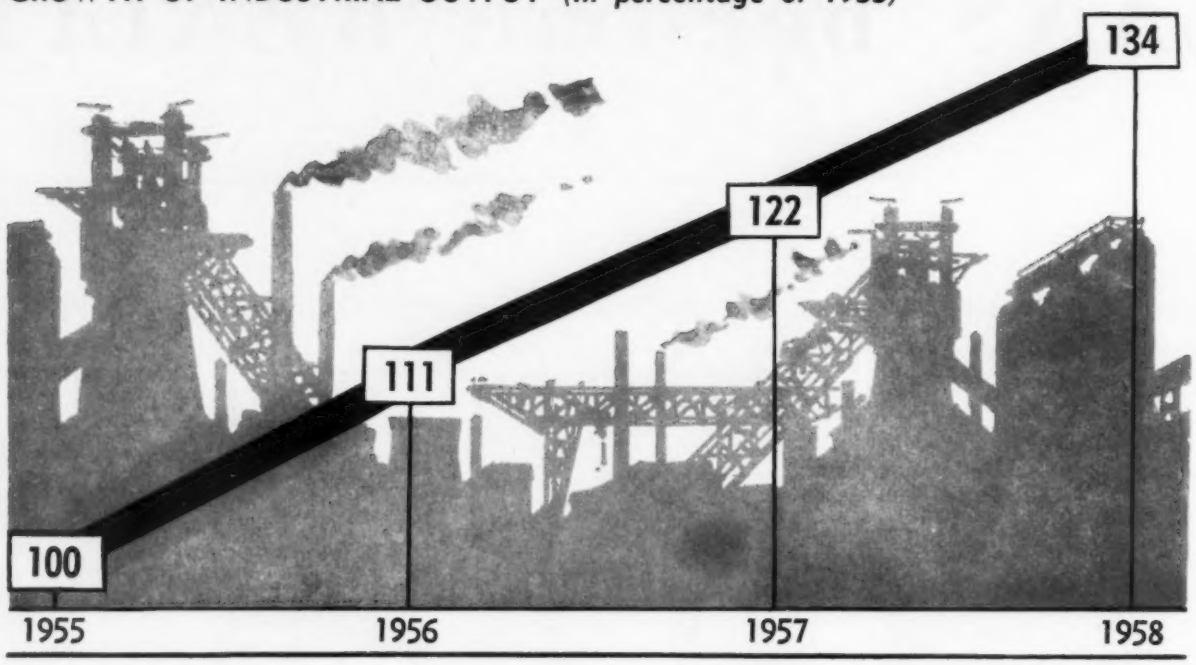
On the stage of the Bolshoi Theater where the Fifteenth Congress met, stood a huge map of the Soviet Union on which were dotted the factories, mills, mines, power stations, railroads, canals, seaports, towns and cities to be built—a massive plan to industrialize the country in five years.

To many people abroad, and even at home, the plan seemed an unattainable fantasy. Those who would have liked to see it fail called it a bluff, a propaganda trick.

But this first plan was not only fulfilled—in nine months less than the five years allowed—it was overfulfilled. What made the impossible

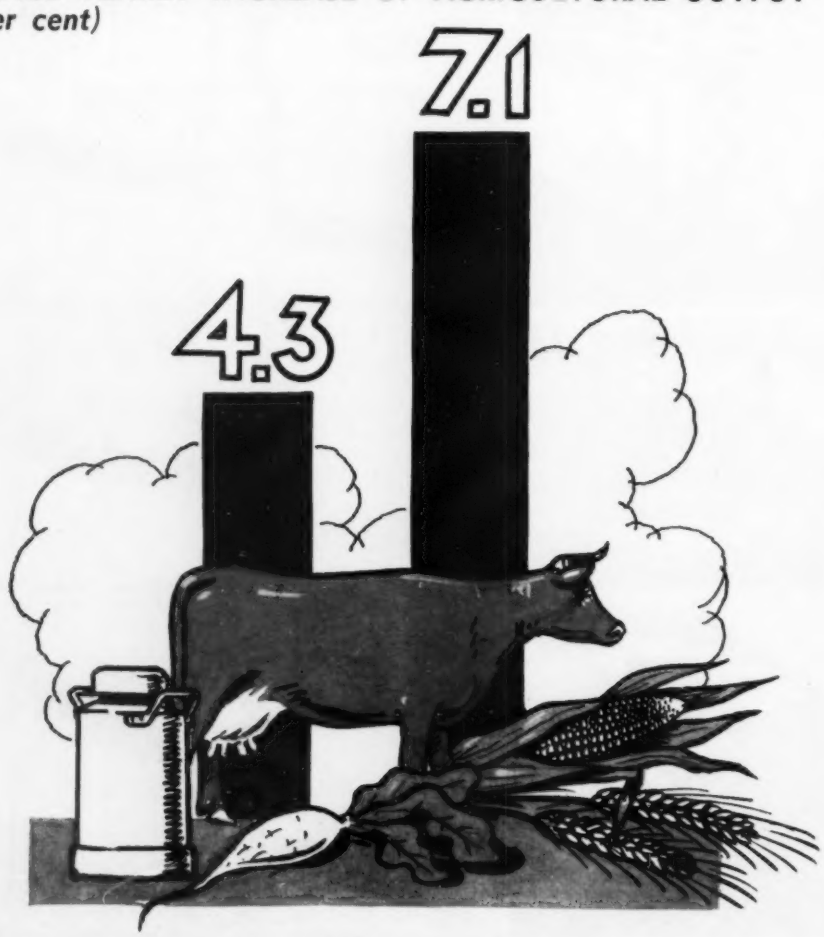


GROWTH OF INDUSTRIAL OUTPUT *(in percentage of 1955)*



PLANS become REALITY

AVERAGE YEARLY INCREASE OF AGRICULTURAL OUTPUT
(in per cent)



Within the pre-war (1930 to 1940) and post-war (1946 to 1957) years

Within 1954 to 1957

feat possible was scientific planning, the great potentials of a socialist economic system, the creative participation of millions of people and the guiding role of the Communist Party in the life of the nation.

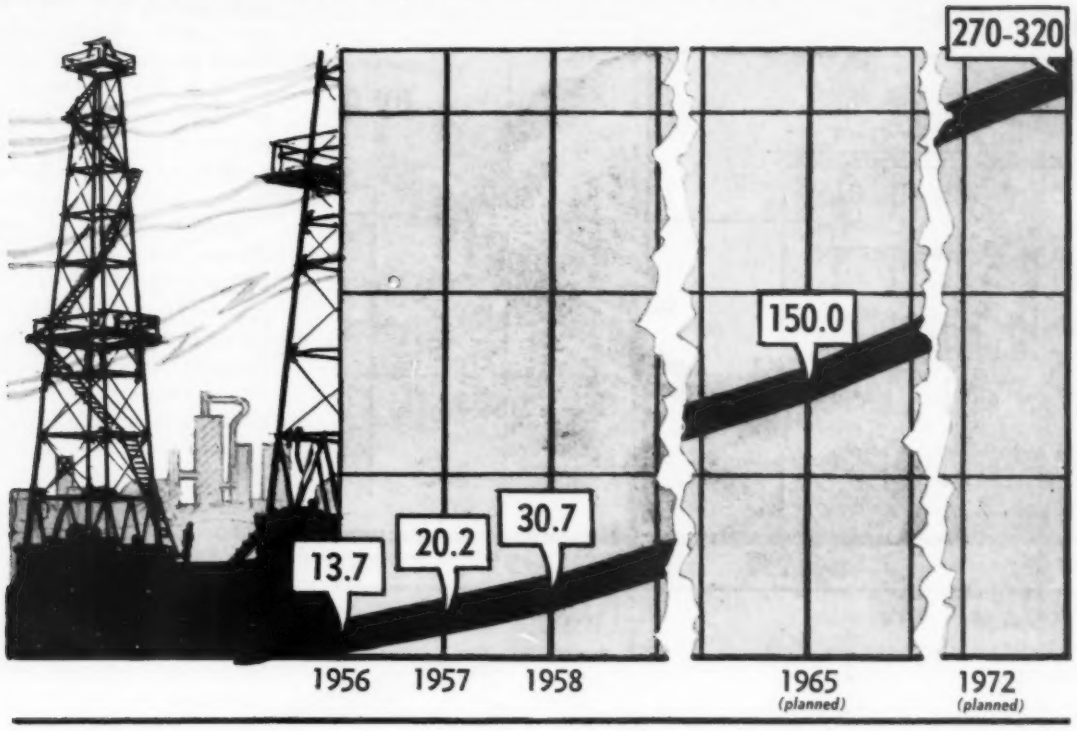
Pre-revolutionary Russia had been a backward country of small peasant farms. By 1932, the end of the first five-year plan, this country had become an industrial power with a rapidly expanding production. Agriculture, too, had made progress, with millions of small peasant households joining to form collective farms which made large-scale mechanized production possible and thus insured constant growth of marketable output.

The first five-year plan covered the period from 1928 through 1932. For the subsequent development of the country's economy the second five-year plan was charted to cover the period from 1933 through 1937. It was followed by the third five-year plan, started in 1938 and interrupted by the war. The fourth five-year plan covered the period from 1946 through 1950, and the fifth from 1951 through 1955. The Twentieth Party Congress, which preceded the one opening this January, approved the directives for the sixth five-year plan to cover the period from 1956 through 1960.

The planned Soviet economy has developed without interruption except for the war period, without depressions or recessions of any kind. As a matter of fact, the rate of economic growth has usually exceeded the levels set by the plans.

During the three years which have passed since the Twentieth Party Congress industrial production has increased by 10-11 per cent annually instead of the planned 7-10 per cent, with each one per cent of increase now worth more than 10 billion rubles compared with 0.5 billion three decades ago, at the beginning of the first five-year plan.

In 1958, during the first half of the year



alone, more coal was mined than for the whole of 1949, as much iron, steel and rolled metal turned out as for all of 1950, more electric power generated than in 1951, almost as many tractors manufactured as for 1953, a considerably larger number of locomotives produced than in 1954, and more natural gas than in 1956.

There has also been a marked increase in agricultural production during recent years. In the early post-war period the annual farm output increase did not exceed 4.3 per cent. In the period from 1954 through 1957 the increase amounted to 7.1 per cent a year, while in 1958 agricultural production grew 17 per cent over the preceding year. Last year's grain harvest was the largest ever gathered, topping even the 1956 bumper crop. The yield of other crops was equally high.

Changes in Industry and Agriculture

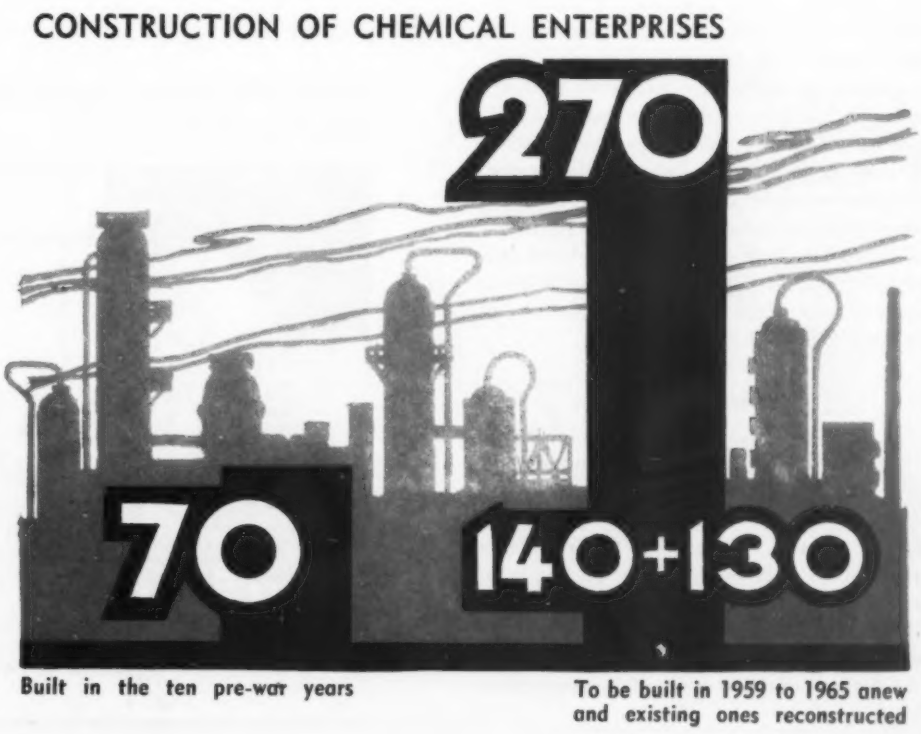
Accompanying the quantitative growth are important qualitative changes. In 1957 the decentralization of industrial management placed most of the country's enterprises under local jurisdiction. In 1958 the reorganization of state-owned and operated machine and tractor stations turned over the bulk of agricultural machinery to the collective farms, thus consolidating their economy.

Both changes, before they were enacted in law, were presented for nationwide consideration. The draft on industrial management was debated at 514,000 meetings throughout the country with an estimated audience of 41 million people. Some 2,300,000 people spoke at those meetings, commenting on the draft or suggesting amendments. In addition, articles and letters by some 68,000 people appeared in newspapers and journals.

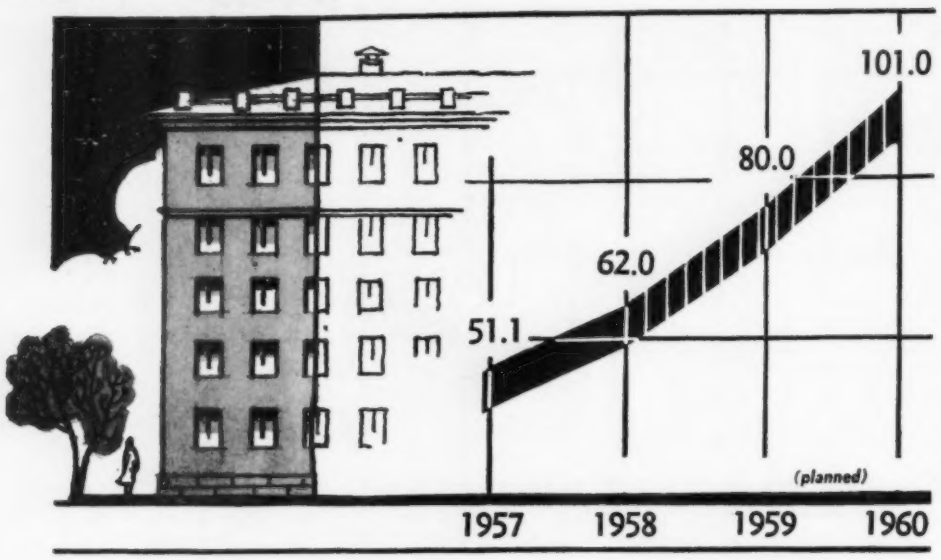
Discussion on the farm proposal took on even larger proportions, with 50 million citizens attending 577,000 meetings and some three million speakers participating actively in discussion. Close to 103,000 articles and letters were published as part of the national debate.

"These figures," commented Nikita Khrushchev, "speak eloquently of the fact that our Soviet society not only declares its democratic principles but puts them into regular practice."

The major changes in industrial administration and farm operation have had most beneficial results and were no small factors in accelerating the growth of the country's economy. Both in industry and farming great successes were scored and higher production targets for the future were set up in the past year or two.



HOUSING CONSTRUCTION IN CITIES
(millions of square meters)



PLANS become REALITY

Recent years have seen the discovery of major raw material deposits and power sources in various parts of the country. This has provided possibilities for establishing very profitable new enterprises and whole industrial centers, particularly in the eastern regions. Also in the East a new grain producing area has been developed in recent years by the cultivation of millions of acres of virgin lands.

In addition to the geographical redistribution of industry and agriculture, there has also been a shift in the relative importance of various branches of the economy. While formerly coal played a major role in the supply of fuel, now the emphasis on natural gas, comparatively new for the Soviet Union, is increasing. Another example is the chemical industry, which is becoming one of the major producers of consumer goods. Increasing emphasis during recent years has been placed on housing construction, which now greatly exceeds all previous highs.

Seven-Year Plan

All this required basic changes in both current and long-term planning. Many of the new projects and tasks were truly gigantic, and it became evident that the remaining years of the 1956-1960 five-year plan were insufficient for their fulfillment. Thus, it was life itself, the growing possibilities and requirements of Soviet society, that called for the drafting of a new economic program for a longer period.

Beginning with the fall of 1957 a plan to cover the period from 1959 through 1965 was being prepared and discussed in the Soviet Union. In November 1958 the Central Committee of the Communist Party approved a draft outlining the target figures for this seven-year plan. It is these figures that will be considered by the delegates of the Twenty-First Party Congress.

The new plan, like all those that had preceded it, has been drawn up with the active participation of millions of Soviet citizens. People have met to work out seven-year plans for their factories and farms. These plans were integrated into seven-year plans for each branch of the economy. These in turn were merged into seven-year plans for the whole of an economic area or a republic.

The regional plans, with the manifold changes and additions made at every level, were merged into the national plan which was presented to the country for discussion. Again, as during previous nationwide discussions, thousands of meetings are held, millions of citizens suggest their amendments and countless items are printed in the press.

Many of the recommendations grew out of the debates held at Communist Party local meetings, regional conferences and republic-wide conventions. An active part in the nationwide discussion was taken by the Young Communist League. During recent months the trade unions also held sessions on an industrial and territorial basis to consider the target figures that would be integrated into the seven-year plan.

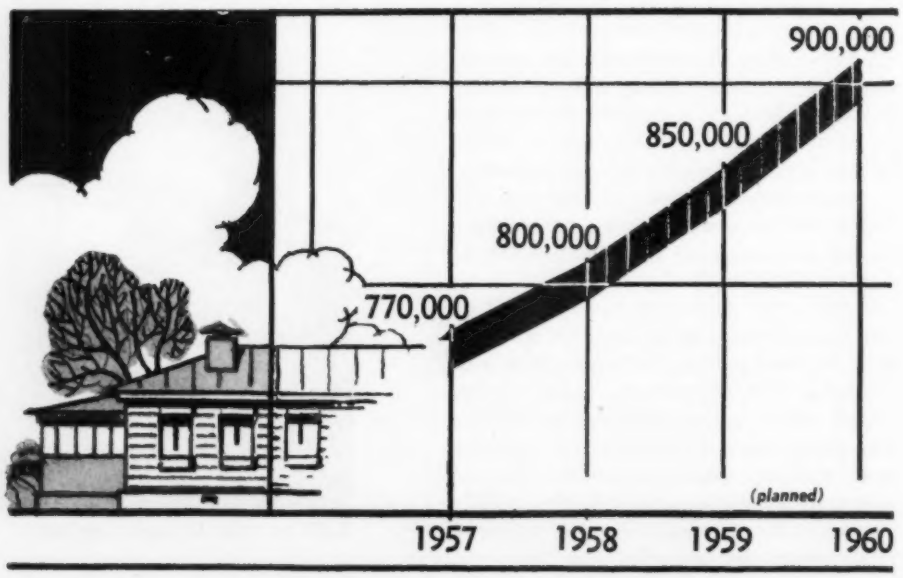
Thus the Twenty-First Party Congress will be summing up the vast amount of work and discussion that has been under way these months. Its final proposals will be a digest of the views and opinions of all the country's citizens.

Creative Initiative

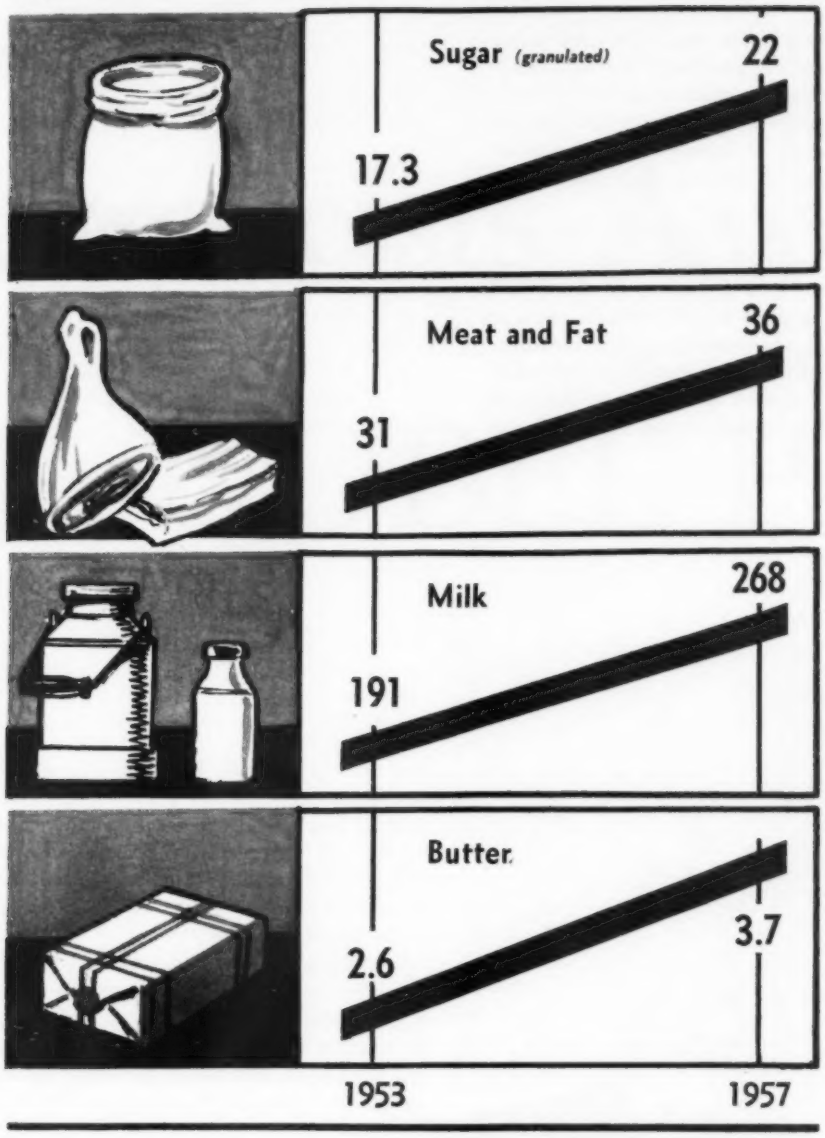
Since planning is done at all levels, beginning with the single factory or farm, large numbers of people are directly involved in sketching out drafts and submitting them to higher planning bodies. Many of the suggestions made by workers and farmers for their factories and farms are of primary importance in arriving at regional and even national target figures.

The Magnitogorsk Iron and Steel Plant, one of the country's largest metal producers, is a

HOUSING CONSTRUCTION IN RURAL AREAS
(number of houses)



PER CAPITA PRODUCTION *(in kilograms)*



Stalingrad Hydroelectric Station now being completed. Its projected capacity of 2,310,000 kilowatts is expected to be topped and will exceed 2,500,000 kilowatts.

The Country's Main Economic Goal

Each of the economic plans since the first has moved the Soviet Union one step further toward the main economic goal—to overtake the world's most developed countries in per capita production of industrial and consumer goods. What this means for the Soviet Union is that the time is steadily approaching when society as a whole and each of its members will enjoy an abundance of material and cultural wealth.

Some thirty years ago the Soviet level of per capita production as compared with the American level was 24 times lower in electric power, 15 times lower in steel, 12 times lower in oil. Today the gap has narrowed enormously and is narrowing further with each working week and even day.

In production of electric power the gap has been reduced from a factor of 24 to 4. In steel the differential is even smaller. In cotton fabric production the gap has narrowed from 4.5 times to 2, in woolen fabrics from 7 to 1.4.

The high rate of industrial and agricultural development visualized by the target figures for the seven-year plan will bring per capita production to a point where the gap will be minimal and in some cases will be completely bridged.

New tasks to be charted by the Twenty-First Party Congress will exceed in their scale all previous plans. No one in the Soviet Union doubts that the plan for 1959-1965 will be carried out successfully and that the country's main economic goal will be achieved in a future not too distant.

case in point. Its engineers have worked out a way of utilizing available equipment so as to make it possible to double the plant's output, and the target figures for the plant have been increased accordingly.

Other plants have followed suit and have adopted higher iron and steel production quotas which are thoroughly practicable by reason of Magnitogorsk workers' new look at the problem. More efficient use of existing blast and open-hearth furnace capacities alone, they believe, can give the country additional millions of tons of metal.

This example shows that the plan, whether for a factory or for the country as a whole, is a blueprint modified and improved as new approaches develop and as experience is gained.

Examples of creative initiative may be cited for any section of the national economy. Some months ago power engineers working with the generators of the new Lenin Hydroelectric Station on the Volga River found ways of increasing kilowatt capacity from 2,100,000 to 2,300,000. Their methods now are used widely to increase the country's power output.

The most recent application is the new

PER CAPITA PRODUCTION

Soviet

PAVEL CHERENKOV

Pavel Cherenkov (shown in the photo at the left under the portrait of his teacher, the late Sergei Vavilov) heads a department at the Physics Institute of the USSR Academy of Sciences. He was born in 1904. In 1928 he was graduated from Voronezh University with a diploma which qualified him as teacher of mathematics and physics.

The research work for his master's degree, completed in 1935, was done under the supervision of Academician Sergei Vavilov, then President of the USSR Academy of Sciences. It dealt with the luminescence of solutions of uranyl salts subjected to gamma radiation.

It was in the course of this work that Pavel Cherenkov made the outstanding discovery which is a landmark in twentieth century physics, a discovery which won him the Nobel Prize.

IGOR TAMM

Igor Tamm works in the Physics Institute of the USSR Academy of Sciences. He was born in 1895. In 1918 he graduated from Moscow University where he has been lecturer for two decades.

His research work has led to important contributions in quantum mechanics and its applications, in particular, to the theory of irradiation, the theory of cosmic rays and the interaction of nuclear particles. He suggested the quantum theory of the dispersion of light in solids and developed the theory of the dispersion of light by electrons. In 1934 he advanced and substantiated mathematically a theory of nuclear forces which served as model for the modern mesonic theory of nuclear forces.

ILYA FRANK

Ilya Frank works in the Physics Institute of the USSR Academy of Sciences. He was born in 1908. In 1930 he was graduated from Moscow University and began work at the Leningrad Institute of Physics. He has been on the staff of the Physics Institute of the USSR Academy of Sciences since 1934 and professor at Moscow University since 1944. His work is principally in optics and nuclear physics. His major contributions were made to quantum physics and the physics of neutrons.

et Physicists Awarded

NOBEL PRIZE

THREE Soviet physicists—Pavel Cherenkov, Igor Tamm and Ilya Frank were awarded the 1958 Nobel Prize in physics "for the discovery and interpretation of the Cherenkov effect," as the citation of the Swedish Academy reads. The award is recognition of a major discovery in irradiation effect which has long been widely known and has been used as a highly important tool in many areas of modern physics.

Previous Nobel awards to Russian scientists went to Ivan Pavlov and Ilya Mechnikov for their work in medicine and physiology in the early 1900's, and to Nikolai Semenov who shared the 1956 chemistry award with the British scientist Cyril Hinshelwood.

Cherenkov discovered the irradiation effect called by his name in 1934 when he was investigating the irradiation given off by pure liquids exposed to gamma rays, the very intense rays emitted by radium. This research was being done at the suggestion and under the guidance of the late Academician Sergei Vavilov.

The investigation disclosed unusual properties of the new irradiation which helped distinguish it from the luminescence of liquids under the effect of gamma rays. Vavilov sought the explanation of this new phenomenon in the greater velocity imparted to electrons by gamma rays when they pass through certain media.

The phenomenon, discovered by Pavel Cherenkov, was explained in a theory developed by Igor Tamm and Ilya Frank in 1937. They showed that the source of the radiation were electrons that moved in a particular medium at a speed greater than that at which light passes through that same medium.

When the speed of an electrically charged particle moving in some medium exceeds the speed of the propagation of light waves in that medium, the particle itself glows. A simple mechanical comparison of this kind of radiation is afforded by waves produced in the air when a body flies through it at supersonic speed.

According to the Einstein relativity theory, particles of matter cannot move at a speed greater than the speed of light passing through a vacuum. This is the greatest velocity possible. But in many media the speed of light is less than in a vacuum and it is therefore experimentally possible to obtain charged particles that move in a particular medium at a speed greater than that of light in that medium.

Tamm and Frank demonstrated that the radiation of charged particles moving at a speed faster than light propagates in the form of a cone, its axis coinciding with the direction of the velocity of the particle's speed and the medium's deflection factor for the given length of the wave of emitted light. Experiments both in the Soviet Union and abroad have long since confirmed both the Cherenkov phenomenon and the theory developed by Tamm and Frank to explain it.

The light deflection factor for various media is either known or is easily calculated. The Cherenkov irradiation is therefore a very convenient tool with which the speed and even direction of movement of charged particles can be measured. This method of measuring the velocity of particles can be used not only for electrons, of course, but for any other electrically charged particles. It is exceedingly accurate and is being used very widely and very effectively in modern physical research.

Cherenkov counters, devices which employ the effect of the Cherenkov phenomenon, are very important instruments for recording charged particles. With these counters the new elementary particle, the anti-proton, was discovered and studied in 1955. They are used in cosmic ray investigation and in experimenting with accelerators that produce high energy particles. Cherenkov counters were carried by the Soviet earth satellites to record the streams of charged cosmic ray particles.

The work of Vavilov, Cherenkov, Tamm and Frank is highly esteemed in the Soviet Union. In 1946 it won the Stalin Prize. In 1958 it was the entry of the USSR Academy of Sciences for the Nobel Award, and the decision of the Swedish Academy undoubtedly reflects the opinion of scientists the world over.

In an interview given to the press shortly after the award was announced Ilya Frank stressed the indebtedness of the Nobel Laureates to Sergei Vavilov.

"I am very proud," said Frank, "that the work of Soviet physicists, my own work included, has been appraised so highly by the Swedish Academy of Sciences and awarded a Nobel Prize. I would also like to note that the success of the work, begun 25 years ago, was ensured in the first place by the fact that it was conducted by a large group of research and technical workers who contributed to no small extent to the discovery and explanation of the Cherenkov effect. And first of all I would like to note the invaluable aid rendered us by the outstanding Soviet scientist, the late Academician Sergei Vavilov.

"I am also glad to see that the results of our discoveries are being applied in various fields of physics and are being further elaborated by many scientists in many countries."

A Promising

Signing the new movie exchange pact: Eric Johnston for the USA, Vladimir Surin for the USSR.

JANUARY marks a year since the agreement on cultural, technological and educational exchanges was concluded between the United States and the Soviet Union. It has been a productive and a promising year, an increased interchange of people and ideas that has done much to create a better climate of understanding between our countries.

In the joint communiqué that announced the agreement, it was the expressed hope of both signatories that the program of exchanges would serve as an important beginning step cutting through some of the misconceptions that have kept our countries apart. Friendlier relations between the United States and the Soviet Union, the communiqué said, would unquestionably make for friendlier world relations.

President Eisenhower stated that such agreements would result in improved mutual understanding between the peoples of the United States and the Soviet Union. The opinion of the Soviet public was voiced by Premier Khrushchev, who wrote in his message to the President of the United States that the agreement was a good practical step toward rapprochement between our countries.

Khrushchev's message read: "It is gratifying that this agreement has met with approval both in the USSR and the USA, and in other countries as well. This, I believe, is due primarily to the fact that the people see in it

Young Americans are greeted by their Soviet hosts upon arrival in Moscow. There are flowers and speeches, and, of course, cameramen to record the eventful beginning of the youth exchange program.

Executive of an American ice revue company sees the arena where his troupe will perform.

g Exchange Year

concrete proof that Soviet-American relations can really be bettered, and this holds the promise of a general improvement of the present unstable and alarming international situation."

A Good Start

The agreement covered a two-year period, 1958-1959, and provided for exchange delegations of people in industry, farming, science, education and public health; for reciprocal visits of writers, artists, composers and theater groups; for exchange of groups representing young people's and women's organizations; for sports competitions;for exchanges of films, radio and television broadcasts.

This exchange program has been most encouragingly carried through in the first year of its operation.

Visiting our country during the year were delegations of American power engineers, metallurgists, chemists, physicians, educators, radio and television people. Among our guests were American composers and writers. Soviet workers in metallurgy, building, medicine, education and other fields returned the visits.

There were also exchanges between scientists of our countries, reciprocal visits of

Continued on page 20

A press conference held by an American delegation after watching the Soviet elections last March. A similar group from the Soviet Union observed the 1956 presidential election in the United States.

INTERVIEWS

YOUTH EXCHANGES CONTRIBUTE TO PEACE

Says **Sergei Romanovsky**

Chairman, Committee of USSR Youth Organizations

THERE is perhaps no better guarantee of enduring peace than the growing friendship between American and Soviet young people that has developed out of the exchange agreement.

Dozens of young Americans—college students, editors of student newspapers, representatives of such organizations as the YMCA, the YWCA, the United Student Council, the Lisle Fellowship, the Experiment in International Living —last year toured the Soviet Union. There were also Soviet youth delegations touring the United States at the same time.

It was my pleasure to be part of a Soviet youth group that visited the United States. I am not likely to forget the friendly way in which we were greeted everywhere we went nor the wealth of impressions we gathered.

Our Committee of USSR Youth Organizations has worked out with American youth groups a larger program of activities for 1959. On an exchange basis, 20 young Americans chosen by the US Council on Student Travel will visit the Soviet Union. There will be visiting delegations from the YMCA, the YWCA, the Young Adult Council, the Young Democrats, the National Federation of Young Republicans, the 4-H clubs and other youth organizations. About 100 young tourists have been invited to the Soviet Union by the Bureau of Youth Tourism.

MORE RADIO AND TV EXCHANGES

Says **Dmitri Chesnokov**

Chairman, State Committee for Radio and Television Broadcasting

THE Soviet people regard the exchanges of radio and television programs as an important means of creating better understanding between our peoples. But thus far these exchanges, as desirable as they are, only touch the fringes of this very important area of cultural contact. We should like to see much more done with the possibilities—a regular and consistent exchange of dramatic productions, of popular science and other programs as outlined by the exchange agreement.

A delegation representing NBC, ABC, Westinghouse and other American radio

A Promising Exchange Year

and television broadcast companies came to the Soviet Union last October to work out specific exchange plans for 1959. The American delegation was received by our Committee for Radio and Television Broadcasting and by the State Committee for Cultural Relations with Foreign Countries.

The Americans visited the Sound-Recording House and the Moscow Television Studios where they saw Soviet television films suggested for American presentation this year. Late last year a delegation of Soviet radio and television people came to the United States for an exchange visit. These reciprocal visits have made it possible to work out many of the details of the exchange program in our field for 1959.

A NATION IS BEST UNDERSTOOD THROUGH ITS ART

Says **Boris Pokrovsky**
Stage Director, Bolshoi Theater

THERE is much more in an exchange of artists than the opportunity it offers to see or hear another country's performers. The soul of a people is to be understood best through its art and that understanding brings sympathy and friendship.

That is why we were glad to hear baritone Leonard Warren and tenor Jan Peerce sing in our theater and why we were so pleased at the reception of the gifted Van Cliburn by our audiences.

It was not only individual American artists who played for Soviet audiences but such groups as the justly famed Philadelphia Orchestra led by Eugene Ormandy. The appearance of the eminent conductor Leopold Stokowski was indeed a major cultural event in the Soviet Union.

We reciprocated with such Soviet artists as violinist Leonid Kogan and pianist Emil Gilels and were, of course, enormously pleased with the reception accorded the Moiseyev and Beryozka dance companies by Americans.

All this is very much to the good. More would be even better. A good many exchanges have been worked out for 1959. We at the Bolshoi Theater are now rehearsing a large ballet troupe for an American tour this spring. Its program will include Khachaturyan's recently staged ballet *Spartacus*, which was very much a success in the Soviet Union, and perhaps another new ballet, *The Hunchbacked Horse*, by the young composer Shcherbakov.

ROY HARRIS CONDUCTS A MOSCOW ORCHESTRA IN HIS FIFTH SYMPHONY, DEDICATED TO THE SOVIET PEOPLE.

PROF. HERMAN MARK, AN AMERICAN CHEMIST, LECTURES ON POLYMERS FOR THE FIBER AND PLASTIC INDUSTRIES.

AMERICAN UNIVERSITY NEWSPAPER EDITORS ARE SHOWN COPIES OF A STUDENT PUBLICATION IN LENINGRAD.

A NEW HOUSING PROJECT IN MOSCOW'S SOUTHWEST AREA IS INSPECTED BY A GROUP OF U.S. BUILDERS.

INTERVIEWS

VERY ENCOURAGING TECHNOLOGICAL EXCHANGES

Says **Yuri Maxarev**
Chairman, State Committee on Science and Technology

THAT part of last year's exchange agreement which called for reciprocal visits of industrial specialists has been very successfully carried out. The possibilities for wider exchanges are very encouraging, particularly since these were the first official USA-USSR exchanges undertaken in the technological and industrial fields.

We had a visit from representatives of the American iron ore and steel industries headed by Edward Ryerson of Chicago. Our guests visited plants in several industrial centers. What was most edifying was the ease with which communication was established. We spoke the common language of modern technology and had no difficulty understanding each other. The American steelmen noted in conversations that there was much they had seen in our country that was new, interesting and useful.

A delegation of Soviet steelmen and ore mining specialists returned the visit last fall and went through twenty of the big American plants. They have the warmest memories of the hospitality accorded them everywhere they went.

There was also an exchange of specialists in the plastics industries and in automation. Our engineers participated in the 14th annual electronics conference held in Chicago, and went through the computer exhibit held in New York, the metal processing equipment exhibit in Cleveland and the plastics exhibit in Chicago.

The first contacts have already confirmed that the exchange of scientific and technological achievements between our countries is beneficial to both sides and, what is more important, promotes mutual understanding and closer relations between our peoples.

WE WERE GLAD TO WELCOME U.S. EDUCATORS

Says **Vyacheslav Yelyutin**
Minister for Higher Education

THE initial steps taken this past year for exchanges of American and Soviet college educators have been mutually informative and, it is our hope, will encourage continued and much broader contacts.

Our ministry was happy to welcome a delegation of natural science instructors

led by Professor John Turkevich of Princeton and delegation of instructors in the humanities led by Dr. Francis Brown of the American Council on Education.

A group of American university presidents, headed by Dr. Edward Litchfield, chancellor of the University of Pittsburgh, made a tour of colleges in a number of Soviet cities. Dr. Litchfield, in a report published on his return, commented on the attentions paid to higher education by the Soviet government and the respect accorded in our country to learning.

"They believe in higher education," Dr. Litchfield said, "and pay for it gladly." That accounts, he added, for the extraordinary accomplishments in education in so short a time span and forecasts an even more impressive development for the future.

In reciprocal exchanges, three delegations of Soviet college educators visited American schools.

Moscow and Leningrad universities are presently host to 22 young American college and graduate students and a group of Soviet students are studying at American colleges.

A MOST PRODUCTIVE EXCHANGE YEAR FOR MEDICINE

Says **Prof. Alexander Myasnikov**
Director, Institute of Therapy

FOR medical scentists this first year of exchanges under the USA-USSR agreement has been most productive. Americans working in various branches of medicine have visited research institutes, laboratories and hospitals in Moscow, Leningrad, Kiev and other Soviet cities. Our medical scentists have had the opportunity of learning about American research in progress and have seen how public health services in the United States function.

A year ago I had the pleasure of taking a group of American clinical cardiologists led by Professors White of Boston and Wright of New York through our Institute. Later we were visited by Professors Raab of Vermont, Pereiro of New York and Andrews of Baltimore.

During the year Professors Pavel Lukomsky, Zigmas Januskevicius and I represented the Soviet Union at the Fifth Congress on Internal Medicine held in Philadelphia and were taken around to hospitals and research laboratories in Philadelphia, Washington, New York and Boston.

We found, as we thought would be true, that the research being done in cardiology and other such vitally important medical specialties in both countries was proceeding along generally parallel lines and the question

U.S. EDUCATORS AT A MOSCOW ENGINEERING SCHOOL.

A Promising Exchange Year

Continued from page 17

agricultural and social security delegations and youth groups. American and Soviet track and field, basketball, hockey and rowing teams have competed for athletic prowess.

Soviet audiences warmly applauded conductor Leopold Stokowski, singers Blanche Thebom and Leonard Warren and other American artists, while pianists Emil Gilels and Vladimir Ashkenazi, violinist Leonid Kogan, the Moiseyev and Beryozka dancers were enthusiastically welcomed by American concertgoers.

Over and Above the Program

All these and other exchanges were carried through in this first year with gratifying success, particularly notable since the exchanges went a good way beyond the scope called for by the agreement, a most encouraging sign for the future. A display of books by Prentice-Hall Publishing Company authors, for example, was arranged in the Soviet Union and exhibitions of American artists were held in Moscow galleries.

Reciprocal visits not stipulated in the agreement were made by a number of groups and public figures. During the year Dr. Detlev Bronk, President of the National Academy of Sciences, Adlai Stevenson, Walter Lippman, Eleanor Roosevelt and Cyrus Eaton visited the Soviet Union. Mr. Robert Dowling, head of the American National Theater and Academy, came to discuss enlarged cultural exchanges and to plan the American tours of Soviet theater companies. At the end of last year Georgi Zhukov, chairman of the USSR State Committee for Cultural Relations with Foreign Countries, visited the United States.

The Soviet and American people have always respected each other's national culture. But while exchanges had previously been haphazard, now they have become incomparably broader and more regular. The United States and the Soviet Union are both highly de-

PROF. KOGAN (LEFT) OF THE FIRST MOSCOW MEDICAL INSTITUTE REVIEWS A CASE FOR U.S. SCIENTIST HOSCH.

AMERICAN EXPERTS WERE INTERESTED IN THE MACHINERY USED ON THE COLLECTIVE FARMS OF THE ALTAI TERRITORY.

veloped countries with wide experience in various spheres, and the increasing exchanges will be of great use to both nations.

We can borrow much from each other. Active cooperation of Soviet and American scientists in the battle against cancer and cardiovascular diseases, for example, as well as close collaboration in other fields might be invaluable not only to the peoples of the Soviet Union and the United States but to all mankind.

For the New Year

Outlined for the new year are many eagerly anticipated projects. In prospect is a rather extensive motion picture exchange program negotiated late last year. It covers showings of American and Soviet feature films and documentaries in both countries, arrangement of film festivals and joint production of motion pictures.

The famous Bolshoi ballet will be touring the United States this spring and American music-lovers will be hearing violinist Igor Bezrodny, cellist Mikhail Rastropovich and singers Pavel Lisitsian and Zara Dolukhanova. Soviet audiences are looking forward to the American ice show performances and will be happy to be applauding Van Cliburn again on his second tour of our country.

The sports exchange for this year is far wider than the agreement provides for. Exchanges of tourists, literature, lectures by specialists in various fields will also be expanded. A feature of this year's exchange will be the exhibitions.

The Soviet exhibition will be held in the New York Coliseum and will show development in industry, farming, building, education, social security, public health and culture, to give Americans an idea of what the Soviet Union is like and what it is doing. The American exhibition will be held in Moscow. Both exhibitions will undoubtedly draw large crowds of visitors, and, we venture to suggest, will show many more similarities in the Soviet and American ways of life than differences.

To further expand our contacts in 1959 it would be quite feasible to exchange delegations of writers and journalists, representatives of Soviet and American cities, deputies of the USSR Supreme Soviet and United States Congressmen, as well as delegations of trade unions and other public organizations.

What we both need is to have more citizens and delegations of our countries visiting each other! This will surely help us get to know each other better, promote mutual understanding and establish closer friendly contacts between our peoples.

both we and American scientists asked as a natural consequence was this one: why not joint research that would hasten the day we can check these crippling and killing diseases and, it may be, eliminate them completely.

WE MUST GET TOGETHER MORE OFTEN

Says **Prof. Yekaterina Vasyukova**
Director, Institute of Endocrinology

AS A worker in medicine I am especially pleased with the sections of the agreement which provide for exchange delegations of medical people and specialists in allied fields. This gives us the opportunity to exchange our experiences, and I cannot think of a more useful or desirable undertaking.

Last year I visited the United States for a month with a delegation of Soviet women physicians invited by the American Women's Medical Association. Our delegation was heartily welcomed everywhere on its tour of hospitals and research centers in seven cities. We were also welcomed at the homes of American scientists and doctors.

Very often our discussions centered around the thought that Soviet and American specialists must get together more often and share their work for mutual benefit and for the benefit of world science.

We were more than pleased to welcome our American medical colleagues who came to the Soviet Union with a return visit. We are happy to see that the friendly ties we made on our reciprocal visits have been so greatly extended during the first year of the exchange program.

WHEN PEOPLE TRUST EACH OTHER, EVERYONE IS HAPPY

Says **Pyotr Rodionov**
Retired Construction Worker

I HAVE LIVED many years in this world of ours and know very well how important it is for people to have confidence in each other. But mutual confidence comes only with familiarity.

That is why I would like to see more exchanges between the United States and the Soviet Union. There is no doubt that closer contact will promote better understanding between our countries. In my opinion, this is the way to build mutual trust.

When people trust each other and live like good neighbors, the work goes well and everybody's life is happier.

IN LENINGRAD, MRS. ROOSEVELT STOPPED TO SEE THE PIONEERS PALACE.

By Yelena Doroshinskaya

Eleanor Roosevelt and

MRS. ELEANOR ROOSEVELT made a three-week visit to the Soviet Union recently. She came at the invitation of the United Nations Association of the Soviet Union with a delegation from the comparable American organization.

During her stay, Mrs. Roosevelt toured Moscow and Leningrad where she saw the sights and spoke with many of the people. She was welcomed by Georgi Zhukov, Chairman of the State Committee for Cultural Relations with Foreign Countries; Yevgeni Afanasenko, Minister of Public Education; and other officials.

In a talk with Yekaterina Furtseva, member of the Presidium of the Communist Party's Central Committee, Mrs. Roosevelt inquired into many aspects of Soviet life—the position of women and their participation in government and public life, the country's social achievements and the public health, welfare and education set-up.

At a press conference held for Soviet and foreign newsmen shortly before she left, Mrs. Roosevelt commented on the very cordial reception accorded her and other members of the delegation during their stay.

Asked her impression of the tour, Mrs. Roosevelt said, "We are convinced that, like Americans, people in the Soviet Union do not want war, but Soviet people have seen war closer than Americans, so, naturally, they hate it more."

Mrs. Roosevelt said that she had seen a lot during her three-week stay. She found her visits to kindergartens, schools and colleges especially interesting. "I could observe that in the comparatively short period of time that has elapsed since my last visit to the Soviet Union about a year ago the standard of living has improved markedly. Life is getting better and better."

FULLY PARALYZED ONE YEAR AGO, THIS GIRL NOW SHOWS SHE'S RECOVERED.

OLGA KOROBCHUK'S SEVENTH GRADE ENGLISH PROVED ADEQUATE FOR HER NEEDS.

ELEANOR ROOSEVELT IS A LUNCHEON GUEST OF HOUSEWIFE NADEZHDA KOPYTSKAYA.

nd Nadezhda Kopytskaya

AMERICAN newspaper readers may remember the letter which appeared in the *New York Times* about two years ago from a Leningrad housewife. The letter, an appeal to American mothers to use their efforts to avert war, elicited a reply from Mrs. Eleanor Roosevelt in a radio talk. Mrs. Roosevelt sent the text of her talk to Nadezhda Kopytskaya, the writer.

Mrs. Roosevelt's reply was not the only one. Many others arrived from women in the United States, Canada, Holland, Denmark and elsewhere. The aftermath has been a friendship by mail which this Leningrad housewife has made with many of these correspondents. Like herself, they feel that war would be an inconceivable disaster.

A Story Behind the Letter

Nadezhda Kopytskaya lives on Leningradsky Soviet Street. Her husband, Anatoli, works as a grinder at the Kirov Plant. She has five children—15-year-old Valentin, 11-year-old Galina, 8-year-old Alla, 7-year-old Anatoli and 3-year-old Mikhail.

She pointed to her children when I asked her what impelled her to write the letter to the *Times*. The gesture needed no elaboration. This was her personal stake in peace.

There was nothing out of the ordinary about that morning two years ago, she told me. Her husband had gone off to work and the older children to school. Alla and Anatoli were in kindergarten and the baby asleep in his crib. She was in the kitchen preparing lunch and listening to the news broadcast at the same time.

In the newscaster's review of the international situation, the word "war" kept cropping up. Perhaps, she said, it was because the house was so quiet, so peaceful, that the word struck her so hard. She had gone through the siege of Leningrad during the last war, had helped other women dig up the mutilated bodies of children in the wreckage of a kindergarten struck by a Nazi shell. What could she do to stop that from happening again?

Without giving herself time to think about whether this letter from one mother would mean anything, she sat down at her kitchen table, wrote what she felt and dropped the letter into the mailbox.

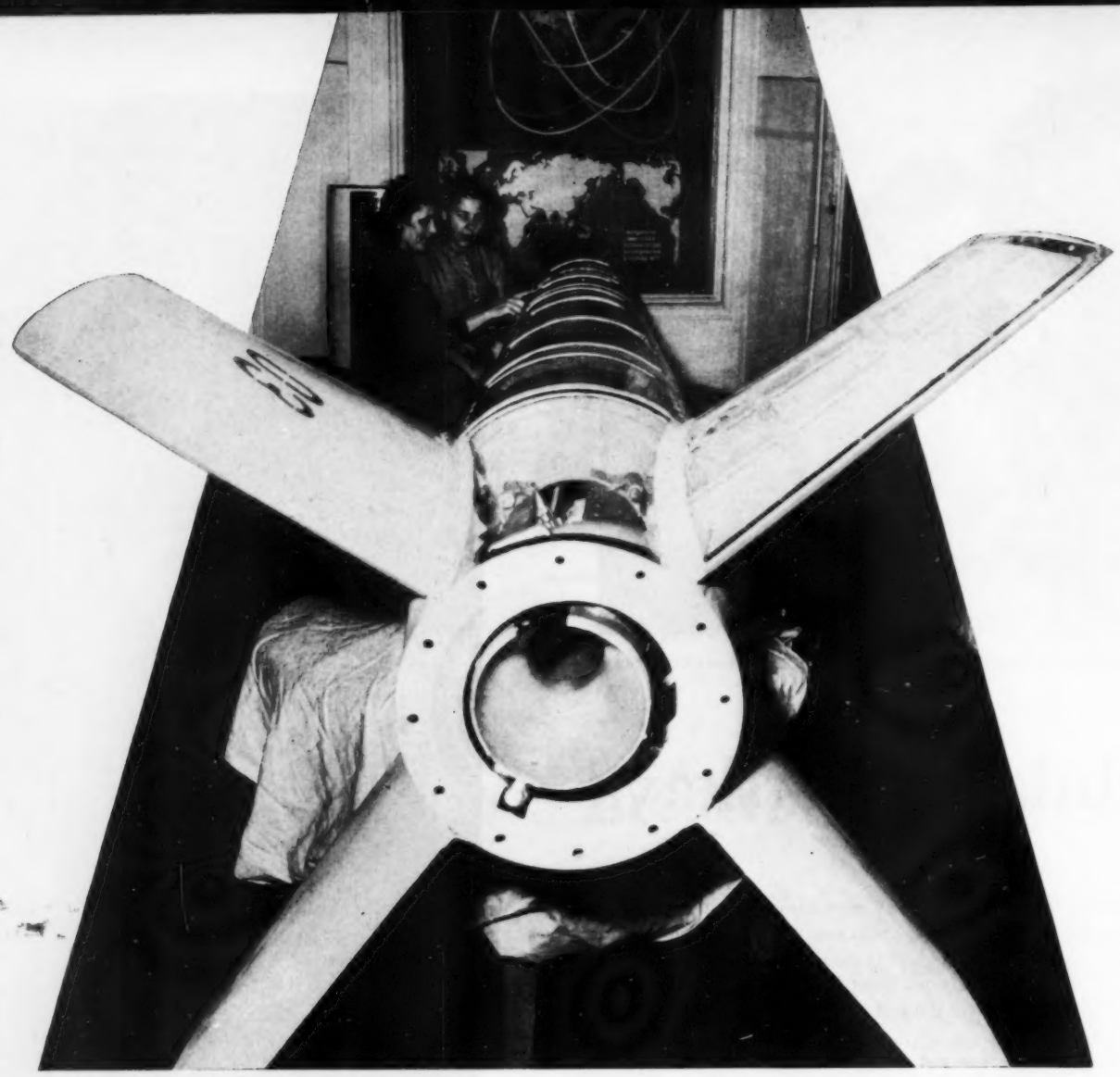
And the replies? One of them came from Lola Robert who lives in New York. Mrs. Robert asked that her letter addressed to Soviet mothers be given space in the Soviet press. Nadezhda Kopytskaya took the letter to the editorial offices of the *Leningradskaya Pravda* and it was published.

Among the letters was one from Leonie Rittenhouse of Darien, Connecticut, the mother of four children. She and Kopytskaya, the mother of five children, became warm friends. They corresponded regularly, wrote each other about their families, exchanged toys and books. They had a great deal in common, the two mothers found.

When Nadezhda Kopytskaya wrote a letter to the *New York Times* about two years ago, numerous replies came from many countries.

Kopytskaya was embarrassed when I told her that her letter to American mothers was a service for peace, that it helped bring people in the United States and the Soviet Union that much closer by cutting across political differences.

"You're exaggerating its importance," she protested. "There was no politics in my mind when I wrote it. I don't know very much about politics. It was something I felt I had to do for my children and my family and my city which suffered so much during the last war."



ONE OF THE SOVIET HIGH-ALTITUDE METEOROLOGICAL RESEARCH ROCKETS RECENTLY DISPLAYED AT THE MOSCOW PLANETARIUM.

SPUTNIK III EXPLORES THE COSMOS

By ALEXANDER NESMEYANOV, *President, USSR Academy of Sciences*

EXPERIMENTAL DOGS SPECIALLY TRAINED FOR ROCKET FLIGHTS ARE EXAMINED AFTER EACH JOURNEY TO DETERMINE UPPER ATMOSPHERE INFLUENCE UPON THEIR ORGANISMS.

THE Russian word sputnik has made its way into all the world's languages. It is symbol for the space age that began when the first earth satellite was launched, an event as significant for civilization as the discovery of fire and electricity, the invention of the steam engine and the release of atomic energy.

It is these discoveries and inventions that mark off epochs in human history. The time boundaries of these epochs are rapidly narrowing. There were thousands of years intervening between the stone, bronze and iron ages, but only a few decades between the age of steam and that of electricity. And between the building of the first atomic reactor and the launching of the first sputnik there was a span of only a few years.

The epoch of cosmic exploration can already be seen in bold outline. Its details are evolving out of the data recorded by the earth satellites already launched and those to come.

Soviet scientists readily share their cosmic research data with the world. Long before the first sputnik was launched, the experimental procedure and the instrumentation to be employed had been described in scientific journals accessible to all. After each sputnik was launched, the Soviet press published a complete report of the design, the instruments carried and the operating procedure. The points of transit were announced daily and the findings reported to numerous international conferences, including last year's International Geophysical Year Assembly in Moscow.

THE SPACE TRAVELER OF THE FUTURE WILL WEAR PROTECTIVE GARB SIMILAR TO THIS ONE.

Test for Calculations and Instruments

To construct and launch artificial earth satellites is a complex scientific and technological task. As the weight of the satellites increases, the problems in launching them become more difficult. However, the advances made in Soviet rocketry are helping to solve the peaceful problems of cosmic research.

The design efficiency and the accuracy of the calculations that shot the sputniks into space have been amply confirmed. The tracking of the sputniks and the measurements of their orbit paths similarly coincide with precalculated data. The scientific instruments they carried also operated as scheduled.

The vast experience that has been gained thus far in rocketry, instrumentation and computation is of invaluable importance for future efforts with larger sputniks and heavier instrument loads, and for future sputniks with a human payload, the next of the major projects of the space age.

A satisfactory solution has been found to the problem of maintaining normal air pressure inside the sputniks. To maintain a constant temperature under sharply changing external thermal conditions is also a complex and difficult problem. This is particularly true for large satellites that carry heat-generating apparatus. That the problem was successfully solved is evident from the fact that the temperature inside Sputnik III stayed within the range of 60° to 70° F. throughout the whole period of instrument operation.

The telemetering apparatus also passed a most exacting test imposed by space flight. Sputnik III's radio transmitters were powerful enough to produce audible signals at distances of 6,000 miles and more.

The apparatus of the satellites incorporated a large variety of transistors. All the scientific and measuring apparatus of Sputnik III was controlled automatically by an electronic time programming device made up entirely of transistor elements. As a matter of fact, this sputnik carried several thousand various transistors.

The possibility of errors in measurement due to interaction between the individual instruments—an ever present problem in these spheres close packed with apparatus—is ruled out by a judicious arrangement of the sensitive instrument parts.

To track the course of the sputniks there is a network of ground stations equipped with radiotechnical and optical instruments. The stations are continuously being refined and today comprise a complicated system of automatically functioning devices that gather, record and analyze highly accurate and predictive data.

How High Is the Atmosphere?

Analysis of the data on the deceleration of sputniks, the way in which their orbits gradually come closer to earth, indicates that the density of the atmosphere at an altitude of 140 miles is five to ten times greater than had been assumed previously from studies made with research rockets. Density at that height was found to be three ten-millionths of a gram per cubic meter.

The first two sputniks showed that the density of atmosphere varied with the time of day and the latitude over which they were traveling. This has been confirmed by Sputnik III, and continued observation of its orbital changes will enable scientists to map out more clearly a model of density within a wide range of altitudes above the earth's surface.

Electronic manometers of special design installed in Sputnik III permit direct measurements to be made of the very low atmospheric pressure found at great heights. These readings show that the density at about 165 miles is a ten-billionth of that at ground level. Higher up, at about 230 miles, it is about a tenth or twelfth of this value. These figures compare favorably with those derived from the sputnik's deceleration.

Further information as to how high the atmosphere extends is given by another instrument carried by Sputnik III—a mass spectrometer. This instrument, designed to check what kind of electrically charged particles are to be found at great altitudes, recorded ions of both elemental oxygen and elemental nitrogen at heights ranging from 150 to 600 miles.

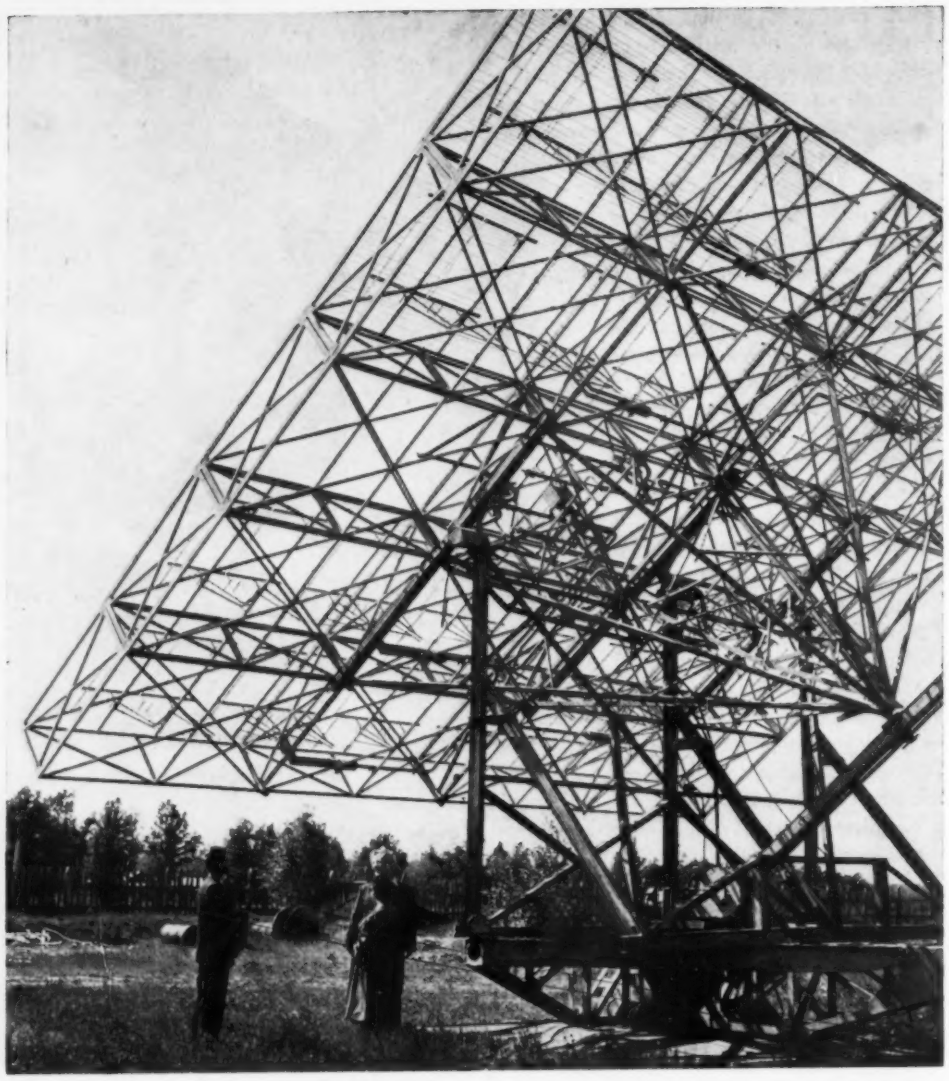
The discovery of these elements, the main constituents of air, 600 miles up indicates that the atmosphere extends out very much farther than had been thought previously.

The Ionosphere and Radio Communications

The ionosphere is that part of the upper atmosphere which contains large numbers of electrically charged particles. They constitute a kind of mirror reflecting radio waves back to earth, thus making long-distance transmission possible, the propagation of radio waves far beyond the limits of direct visibility.

The ionosphere is made up of several levels which vary as to their electron density—measured by the number of electrons per cubic centimeter—and in the type of radio waves they will reflect. A detailed study of the iono-

SPUTNIK III EXPLORES THE COSMOS



GIANT ANTENNA OF A SATELLITE-TRACKING RADAR-SCOPE, ONE OF A CHAIN THAT GIRDS THE SOVIET UNION.

sphere is therefore of prime importance for radio communication.

An analysis of the radio signals sent by the sputniks helped estimate the extent of electron concentration in the regions lying above the level with the maximum content of electrons, denoted as the level of main maximum ionization. The observations showed a tenfold increase of electron concentration from an altitude of 65 miles up to 185 miles. From 185 miles up to 300 miles the concentration declined by 50 per cent.

These results are similar to those obtained with the aid of geophysical rockets, especially the one launched by the USSR Academy of Sciences last February. But since the measurements with the aid of sputniks were carried on for an incomparably longer time and over various parts of the earth, much more extensive data were gathered.

Sputnik III readings show that positive ion concentration in the daytime is some 160,000 ions per cubic centimeter at an altitude of 490 miles and about 500,000 ions per cubic centimeter at 150 miles. These findings are of inestimable value for determination of ionization variations above the main maximum in the ionosphere.

Interesting results were received by Sputnik III on the temperature of ionospheric electrons. It proved to be much higher than the temperature of neutral particles and ions at the altitudes of the satellite's flight. This is an unexpected result which requires further study. Physicists think it might be due to variable geomagnetic fields.

In its flight through the upper atmosphere, Sputnik III acquired an electrostatic charge on its outer surface. Measurement showed this was a negative charge and its intensity proved to be far greater than expected.

Another surprise was the unexpectedly great intensity of the electrostatic field in the upper atmosphere. It measured from 10 to 100 times stronger than had been anticipated. This is a finding that may prove to be the key for an understanding of some hitherto unexplained processes that occur in the ionosphere.

The Earth's Magnetic Field

A magnetometer carried by Sputnik III has mapped out the magnetic field of the earth hundreds of miles above the ground. Analysis of readings indicates relatively brief but rapid changes in the field each time the satellite passed through what is known as the F_2 layer of the ionosphere. This is thought due to systems of currents in that region. The suggested explanation will be verified by further study of the data gathered.

The Sputnik III readings also show that the distortion of the earth's surface magnetic field known as the East Siberian Anomaly falls off only very slowly with increasing height. This appears to disprove the theory that the sources of the anomaly lie in the upper layers of the earth's crust.

Valuable information was received on meteor particles which not only is important for theoretical studies of the cosmos but also has very practical meaning for ensuring safety of future manned flights into outer space.

Sputnik III's recorders, whose measuring surface totaled 840 square centimeters, have registered an average of one strike every 100 seconds. This corresponds to the density of the meteor substance of less than one ten-billionth of a gram per square meter of surface per second. Besides this very low density, however, the instruments recorded at one point a short but sharp increase in the number of impacts that reached a figure of several dozens per square meter per second.

A Halo of Charged Particles

The study of cosmic radiation with the aid of artificial earth satellites creates new opportunities for obtaining information on the origin of particles with extra high energies. Valuable data have already been provided by Sputnik II. The study was further advanced by Sputnik III whose more complicated instruments were able to collect more detailed information. In addition to charged particles, these instruments also recorded photons and heavy atomic nuclei in cosmic rays.

Moving from south to north, Sputnik III recorded an average intensity of 300-500 photons per second passing through its counters. After crossing 60° north latitude the number of photons increased sharply. As the sputnik moved from north to south there was a sharp drop below this latitude.

The high readings indicate that a new source of photons comes into play. The natural explanation for this phenomenon is its connection with the Northern Lights, since their zone is close to 60° north latitude.

As the sputnik passed over the equator, even more intense streams of charged particles were recorded. The number of particles in these streams is thousands of times more than in the stream of cosmic rays.

It can thus be concluded that our planet, like some other celestial bodies, is circled with a kind of halo of fast moving particles held in a ring by the earth's magnetic field.

The data on heavy atomic nuclei gathered by Sputnik III has proved to be very important for advancing the theory of the origin of cosmic rays. The readings indicate that the number of heavier-than-iron nuclei in cosmic radiation is roughly 10,000 times less

than the number of nuclei of iron, nickel and cobalt.

Generally speaking, the composition and proportion of the different atomic nuclei in cosmic radiation is related to the abundance of chemical elements in the universe. The preliminary results of Sputnik III investigations confirm the view that the proportion of extra heavy nuclei approximately corresponds to the proportion of these same nuclei evolved from analyzing the composition of planets, stars and meteorites.

Promising results have been achieved in the study of corpuscular radiation. One of the most interesting here is the discovery of intensive electron streams recorded by Sputnik III. The intensity of these streams increased with altitude and above high geomagnetic latitudes. At times the streams even jammed the instruments and exceeded the upper limits of their measuring scales.

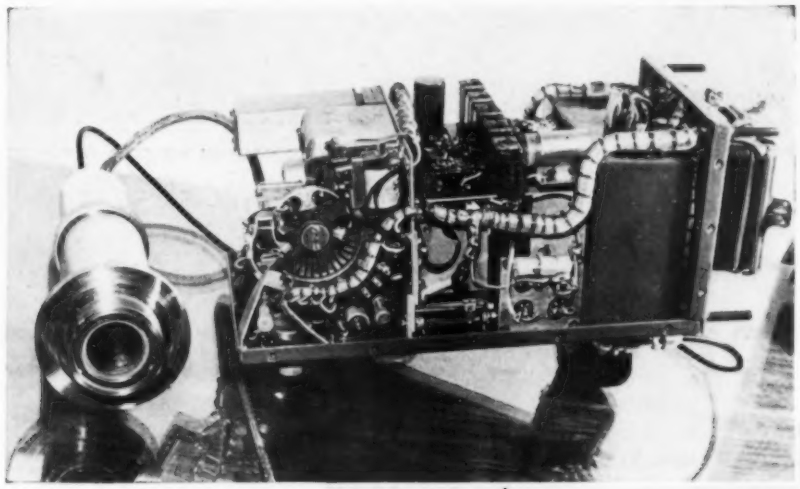
These electrons cannot be corpuscles coming from the sun because their velocity is too great. It seems more likely that they are electrons from the earth's own atmosphere accelerated to very high energies—estimated at 10,000 electron-volts, according to Sputnik III data—as a result of variable magnetic fields produced in the outer atmosphere by the interplanetary environment and the sun's corpuscular streams.

Toward Manned Space Flight

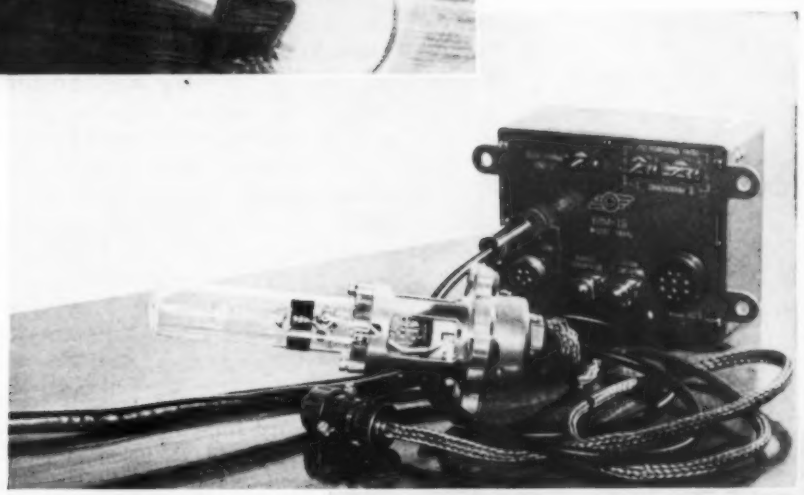
The launching of each earth satellite brings us measurably closer to human flight in space. Sputnik II with its dog traveler supplied the first reliable experimental data ever gathered on biological aspects of space flight. We now know that a highly organized living organism can withstand the great accelerations required to launch a satellite in orbit and can tolerate the subsequent condition of weightlessness.

Of course, a great deal of exploratory work will need to be done before the first man is launched into space. But a manned satellite and even manned space stations that would serve as departure terminals for flights to the moon and planets closest to the earth, while projects for the future, are very much on the working agenda of space engineers, space biologists and space medical researchers.

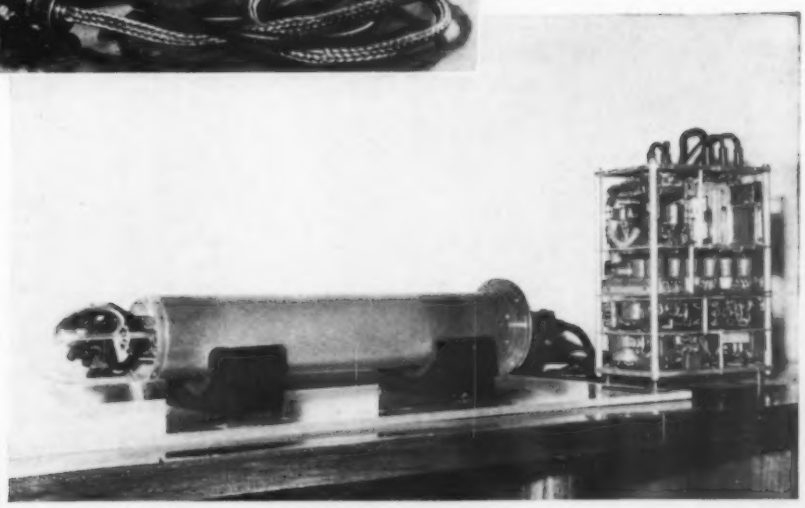
More immediate, however, than a manned satellite launching are other projects which are not so dramatic but are, nevertheless, of enormous value for science—the launching of wholly or partially recoverable satellites, the development of oriented satellites for many kinds of experiments which cannot be carried on under terrestrial conditions, and the design of "eternal" satellites that will circle the earth at high altitudes and will have a practically unlimited life span.



MASS SPECTROMETER TUBE AND ELECTRONIC UNIT USED IN SPUTNIK III.



IONIZATION MANOMETER AND D.C. AMPLIFIER USED IN SPUTNIK III.

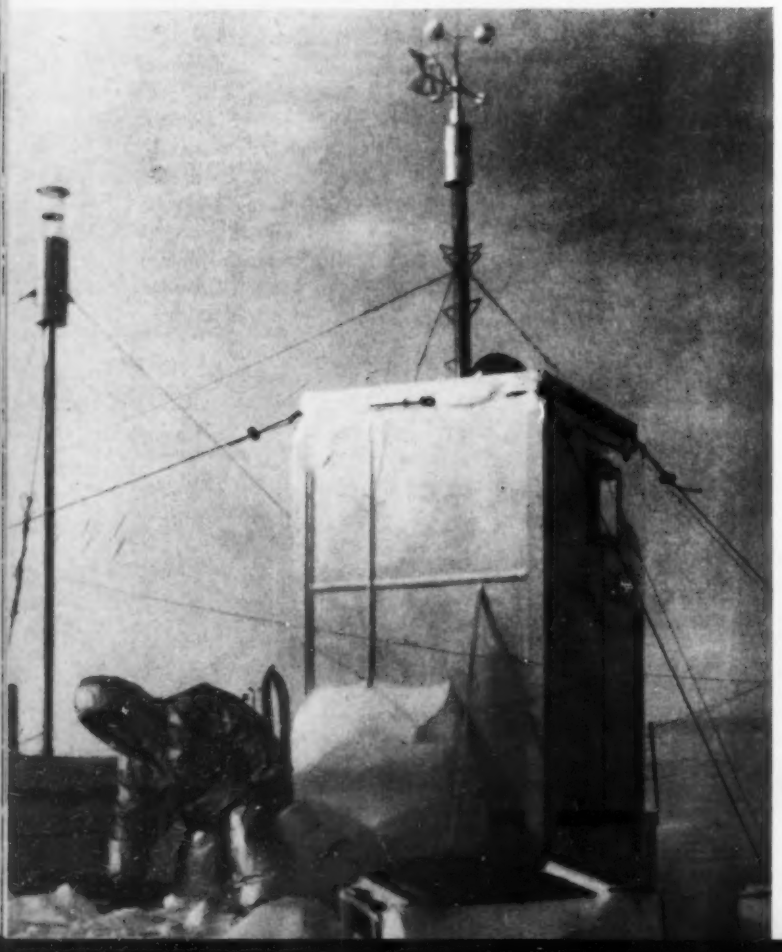


ORIENTATION AND ELECTRONIC UNITS TO MEASURE EARTH'S MAGNETIC FIELD.

AN AERIAL VIEW OF MIRNY, THE SOVIET ANTARCTIC EXPEDITION BASE CAMP. THERE ARE FOUR OTHER STATIONS CARRYING ON THE IGY PROGRAM ON THE COLD CONTINENT.

In the Heart of the Antarctic

SOVIETSKAYA STATION RECORDED THE EARTH'S LOWEST TEMPERATURE — 178°.



By Alexander Afanasiev

IN the heart of the eternally frozen Antarctic, thousands of miles removed from civilized settlements, IGY scientists of many countries are exploring the unknown mainland of the icy continent. In these regions of eternal deep-freeze the Soviet Antarctic Expedition has located six stations. Four of them are in the hinterlands, outposts of the coastal base camp at Mirny.

The Vostok station, in the region of the Southern Geomagnetic Pole, is 874 miles from the Mirny base. Another station, the Sovietskaya, is located at an almost inaccessible 12,000 feet above sea level, 880 miles from Mirny and 434 miles from the pole.

Research at these Antarctic stations in meteorology, aerology, terrestial magnetism, glaciology, the ionosphere and other fields under the IGY program is carried on under incredibly difficult conditions. At stations in the interior scientists report that automatic instruments stop registering, ink freezes despite the anti-freeze mixed with it and kerosene solidifies to look like wet snow.

Until recently the coldest place on earth was considered to be at Verkhoyansk, in North-East Siberia. Instruments there recorded a temperature of 155.6 degrees below zero. Then instruments near Oimyakon,

THE ICEBREAKER OB IS ONE OF THE SHIPS THAT BRING FRESH SUPPLIES AND EQUIPMENT AS WELL AS PERSONNEL REPLACEMENTS FOR THE SOVIET ANTARCTIC EXPLORERS.

on the upper reaches of the Indigirka River, also in Siberia, recorded a still lower temperature—159.8 degrees below zero.

Two years ago a new absolute low in the air's temperature was registered at the Amundsen-Scott station at the South Pole—a reading of 166.1 degrees below zero! But even this, IGY scientists have discovered, is not the coldest reading. A temperature of 176.18 degrees below zero was recorded at the Vostok station and a still lower one of 178.16 at the Sovietskaya station.

Peculiar things happen to metals and other materials and to the human organism at these glacial thermometer readings. They can be observed under artificially created low temperature conditions. As a result of decrease in volume which takes place in deep cold, the metal's durability increases under static loads and declines sharply under impact loads. Ice will become so hard that it cannot be cut by a saw. It will at the same time become much more brittle.

The effect of such low temperatures on the human organism is obviously of much more than theoretical interest. The enormous loss of heat in the human organism when exposed to such outer cold will result in changes in the periphery tissue and will unbalance the normally coordinated flow of arterial and venous blood. The sharp drop in temperature will disturb tissue metabolism and affect the thyroid and suprarenal glands.

The polar stations of the Soviet Antarctic Expedition are equipped to provide normal living and working conditions. Workrooms and living quarters are roomy and properly ventilated. An indoor temperature of 63-72 degrees is constantly maintained.

Scientists work outside for periods no longer than 20 to 30 minutes. They wear masks, glasses and fluted clothing into which oxygen is piped. Those doing meteorological and aerological work outdoors are equipped with 40-watt electric heaters keeping their feet, hands and body warm.

These are some of the defenses with which the scientists have equipped themselves to meet the killing Antarctic temperatures. They are adequate not alone for the absolute low temperature already recorded but for the even lower temperatures that may have to be faced as the scientists push further into the interior of this unknown continent of perpetual frost and violent storm.

THE BASE CAMP MAINTAINS PERMANENT AIR CONTACT WITH OUTPOST STATIONS.

FOOD PREPARATION UNDER ANTARCTIC CONDITIONS PRESENTS PECULIAR PROBLEMS.

On the Threshing Floor by L. Roiter

The Geologists by D. Polyakov

SOVIET ART portrays MAN and his LABOR

By Alexei Gastev

MAN and his labor have always been a pivotal theme of Soviet fine arts. Starting with the twenties this motif has been dominant in art exhibits. And it is altogether natural, since it was the spirit of the time itself, a time of construction on a massive scale, which the Soviet artist was trying to present on canvas or in sculpture.

It would have been an artist of small dimension indeed who could have shut his eyes to the enormous drama being played out all around him. These were heroic scenes—a nation of men and women rebuilding out of war and invasion, transforming a devastated country into an advanced power.

Here were subjects ready and waiting for the artist—a great industrial city arising where there had been only barren waste, or collective farmers harvesting wheat that stretches to an endless horizon. It is this drama and its heroes—the workers and farmers—that Soviet artists have painted and sculptured.

New Landscapes

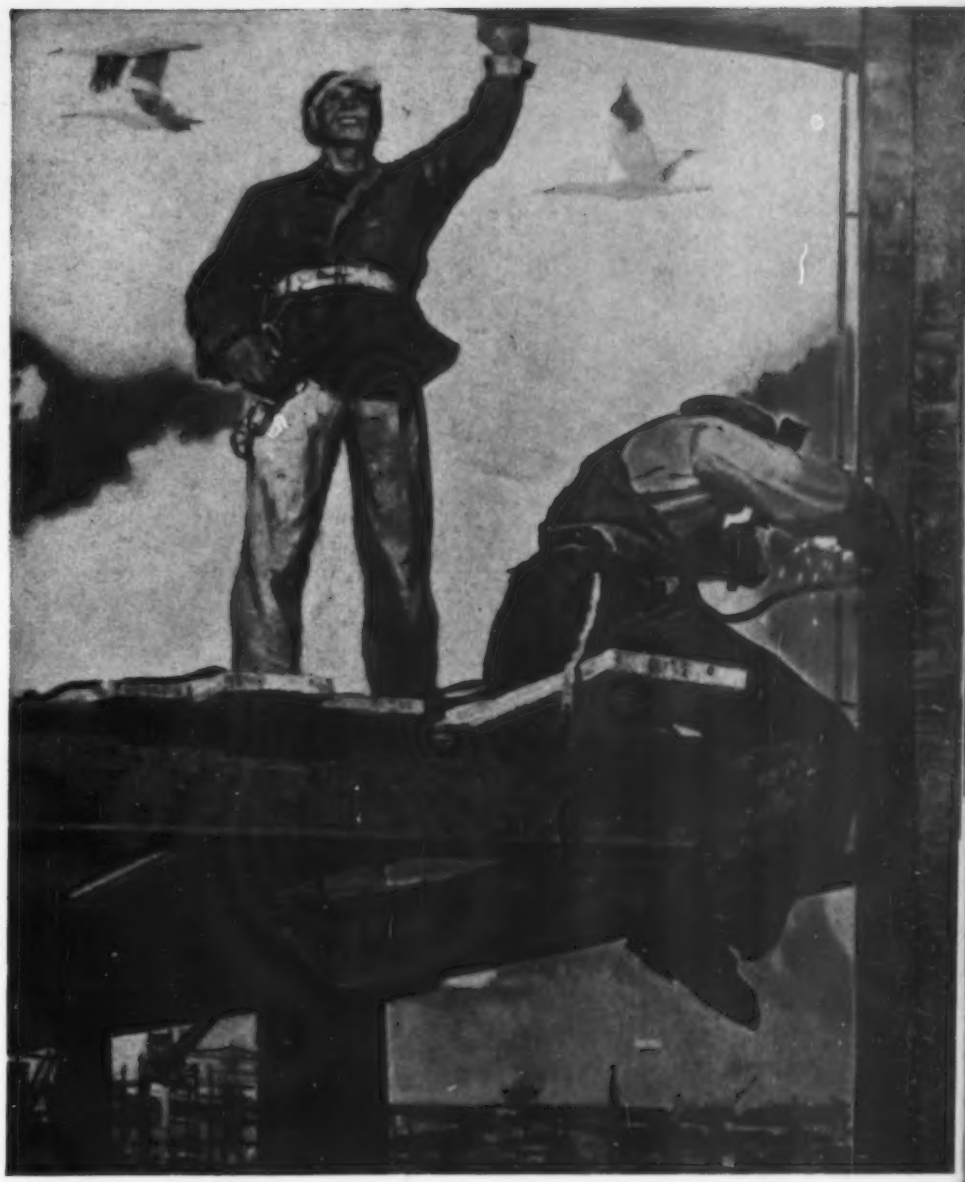
A frequently used background in Soviet painting is the industrial landscape. Characteristic is Kotov's *Blast Furnace Number 1* done in 1930, at a time when the whole country was concerned with accelerating the pace of industrialization. The painting, the first blast furnace of the Magnitogorsk Iron and Steel Plant being built, gives the atmosphere of nationwide construction.

This is one of the rarer canvases in which major emphasis is given to the construction itself rather than to the builders. In most paintings with industrial themes the worker is in the foreground. This is typified by Gorelov's *An Honored Steelmaker and His Team;* by Deineka's *The Forgemen;* by the painting done by a group of artists, *Gift from Leningrad,* which depicts the assembly of a turbine for the Tsimlyanskaya Hydroelectric Station.

The big dams built in the last decade to harness the power of the country's rivers have served as background for many paintings. Thousands of young people came to work on these gigantic projects. More often than not the construction sites of the new hydroelectric plants were in distant uninhabited areas with very little in the way of modern comforts.

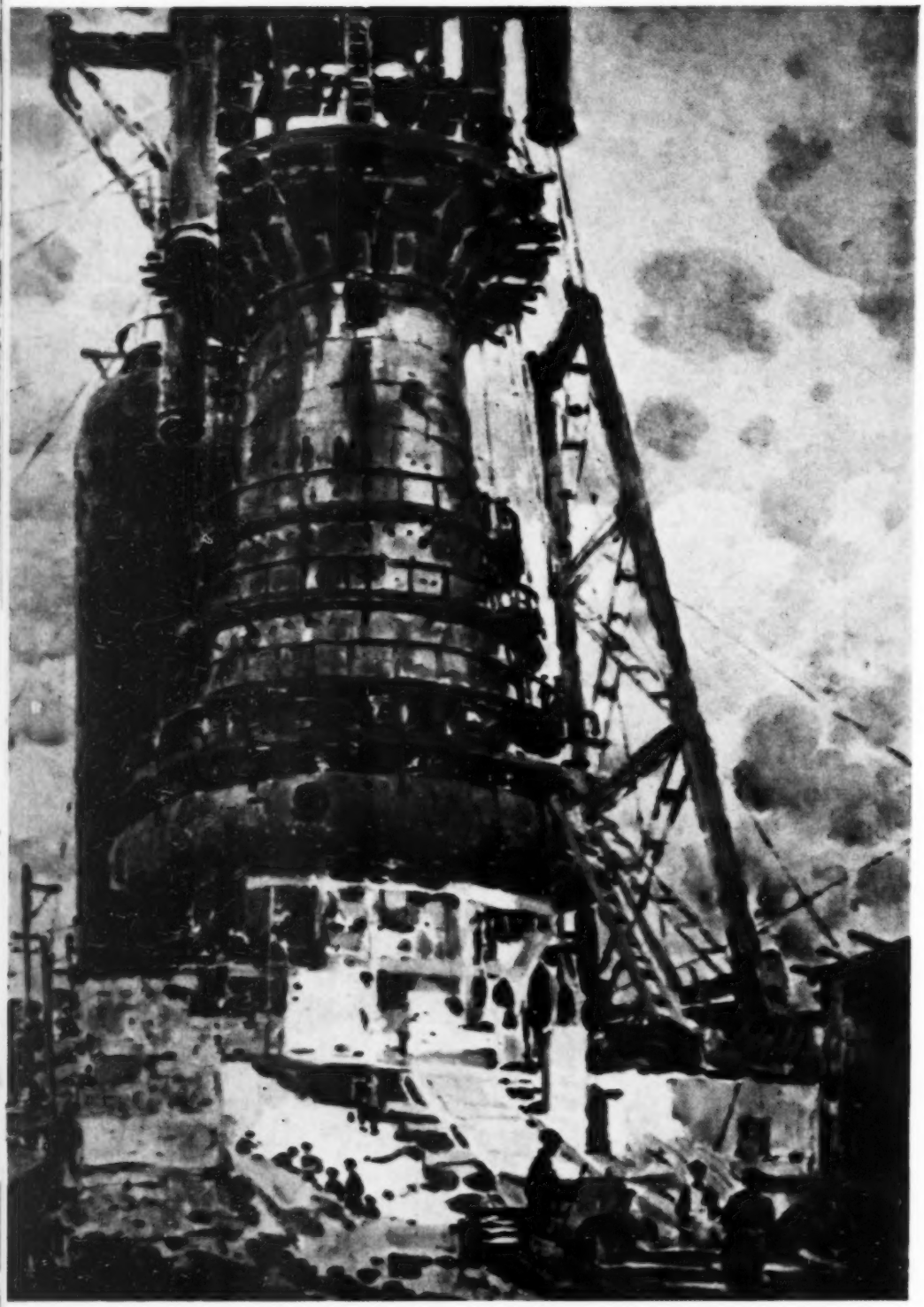
But these enthusiastic pioneering people made small matter of the hardships. They did the impossible, working against time and

Continued on page 34



***How Beautiful!* by I. Zarins**

***Oil Workers of the Caspian Sea* by T. Yashayev**



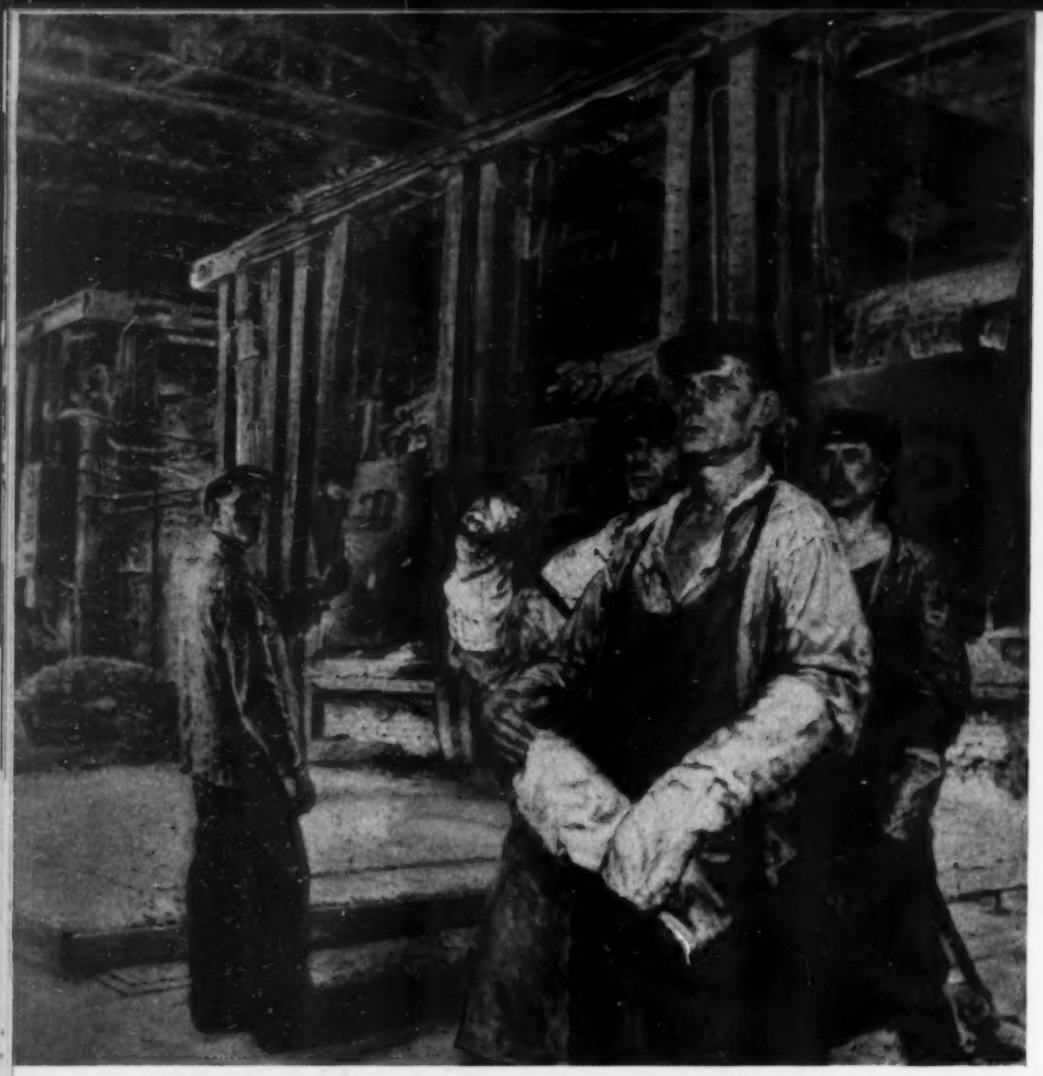
Blast Furnace No. 1 by P. Kotov

Fishermen's Rowing Contest by J. Osis

Awakening of the Virgin Lands by V. Basov

Osis

Young Prospectors by V. Gavrilov



An Honored Steelmaker and His Team by G. Gorelov

MAN AND HIS LABOR

Continued from page 31

against nature as though they were determined to show the world what Soviet people could do.

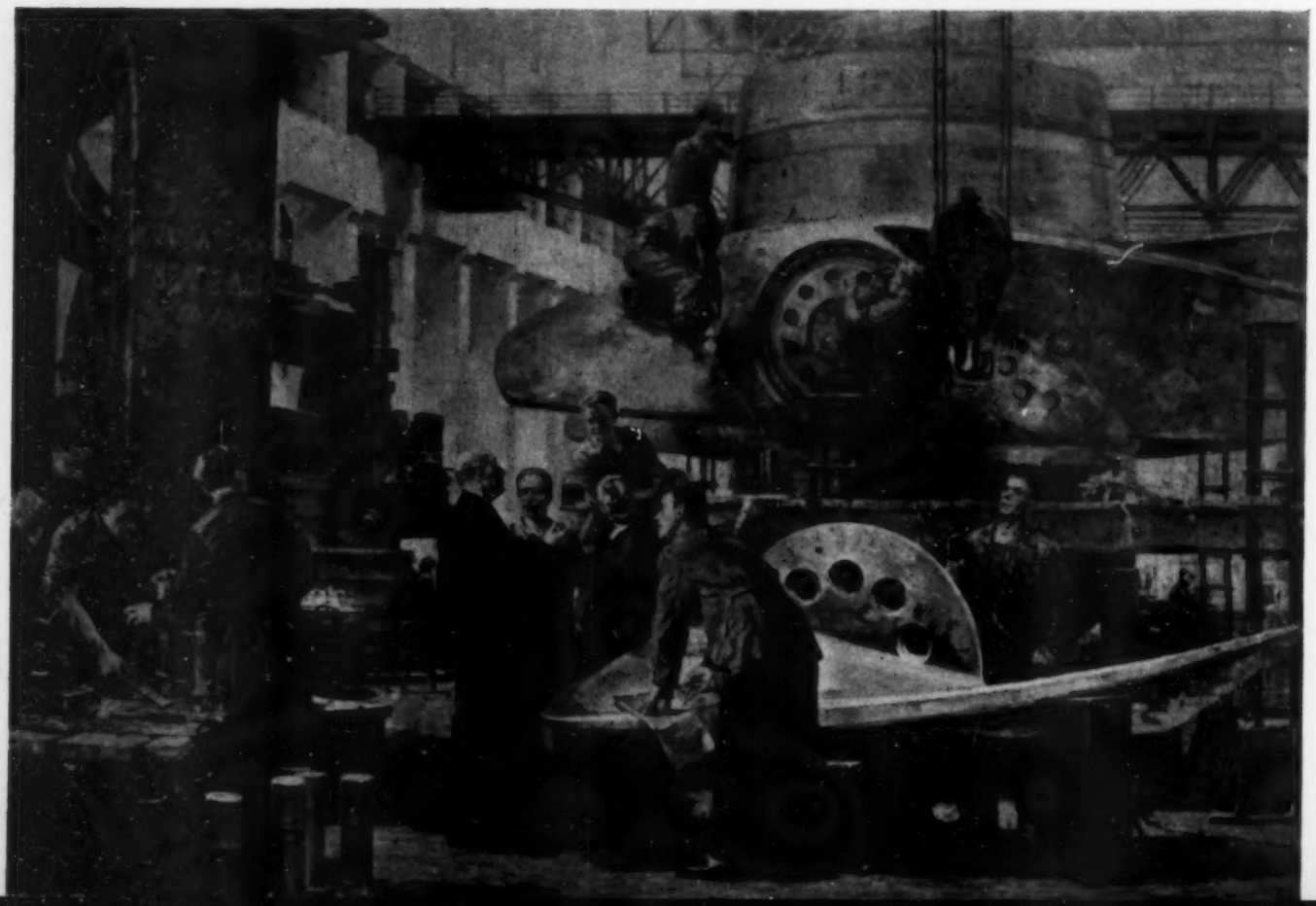
Many artists came to these construction sites. They sketched excavators and cranes and steel scaffoldings, but mostly they sketched the builders. Then they worked their sketches onto canvas.

One such painting is Andronov's *Building the Lenin Hydroelectric Station.* This is a lean picture, sparing of lines. The brushwork is economical but driving, as though it were pulsing with a powerful beat, its movement urgent and irresistible. The men and trucks shuttle back and forth almost in a measured rhythm. The color is restrained and terse, even austere.

People of New Spirit

At a recent exhibition Zarins, a young Latvian artist, displayed a canvas titled *How Beautiful!* Steeplejacks are working on the top of a building going up. This is hard and dangerous work, but these men are buoyant, at ease in their jobs. Their animation shines through the bright warm colors, the blue sky

Gift from Leningrad by N. Veselova, V. Zagonek, A. Rubin and Y. Tulin



***Shamama Gasanova* by G. Akhmedov**

and the sun reflected off the steel girders. There is a warmth and a grandeur and a poetry in work, the artist is telling us with his glowing brush strokes.

Exchange of New Experience, a painting by Levitin, personifies lathe operators Genrikh Bortkevich and Nikolai Bykov, who have been competing for priority as top workers in their trade for many years now. The two men are passing on to each other the "secrets" of their success. This is the spirit of friendly emulation and creative rivalry which is symbolic of the relation between Soviet workers.

In his *Young Prospectors*, Gavrilov paints a group of young geology graduates on a first independent expedition for new mineral deposits in unexplored regions of Siberia. Hard and challenging work far from home is beautifully conveyed in the composition.

Farmer As Hero

Among the many notable paintings on collective farm work is Mylnikov's *In the Peaceful Fields*. A group of singing women walk through a field in flower, the sun overhead glows in their faces. The painter strove to make his figures monumental and therefore placed the horizon low so that the figures, sharply defined against the sky, loom large as they move toward the spectator. The impression the painting conveys is of a fruitful, bulging earth and of farm women walking out to reap its bounty.

Basov's *Awakening of the Virgin Lands* is dedicated to the young people who volunteered to go East to help cultivate barren steppes of Kazakhstan and Siberia. The painting shows the endless plains at evetide. Their silence, undisturbed for centuries, is broken by the rumble of tractors. The eagles, former rulers of the steppe, fly from their nests in the grass, alarmed by the tractor-armed men.

Sculptured Portraits

Labor as theme is also vividly developed in work by Soviet sculptors. Sabaneyev's small figure *After the Civil War* takes us back to the early twenties. A Red Army man, still in military tunic, wields a pick. It is the demobilized people's army working to rebuild their war ravaged country. There is great power in the pose, the turn of the head, the grip of the strong hands on the weapon of peace which has replaced the weapon of war.

The sculptured portraits of industry and farm innovators personify man, his driving force, his creativity. Akhmedov's sculpture of Shamama Gasanova characterizes the collective farm woman who by her work has earned the love and respect of her people. Gasanova's lips are set in a firm line of determination, her glance is keen and penetrating. On her jacket are pinned two Gold Star medals, for twice she has been awarded the honorable title of Hero of Socialist Labor, the country's highest award for endeavor.

This is the Soviet sculptor's and painter's theme, one which is central to the society he is building as a worker and portraying as an artist. I cannot agree with those who say that by showing man at work Soviet art robs life of its romanticism. It is man through his labor who changes life, makes it meaningful. What more challenging subject can an artist find? Our painters and sculptors do not have to flounder in abstractions for inspiration, they find it in the very life of the people.

***After the Civil War* by L. Sabaneyev**

***Bread* by V. Mukhina**

Graduate students of the Central Asian University in Tashkent with an electronic microscope.

Yuri Ivanov's graduate studies at the Medical Institute of Kuibyshev cover respiration control.

Professor Vertushkov of the Sverdlovsk Mining Institute heads research on Urals' ore deposits.

SCHOOLING FOR FUTURE SCIENTISTS

By NIKOLAI NAZAROV
Ministry of Higher Education

This is the concluding article in the series on the Soviet system of education published in the last five issues of our magazine. The next issue will carry an article on the USSR Academy of Sciences, academies of Soviet Republics and the country's network of scientific and research centers.

SCHOOLING for future scientists in the Soviet Union is based upon the solid foundation of the entire system of education. The constant progress of the country's schools, from the elementary grades through college and university level, helps fulfill the vast program of training scientific personnel for all fields of the economy and culture. The scope of this program can be judged by comparing the four-fold increase in the number of workers and employees during the past four decades with the 24-fold increase in the number of scientists with graduate degrees.

The country now has almost a quarter of a million scientists and college instructors. Among them are more than 100,000 people with a Master of Science degree and some 10,000 with the degree of Doctor of Science. The comparatively smaller number of doctors is explained by the fact that this degree is conferred only for outstanding scientific contributions.

Scientific personnel is not only increasing quantitatively. The qualita-

These Azerbaijanian researchers in automation collaborate in designing new types of machines.

The graduate course at Udmurt Engineering Institute requires study of a foreign language.

Michael Gulkhasyan, an Armenian post-graduate, is now working as a specialist in plant breeding.

tive change is also noticeable. As the country's educators bring school instruction closer to real life situations, more favorable conditions are created for future scientists to acquire better background and training in their specialties.

The work-study plan combining studies in the senior grades of secondary school with work in factories or farms is now rapidly spreading throughout the country. As a result young people are obtaining a deeper understanding of the demands that will be made upon them on their future jobs, and they are able to choose more wisely the field in which they are most interested and for which they are best suited.

Similarly, the increasing opportunities to get a college education at evening and correspondence courses while working helps the young people to decide upon a future career intelligently. And this is especially valuable for those who choose to make science their life work.

Secondary School

Science teaching, in both its more specific meaning and as a method of inquiry, is one of the fundamentals of Soviet education. At home and school children learn to respect scientists and the work they do. Many parents look forward to a scientific career for their child, encourage his normal intellectual curiosity and inventiveness.

In school children are taught to use science as a thinking tool with which to investigate the surrounding world of nature and of man. They are encouraged to analyze phenomena, to think through a problem independently.

In every library there are popular science books for children, and everywhere in the country popular science films are widely shown. Various after-school centers and clubs for young naturalists, young mechanics, budding mathematicians or chemists help to stimulate and direct germinating interests.

Very frequently college teachers and senior students majoring in one of the sciences will give talks to the younger school children and describe the new things being done in science. For older school children the colleges arrange series of lectures on mathematics, physics and biology in addition to those on the humanities.

For children who show special aptitudes for the sciences, special schools are being set up. They will work along lines similar to the special schools for children gifted in music, drawing, dancing and dramatics which have been functioning for a long time now. These new science schools will prepare children for the college or university of their choice.

Thus, the aim of the whole system of Soviet education is to provide more than a superficial acquaintance with the large and evergrowing body of scientific knowledge which actuates our modern life.

Colleges and Universities

As the work-study plan becomes more widespread, increasing numbers of young people come to schools of higher education equipped with a background of practical experience in some phase of industry or farming related to the profession they wish to follow. They have, besides, a background of general secondary school education. If they are interested in scientific research in addition to the regular college or university program, their creative initiative is encouraged in every possible way and they are given every opportunity to develop their aptitudes.

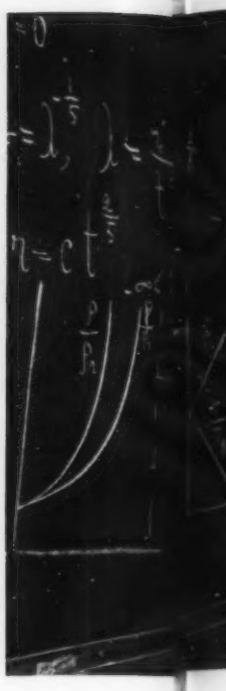
Any student may join the extracurricular scientific circles or societies. They carry on research under the guidance of faculty members who are research specialists in the corresponding fields. This kind of activity helps the student determine whether he is really suited for a career in science and selects out the most capable students for future scientific work.

In the third or fourth year of study, when the student has chosen his particular specialty, he can engage in more serious research in his chosen field. The research projects carried on are usually those suggested to the college departments by nearby scientific institutes or by local industrial and agricultural enterprises. Frequently they will meet a specific need or will provide the solution for some current practical problem.

The college graduate with ability continues his studies for a master's degree. Most students do their graduate work at colleges and universities, a smaller number at research institutes.

Alexander Nesmeyanov, President of the Academy of Sciences, with Moscow University post-graduates.

Fatima Velitova, Tatar student at the Kazan Chemical Institute, prepares her master's thesis on analytical chemistry under the guidance of eminent chemist Alexander Arbuzov.



SCHOOLING FOR FUTURE SCIENTISTS

A Flexible Organization

The number of students now working for a master's degree totals 30,000 compared with 3,000 in 1930. The increase is even greater proportionally in such republics as Turkmenia, Uzbekistan, Kazakhstan, Tajikistan, Moldavia and Estonia.

Soviet graduate education is rather flexible in organization and is adapted to meet varying individual needs. A college-trained specialist may, for example, take a four-year graduate course by correspondence while working at a full-time job.

These people, comprising about 30 per cent of all graduate students, are science's most valuable recruits since they are mature in every sense of the word. The flexible time arrangements that correspondence study permits is especially valuable for them because it can be worked into their job and family responsibilities more easily than attendance schedules at usual schools.

There are also intensive one-year graduate courses. These are taken for the most part by secondary school science teachers or young university instructors who wish to complete a master's thesis they have been working on for some time previous. Candidates for these one-year graduate programs are selected by the faculty council of a college or university or by a local board of education.

Most graduate students, however, take the three-year course at day schools. Candidates are chosen on the basis of competitive examinations in three subjects—one in a field selected by the applicant as his specialization, the second in a foreign language and the third in philosophy. Required in addition is a paper in the applicant's specialty written on a theme suggested by his professor.

Stipends and Vacations

An applicant for graduate study must have had at least two years of job experience in his specialty. In specific cases this requirement may be waived and an applicant may be permitted to enroll for the advanced study immediately after college graduation on the recommendation of the faculty council. This waiver is permitted only for the student who has demonstrated outstanding scientific capabilities.

Since all education in the Soviet Union is free, there are no fees of any kind for graduate study. Full-time graduate students receive a government stipend for maintenance—1,000 rubles a month for those who have worked for two years prior to admission to graduate courses, and 700 rubles a month for those admitted directly from colleges.

Every student gets an additional month's stipend annually for the purchase of scientific literature. All instruments and experimental apparatus required for the graduate's scientific work are furnished by the universities and research institutes free of charge.

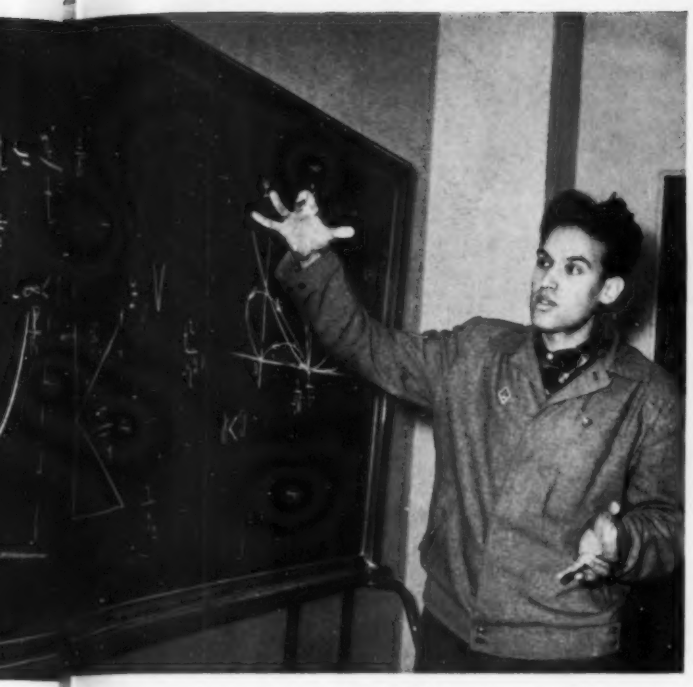
Graduate students get a two-month vacation yearly during which time they receive their usual stipend. Those who are enrolled in the one-year course continue to receive full pay for the job at which they were employed prior to enrollment. Correspondence students, in addition to their regular vacation from work, are allowed another month with full pay.

Program of Study

When a student who has been working at his specialty begins his graduate courses, he has already received a good grounding in his field. His graduate work is intended to prepare him for independent and original work for the advancement of science.

Students work according to individual programs they themselves set up. They do independent study and conduct their own experiments under the guidance of a senior scientist whose function is largely to stimulate creative scentific thinking.

The student working for a graduate degree is expected to equip himself with a scholar's tools and with the general background that makes



Graduate student Igor Shishkov describes his research problem before a college scientific society in Moscow.

Young scientist Pliyev, who won his master's degree in his native Ossetia in the Northern Caucasus, is now teaching physical chemistry in one of the technological institutes in Kazakhstan

the roundly educated man. However good his professional qualifications may be, the student will not be permitted to defend his thesis unless he has mastered a foreign language, is well versed in philosophy or has done some considerable teaching.

Any thesis submitted toward a master's degree must be published in a scientific journal or independently. This is to guarantee quality and originality of work. After publication the thesis must be defended before an open meeting of the faculty council. The conferring of a degree is decided by secret ballot.

Thesis Projects

Graduate students Ata Djikiev and Shikhberdy Anaklychev of the Institute of Ethnography of the USSR Academy of Sciences in Moscow, who are natives of Turkmenia, were recently granted their Master of Science degrees in history. One did a study of the old customs of the Turkmens on the southeast coast of the Caspian Sea, the other a study of the present-day customs of oil workers in Turkmenia.

Each student chose his own theme and did original research in his native region. Their adviser throughout the years of graduate study was Academician Sergei Tolstov. They consulted him on research techniques, accompanied him on some of his research expeditions and sought his aid in the solution of knotty problems.

On occasion the thesis project will take the form of assisting some eminent scientist in a research study he has under way. Sometimes a graduate works in collaboration with a group of scientists on a subject of major importance. This enables young scientists to learn not only from their superiors but from one another, too. They boldly and clearly state their own views and at the same time listen to those of the other members of the group.

There are multiple examples of this kind of mutually helpful and creative collaboration which serves to train the new generation of scientists. Professor Vasili Atroshchenko, the well-known chemist who heads the inorganic matter technology department of the Kharkov Polytechnical Institute in the Ukraine, designed an original autoclave in collaboration with one of his students; a highly efficient installation for the production of nitric acid with another; a new ammonium synthesis method with a third.

There is one characteristic that thesis subjects have in common. Whether they deal with theoretical or applied scientific problems, the problems will be current. Theoretical research paves the way to applied science, while applied science, coupled with advancing practice, prepares the ground for new discoveries and major generalizations.

The underlying principle was perhaps best phrased by Nobel Prize winner Nikolai Semenov, a physical chemist who has trained more than one generation of Soviet scientists. "The development of present scientific thinking will depend upon the degree to which its basic ideas are modified and expanded by the vigorous creative work of young scientists."

Research at Work

At an international congress of chemists held in Philadelphia some time ago there was much interest evoked by a paper on a new method of single-stage oil processing read by a Soviet scientist. The author and originator of the process was Martuza Nagiev, Vice President of the Azerbaijan Academy of Sciences.

Nagiev is one of the growing number of Soviet scientists who do their graduate work outside the university. He went through a vocational school, then graduated from an oil institute and worked as engineer and researcher. It was while he was working that he did the thesis research for his master's and later for his doctor's degree.

A considerable number of scientists complete their graduate requirements on leaves-of-absence from their jobs. They are granted their full pay during such leaves. Others, like Martuza Nagiev, do their thesis project research concurrently with work as engineers or researchers in plant laboratories and technical councils.

There are about 10,000 technical specialists with advanced degrees, masters and doctors of science, now working in industry and agriculture. The requirements for these graduate degrees are stringent, the standards high, but for those who demonstrate the capacity to meet these standards and show progress in their research, the Soviet educational system clears all obstacles that might hamper study.

Graduate Students of Moscow University

By DMITRI CHERNOV

Kazakh graduate Abdysamet Sadybekov chose soil biology as his major.

Samari Velikovsky joined the staff after earning his master's degree.

Yelegia Petrova is doing graduate work in the field of microbiology.

Arifjan Akrabirov is enrolled in the mechanico-mathematics department.

Ilfa Kutasova, graduate Tatar student, is majoring in philosophy.

Anthropologist Yuri Rychkov conducted excavations in the Pamir Mountains.

Lilia Osipova tests the effect of temperature on infrared absorption.

THE roster of scientists trained at Moscow University is a long and distinguished one. Many former graduates are today's world renowned men and women famed for their contributions in most varied fields of science and technology. Others teach in colleges and universities or work at research centers in almost all parts of the country.

The university's graduate student body includes young people from every one of the Soviet Republics and many foreign countries. They do their graduate study and research under the guidance of most experienced faculty members that include many eminent Soviet scholars and scientists.

Among the hundred academicians and the four hundred professors teaching at the university is chemist Alexander Nesmeyanov, President of the USSR Academy of Sciences. He himself received his scientific training at the university in the twenties. Academician Alexander Oparin, a leading biochemist, is another alumnus who is now teaching future researchers.

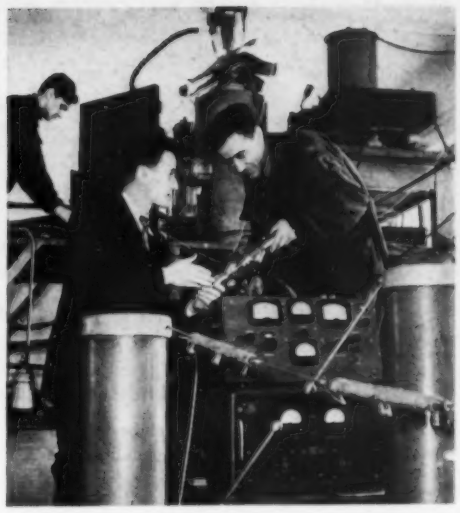
The university is proud of such faculty members as Academicians Dmitri Skobeltsyn and Sergei Vernov, pioneering investigators in cosmic ray phenomena; Leonid Sedov, researcher in mechanics; Victor Vinogradov, the linguistics scholar; Ilya Frank, recent winner of the Nobel Prize in physics.

A common and oft repeated item in Moscow newspapers is the announcement: "Student so and so will on this date make a defense of a thesis he is submitting for his master's degree. The public is invited." The list of candidates more often than not includes students of Moscow University, and the subject matter of their thesis projects covers nearly every field of science known to modern man.

The twelve departments of the university provide undergraduate and graduate instruction in more than 200 specialties. New departments are organized as the need arises. A recent addition is the graduate division of literature of the peoples inhabiting the Soviet Union in the philology department.

Moscow University is the country's leading school for graduate study. The towering new building is a city in miniature. University facilities include 1,500 laboratories, an astronomical observatory and a hundred-acre botanical garden. The university library is a great repository of modern and ancient manuscripts and books in every one of the world's languages.

The pictures on these pages show the multi-national family of graduate students of Moscow University. Some of them began their college education in the classes of this same building, then worked for a while and have now returned for advanced study. But many of the graduate students came to Moscow University from other parts of the country, like the young people portrayed on the facing page.



Setting up a research project in a laboratory of the University's atomic physics department.

Professor Valentin Asmus (center) leads a group of graduate students in a philosophy seminar.

IRINA BABENKO (RIGHT) TELLS ABOUT HER WORK TOWARD A MASTER'S DEGREE IN PHILOLOGY.

Anatoli Popov's thesis for his master's degree in chemistry took three years of hard lab work.

Geologist Alexander Stroganov shows off his new specimens to Glafira Krutova, an undergraduate.

Galina Kolenchuk's graduation paper dealt with defining uranium by electrochemical means.

Graduate Students of Moscow University

PROF. ISMAIL ZAITOV HELPED MARGARITA REVERDATTO IN HER GRADUATE PROJECT OF MAPPING THE ELBRUS GLACIERS IN THE CAUCASUS AS AN IGY PROJECT.

Rufina Tikhomirova (left) of the Journalism School examines the University's newspaper.

Students get together for various activities in the dorms' comfortable recreation rooms.

A student from Azerbaijan and one from Kazakhstan take time out from their studies to chat.

Sergei Ushakov, graduate geography student, and his wife Lidia, high school physics teacher, both studied at Moscow University.

Ushakov and his friend geophysicist Koryakin posed for this photo in Capetown, South Africa, with the American scientist Waite (center), their colleague on Antarctic exploration.

This picture with penguins is from Sergei Ushakov's album on his two Antarctic expeditions.

Dean of Soviet Architects

By Boris Lazarev, Architect

IVAN ZHELTOVSKY, dean of Soviet architects, passed his recent ninetieth birthday working at his drafting table. In the sacks of birthday messages which arrived for him there were cards and letters from children who had heard his name in classrooms, from masons and carpenters who had worked on buildings he designed, from such pre-eminent people in their own fields as the ballerina Galina Ulanova and the composer Dmitri Shostakovich. All of them wished him as many more years again of creative work.

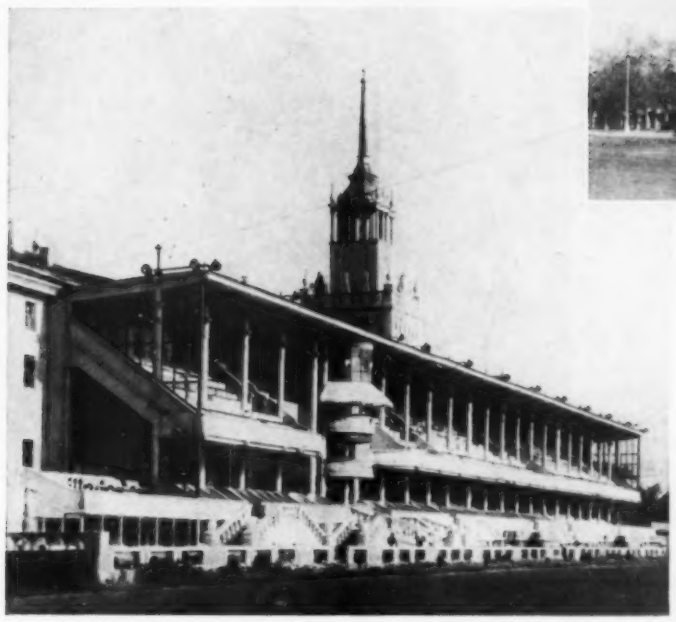
He commented smilingly to reporters that one or two of the birthday messages from close friends had suggested that he had earned a rest. Perhaps he would take a day or two off when he got around to it, he laughed, but not in the immediate future. He says he is too busy now. The national housing program is to provide the urban population with 15 million new apartments by 1965. Another 7 million houses are to be built in rural communities during the same seven years.

The Past Four Decades

When the October Revolution took place in 1917, Zheltovsky was past 50, an architect who had designed more than a hundred distinctive buildings and had been honored with the title Academician of Architecture. He would seem to have been at the peak of achievement, his work recognized and handsomely rewarded not only at home but in many countries abroad.

Zheltovsky was one of the intellectuals of the old regime who grasped the meaning of the Revolution in its human terms and translated it into his designs. Invited by Lenin, head of the new government, to serve as architect and consultant on construction, he willingly accepted. Among the projects he directed at the time were a "New Moscow" master plan for reconstruction of the Soviet capital. Many of the drafts he worked out then have long since been given form and dimension in stone.

The Moscow Hippodrome was reconstructed by Ivan Zheltovsky after a fire which almost completely destroyed it some years ago.



Zheltovsky's reconstruction included the use of colored concrete for the grandstand of the track.

He supervised the restoration of the Bolshoi Opera House. He planned the ensemble of pavilions for the first national farm exhibition in 1923; it won him a gold medal at an architectural competition in Paris. In Moscow he designed a power plant, the State Bank building on Neglinnaya Street, the apartment house on Mokhovaya Street which housed the American Embassy at one time, and reconstructed the interior of the Grand Kremlin Palace.

Elsewhere in the country he designed the municipal council building in Sochi, the Government House of the Daghestan Republic in Makhach-Kala and structures in Yerevan and Nalchik. He also planned the Soviet Pavilion for the Milan International Exposition.

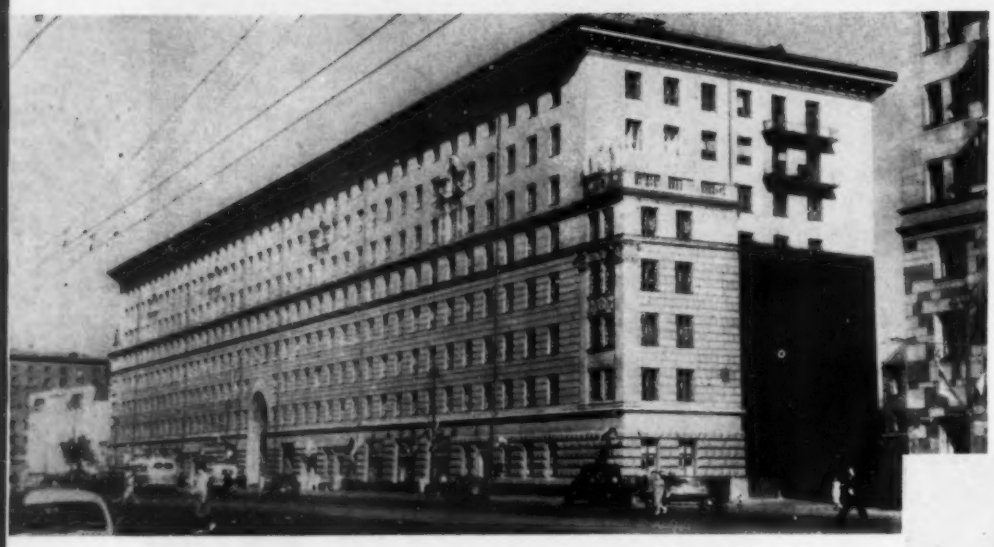
During the Second World War he taught in Moscow as head of an institute of architecture and planned for postwar reconstruction and rehabilitation a series of standard housing layouts for factory areas and collective farms that were subsequently published as portfolios.

After the war he worked on the reconstruction of the Moscow Hippodrome, designed several large apartment houses; a large-panel prefabricated cold storage plant; and three motion picture theaters.

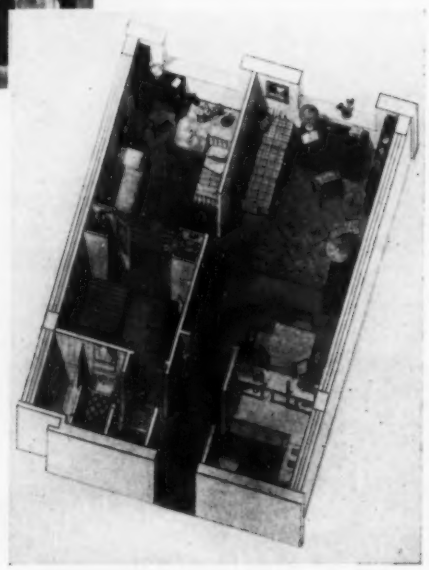
Functional Emphasis

The apartment houses on Moscow's Bolshaya Kaluzhskaya Street, Smolensk Square and Peace Esplanade designed by Zheltovsky are

The tower on this apartment building is a tribute to the old style of architecture. Zheltovsky now eliminates non-functional decorations.



This apartment building demonstrates Zheltovsky's treatment of mass, relieved by first-floor shops.



This small apartment offers comfort and convenience without waste of space.

Dean of Soviet Architects

Architectural design provides plenty of light for all apartments in this building.

characteristic of his functional emphasis. These are houses for people to live in. The lobbies and halls are roomy, the staircases easy to climb, the elevators are caged in shafts outside the building proper to reduce operating noise to a minimum, the flooring and partitions are sound-proofed, the windows do not frost over even in the coldest weather and the plumbing is laid out so that repairs can be made without inconveniencing the residents.

Together with other Soviet architects Zheltovsky discarded tradition-bound and petrified formulas and designed structures that while individual are at the same time standardized so they can be built simply and economically in large numbers. He has demonstrated in practice that standardized construction, with its enormous saving in building costs, need not conflict with the basic tenets of architectural harmony.

The architect's function, he believes, is to develop an organic unity between the structure's function and the new materials out of which it is to be built. This is the approach which Soviet architects and building engineers generally believe will solve the country's housing shortage within the next dozen years or even earlier.

His Principles of Design

Most of Ivan Zheltovsky's 90 years have been spent in working out his own principles of design. He has tried to find the common principles shared by such outwardly dissimilar structures as the Spasskaya gate-tower of the Kremlin, the Palace of the Doges in Venice, a Greek temple and a Chinese pagoda.

In working out his designs he thinks in terms of the basic relationship with the environment which a building or a group of buildings

Columns, balconies and large windows
dominate this apartment building
which at one time housed the U.S. Embassy in Moscow.

The State Bank in Moscow
features a more decorative aspect
of the architect's work.

must have. This relationship he defines as "unity of the whole and variety in the parts."

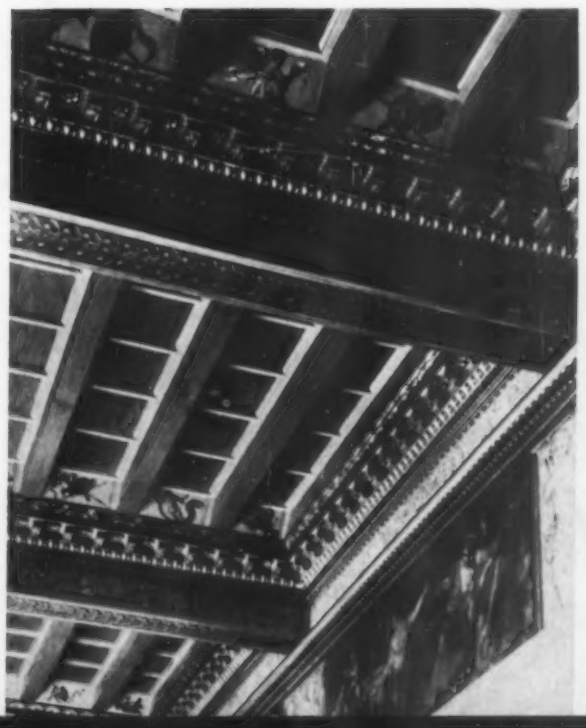
He assigns much importance to proportion. He has concluded from his studies that in the most progressive and forward-looking periods of social development, structures have been built lighter as they climb upward, with each additional weight lighter than the one below it. This is nature's system of proportion that gives its structures a feeling of lightness and enduring strength at one and the same time.

The veteran architect is interested in everything that relates to the way people live and work, whether it is a plan for the Palace of the Soviets or one for a balcony railing. Recently he has been extremely busy with such projects as the designs for a new building for the Tretyakov Art Gallery and a new wing for the Hotel Moscow, besides a new project for reconstruction of the center of the Soviet capital. And despite all this he finds time to work on a color scheme for painting Moscow's buses and trolleys.

"Even a city street," he says, "with its gray buildings in dreary winter weather, can still be given the feeling of light and sunshine. Let's see what we can do with color."

Zheltovsky lives in a house on a quiet Moscow street—a veritable museum of original Leonardos, Raphaels and El Grecos he collected. The chair at his work table once belonged to the famous Russian poet Zhukovsky, and the clock on the table comes from the yacht of one of Russia's famous sailors, Admiral Ushakov. Among the rare books in his library is the *Four Books on Architecture* written by the Italian Renaissance architect Andrea Palladio, with handwritten emendations by the author. But perhaps the most striking sight for the visitor is the studio of this 90-year-old architect, with its walls lined with drawings of work still to be done.

In restoration project
on an old mansion Zheltovsky undertook
the task of replacing its intricate plafond.



"YOU'LL REALLY SEE PROGRESS"

say villagers

AT A TRANS-VOLGA COLLECTIVE FARM

By Konstantin Vinokurov

GENERAL VIEW OF THE VILLAGE OF THE TIMIRYAZEV COLLECTIVE FARM SITUATED IN THE WOOD-AND-STEPPE PART OF THE GORKY REGION BEYOND THE VOLGA RIVER.

LET'S SAY this is your second visit to a collective farm. Before you leave you comment on the progress that's been made since your last visit. Invariably, you'll get this in reply: "It's nice of you to say so, but come back in a year or two and you'll really see progress."

There's a small but well-run collective farm that I've been visiting once a year, more or less, for the past ten years. It's in the trans-Volga region, not far from the city of Gorky. The country is heavily wooded with pine forests stretching for mile on mile. In the river valleys you get fir and alder.

The valley soil has always been considered fairly marginal farmland, a lot of work put in and not much in the way of crops pulled out. Where it isn't rocky, it's swampy. But this collective farm—it is named after the prominent Russian agricultural scientist Kliment Timiryazev—has been performing a small miracle of soil enrichment.

It's not a large farm as collective farms go in the Soviet Union—about 8,600 acres all told, compared with the 35,000- to 50,000-acre farms in the grain regions. Most of the Timiryazev farm's land is sown to wheat, flax, corn and fodder, about 500 acres are used for pasture, 150 or so for orchards and a 1,500-acre corner is thick pine forest. The farm has 400 head of cattle, hogs and sheep and several thousand chickens and ducks. The cattle, outbuildings, windmill, brick kiln, dairy, flax oil mill, shops and farm machinery—all this is owned collectively by 164 families.

The farm has gotten its poor-yield land to flourish. Through carefully planned crop rotation, gradually deepening the plowed layers and systematically introducing larger amounts of organic and mineral fertilizer, the fertility of the soil has been raised to the point where it will give 1.6 tons of grain to the acre.

Fruit was almost non-existent some years ago, now the farm orchards bear well and are bearing better each year. The farmers are also very careful about their pine woods. They do a good yearly job of clearing and reforesting, to replenish the trees cut for lumber.

Ten Years of Growth

It has been a fascinating thing for me in these ten years of visits to watch the farm grow. And not this farm alone but the whole countryside in the Gorky Region.

On a site I remember some years back as dense fir forest, there is now a man-made lake dozens of miles long and wide created when the Volga River was dammed by the Gorky Hydroelectric Plant. Before the plant was built, the Timiryazev farm used to generate its own electricity. It was expensive and inadequate to the bargain. Now all of the farm's power needs are met for a small fee. This has done a great deal to increase labor productivity and reduce overhead costs.

When I visited the farm late last fall, it was a little more than a year since my previous visit and as usual, the farm looked different. There were new buildings at the edge of the village and the ring of axes in the woods nearby seemed to be a carryover from my visit a year ago.

There was the same pungent smell of pine wood shavings I remembered along the village street where more new houses were being built. I saw a finished two-story building with big windows on the village square that I didn't remember being there a year ago.

I said to the farm's chairman, Ivan Yemelyanov, an old friend by this time, "That's a new one, isn't it?" pointing to the building.

He nodded and replied, "We'd feel like we were standing still if we didn't have something new to show you every time you come out. That's our new Palace of Culture."

We stopped at his house for a cup of tea. This is almost a traditional ceremony for Yemelyanov and me now. We sit down and he tells me what's happened on the farm since my previous visit. This time I start off with the same question, "Well, what's new?"

Better Use of Machinery

"Perhaps the most important of the past year's developments," the farm's chairman begins, "is the reorganization of the machine and tractor stations. Then, with the new government procurement system, we now get higher prices for our crops. And you know,

STOCKBREEDING IS THE FARM'S SECOND LARGEST BRANCH AFTER FLAX. THE FARM'S TOTAL INCOME HAS DOUBLED SINCE 1953 AND EXCEEDED 7 MILLION RUBLES IN 1958.

of course, that farm taxes have been lowered. All of this has given the farm a big boost."

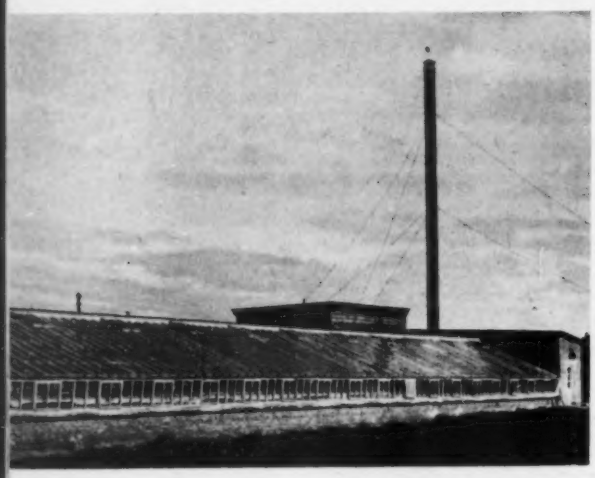
Going into details, Yemelyanov outlined what the reorganization of the machine and tractor stations has meant. "They used to do nearly all the field work on the collective farms in exchange for a percentage of the crops. Now we do it all ourselves, using the machinery we were able to buy when the stations were changed over to maintenance and service depots. Our farm spent 309,000 rubles buying tractors, combine harvesters and other machines.

"Without boasting, I can state that we are able to use this machinery more efficiently, to do more work in less time. We've done deeper plowing this past season, more cultivating, and used more organic and mineral fertilizers. As a result, our yields this past year have been higher."

Figures showed, Yemelyanov told me, that the farm's average milk yield per cow in the past five years had doubled and the total production of meat had more than doubled. The farm increased its cash income from 4,070,000 rubles in 1953 to 7,000,000 rubles in 1958.

"So you see," said the farm's chairman after he'd read me the figures, "we didn't have to count pennies when we bought all that machinery this past year."

NOW RETIRED, FYODOR GALKIN TEACHES CARPENTRY. *KROKODIL*, THE FARM'S WALL NEWSPAPER, IS POSTED REGULARLY. FARM CHAIRMAN YEMELYANOV IS CHESS FAN.



RECENTLY BUILT GREENHOUSE BRINGS GOOD INCOME.

THE FARM'S TROTTERS ARE KNOWN IN MANY PARTS OF THE COUNTRY OUTSIDE THE IMMEDIATE NEIGHBORHOOD.

FARM'S PROGRESS

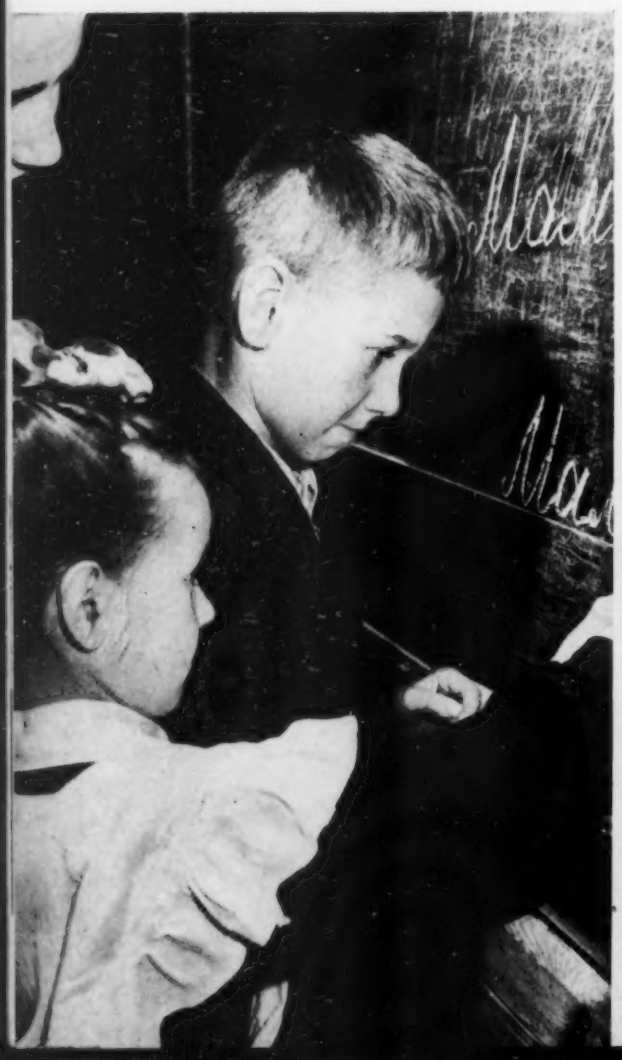
Higher Prices for Farm Products

"How about the new procurement system and the new prices the government pays for your crops?" I asked. "How does that show up in your budget?"

"It's still a little early to say how much more that will amount to in the long run, although there's no question that it will mean more income. Our money crop is flax. By the old system we used to get premiums for flax delivered over and above the amount stipulated in the contract with the government purchasing agency. Under the new system we lose these bonus payments.

"But the way it works out with our more advanced methods of farming is that we're able to improve the quality of the flax we raise and to grow more of it. So with less labor and less money invested we get higher incomes. We also, of course, get the new higher prices for the grain, meat and milk we sell. All in all, our farm's income in 1958 was a half million rubles more than in 1957,

VITYA TUMANOV HELPS HIS YOUNGER SISTER AT SCHOOL.



THE TUMANOV FAMILY BUILDS ITS THIRD HOUSE IN THREE YEARS.

WATCHING TELEVISION AT FARM'S VACATION RESORT.

and a slice of that increase is to be accounted for by the new price system."

"What's that construction you're working at near your cattle sheds?" I asked.

"It's a mechanized cowshed we're putting up. It was designed for us by a couple of engineers from a Moscow research institute for livestock breeding who spent some time here. Did you see the new houses we're building and the park we've laid out in the center of the village? We're really growing. Come back in a year or two. . . ."

I filled in the rest of the sentence for him, ". . . and you'll really see progress."

A Farm Family

I wanted to do some visiting around to see how the collective farm's growth had affected individual incomes. Bookkeeping figures showed that they had just about tripled in the past five years. To get a better picture of what this meant in personal terms I dropped in on the Tumanovs, a family with ten children.

This farm family lives in a house that they built with savings. They moved into it three years ago when the old house got too small for the growing family. Their eldest son Leonid recently got married and moved to his own house. Their second eldest son is now building a house for himself, too.

The family at present has three earners—the father, Semyon, who works with a field crew on cereal crops; Tanya, a daughter, who is a milkmaid in the dairy; and the mother, Yelizaveta, who works with a vegetable crew when she is free from her household chores and the younger children. In 1958 the Tumanovs—that is to say the three earners—brought home 26,702 rubles in cash, three tons of wheat, nine tons of potatoes, vegetables and other foodstuffs for the year's work.

This is tax-exempt income that goes entirely for the personal use of the family. All taxes, capital investments like machine purchases and farm maintenance costs come out of common farm funds.

The income the Tumanovs receive for work done on the collective farm is supplemented with the income from their own household plot. They have their personal kitchen garden, orchard, cow, calf, five sheep, geese, chickens and beehives. This income is subject to a tax, but it does not exceed 4 per cent.

The collective farm has its own vacation resort built in a beautiful pine grove on the shores of the new man-made Gorky Lake. It has its own old-age pension system and social security fund for the sick and disabled.

Toward the end of my stay I sat in at a farm membership meeting. The point under discussion was a projected plan for the farm's further growth. This was part of the nationwide discussion that was going on in preparation for the Communist Party Congress that would be proposing target figures for the country's economy as a whole.

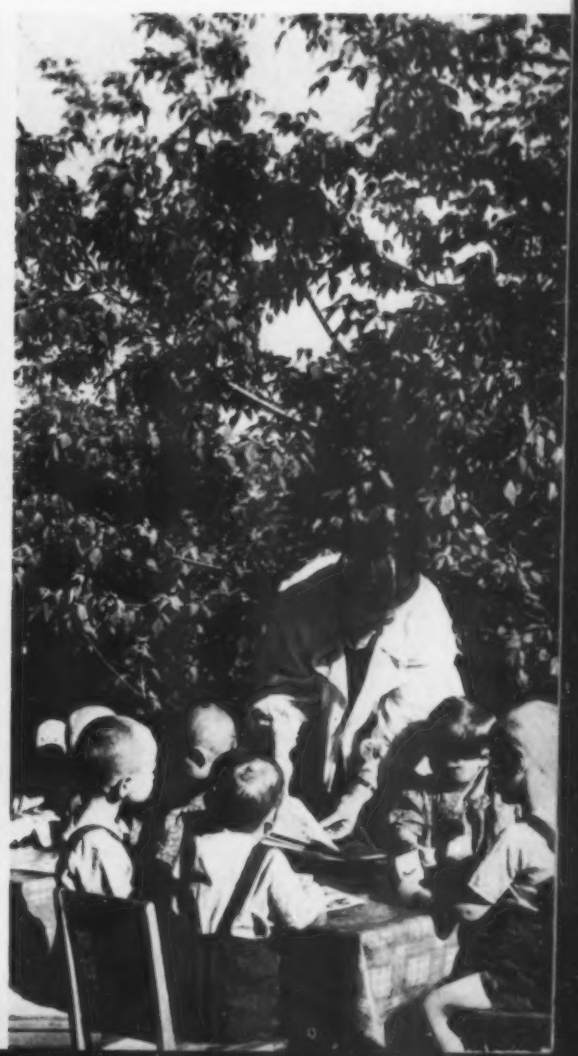
The discussion at the Timiryazev farm was spirited, lively and very much down to earth. When the farmers talked of so many more bushels of wheat per acre, so many more quarts of milk per cow, so many more houses to be built in the next few years, they had no doubt at all that these figures would be realized. Nor did I.

I should know the slogan of the Timiryazev farm by now, I've heard it so often in these past ten years: "Come back in a year or two and you'll really see progress."

AT THE HAND TAILORING SHOP OF THE FARM'S VILLAGE.

THIS RESORT IS ON NEARBY MAN-MADE GORKY LAKE.

THE RESORT'S ELECTROTHERAPY ROOM. ALL SERVICES ARE FREE.



TODDLERS OF FARM FAMILIES IN THE KINDERGARTEN.

Siberia's Creeping Orchards

YOUNG HORTICULTURIST HOLDS A CREEPING TREE BRANCH TO DISPLAY ITS FRUIT.

THE APPLES in the picture above were grown on creeping trees that cover the ground like a thick carpet. It might seem that this kind of horticulture would produce inferior fruit, but the fact is that experts find apples grown this way especially fragrant, tasty and attractive.

This odd apple was developed by Siberian horticulturists in a region where, up until just recently, short summers and long winters with their biting cold and sharp wind were considered an effective barrier to fruit growing. Indeed, even the raising of vegetables was once considered to be a feat.

But times have changed. Modern science and machinery have helped move the northern borders of farming closer to the Arctic. As a matter of fact, tomatoes have been grown successfully for many years on the Kola Peninsula beyond the Arctic Circle, and rich harvests of corn have been gathered in areas of almost eternal frost. And now orchards full of apple, pear and plum trees are growing in Siberia.

While seeking fruits adapted to these rigorous climatic conditions, Vsevolod Krutovsky, one of the founders of Siberian fruit growing, produced a creeping fruit tree. He named it the Krasnoyarsk Creeper in recognition of the region in which he made this transformation of nature.

When a sapling is a year old it is bent to the ground. Succeeding branches are also trained in this way so that a grown tree reminds one of a plate of apples framed in their own greenery.

There are many such "plates" these days on Siberia's collective farms and in the orchards of her gardeners. Thousands of tons of apples have already found their way to the tables of city consumers.

BEFORE THE FIRST SNOWFALL THE CREEPING APPLE TREES ARE COVERED WITH PINE BRANCHES AND, THUS PROTECTED, SURVIVE THROUGH THE MOST SEVERE WINTERS.

EYE EXAMINATION AT THE CLINIC OF THE KOLOMNA DIESEL LOCOMOTIVE PLANT. THE WORKERS GET COMPLETE MEDICAL AND DENTAL CARE WITHOUT ANY PAYMENTS.

HEALTH SHOP IN A FACTORY

By Georgi Yuryev

WORKERS at the Kolomna Diesel Locomotive Plant call their factory polyclinic the health shop. An apt name since its job is to keep several thousands of human engines in top-notch running order.

Soviet medical practice stresses disease prevention. The clinic at Kolomna, and those like it attached to every factory of any size in the Soviet Union, is therefore busy the year round with medical checkups to head off colds, infectious ailments and occupational diseases.

The clinic is on the plant grounds. In attendance are a neuropathologist; a dermatologist; an oculist; an ear, nose and throat man; a surgeon; a dentist; and a specialist in corrective exercises.

Seven laboratory rooms provide facilities for thorough diagnostic testing, including X-ray and electrocardiogram. The eleven treatment rooms are equipped to handle everything from a bruise to emergency surgery, and the physical therapy apparatus includes quartz and solux lamps, large and small ultra-high frequency units, Franklin and hydrolytic baths, besides a special hydropathic setup. The clinic has ten examination rooms and directly in the shops there are first aid rooms. There is also a dental laboratory.

Members of the family of a Kolomna worker may be treated by the clinic specialists if they wish and the workers may use the additional services of the Kolomna town hospital. Children are cared for at the town's

THE BEST DOCTORS OF THE TOWN ARE INCLUDED ON THE PLANT CLINIC'S STAFF AS CONSULTING PHYSICIANS.

HEALTH SHOP IN A FACTORY

infant consultation centers and the children's polyclinic. All medical and dental services are supplied without charge.

Regular Medical Checkup

Before an aspiring locomotive builder begins work at the plant, he gets a complete medical examination by a panel of specialists at the polyclinic in his home district. His medical history is kept on file in the plant clinic. Thereafter his health is checked periodically. Once a year the plant clinic gives vaccinations and other innoculations against infectious diseases.

If a worker's medical history indicates that he at any time suffered from a serious ailment, he is placed under special observation. Instrument-maker Yevgeni Terekhov's medical card, for example, shows a three- or four-time a year follow-up ever since he started work at the plant in 1954. His district polyclinic certified that Terekhov was in good health but noted that some years previously he had suffered from rheumatic fever. He was therefore automatically added to the roster for special checkup.

The clinic pays special attention to workers in the more taxing trades, steel-smelters, coppersmiths, furnacemen and the like. They get medical examinations more often than other workers. They also get priority in accommodation at health resorts.

Treatment and Follow-Up

Preventive medicine, however, is not the only aspect of the clinic's work. Treatment is provided for workers who suffer from chronic ailments. The treatment may require that the patient's job be changed. If that's the diagnosis, then the job is changed.

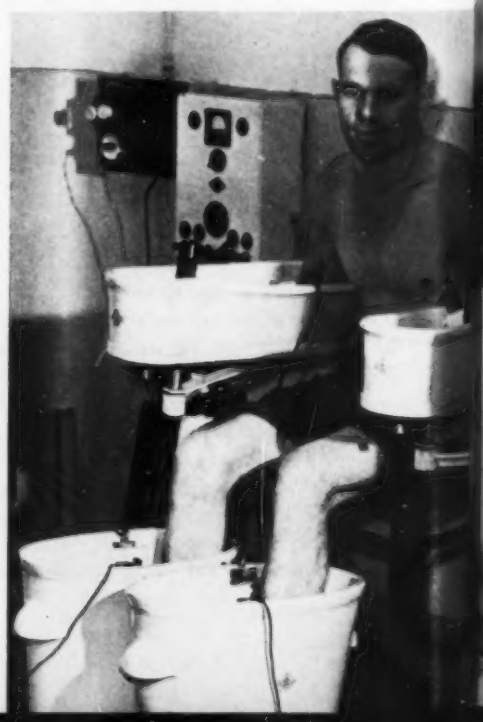
Fitter Nikolai Nikulshin is a case in point. He suffered from chronic eczema of the hands. Since his job made it impossible for him not to touch the lubricants which his attending physician thought was a factor in the condition, he recommended "drier" work. Nikulshin was transferred to work on a drilling machine, his wages stayed the same.

Alexei Parkhonin started work at the plant as a chauffeur. He suffered from peptic ulcer, an ailment of long duration with him. He was told to report to the clinic once a month and was given physiotherapy and a special diet, available at the dietetic section of the

Metal worker Pyotr Chekin recovers from pneumonia in the plant's hospital.

Mechanic Ivan Chemodin visits his doctor after returning from sick leave.

Assembler Nikolai Osipov is given physiotherapy to help him recover from the flu.



Daily medical inspection of workers' hands helps to prevent infections from minor cuts.

Thorough regular checkups by the plant's physicians provide each worker with his full medical history.

All work benches, machines and exhaust pipes are checked periodically by the physicians.

Dr. Daniel Pilch, a surgeon, is always ready for an accident or an emergency call from the employees.

Instrument maker Mikhail Romanov is treated at home by his attending physician.

Dr. Maria Alexandrova, plant dentist, cares for Mikhail Avdeyev, employee of the smelting department.

plant cafeteria. Twice, on prescription from the clinic, he was sent to a southern health resort. The consistent follow-up and care did the job, and before long Parkhonin's ulcer was completely healed.

Gennadi Ryzhov's medical record cites another successful treatment, this one not so much medical as financial. Ryzhov worked as an assembler, but after an operation he found the heavy work too much for him. He was thereupon transferred to machine-repair work. But the wages for his new job were lower. The medical commission at the plant established the degree of Ryzhov's incapacity and recommended that the amount of pension allowed for such disability be granted him. With his wages in the new job plus his disability pension his present income is even slightly higher than it was before.

Paid Sick Leave

The Kolomna plant clinic follows a procedure on sick leave that is standard for industrial establishments everywhere in the country. Dr. Natalia Knyazeva, one of the clinic physicians, examines mechanic Ivan Chemodin, let us say. He complains of headaches and a cough. She diagnoses a bad head cold, prescribes two days in bed and authorizes a sick leave for that period. If his cold hasn't improved by that time, the doctor prolongs his sick leave up to a maximum of six days.

Sick leave of longer duration must be approved by a commission consisting of Dr. Klara Belova, chief of the clinic, a consulting specialist and the attending physician. The commission can grant sick leave for as long as is necessary.

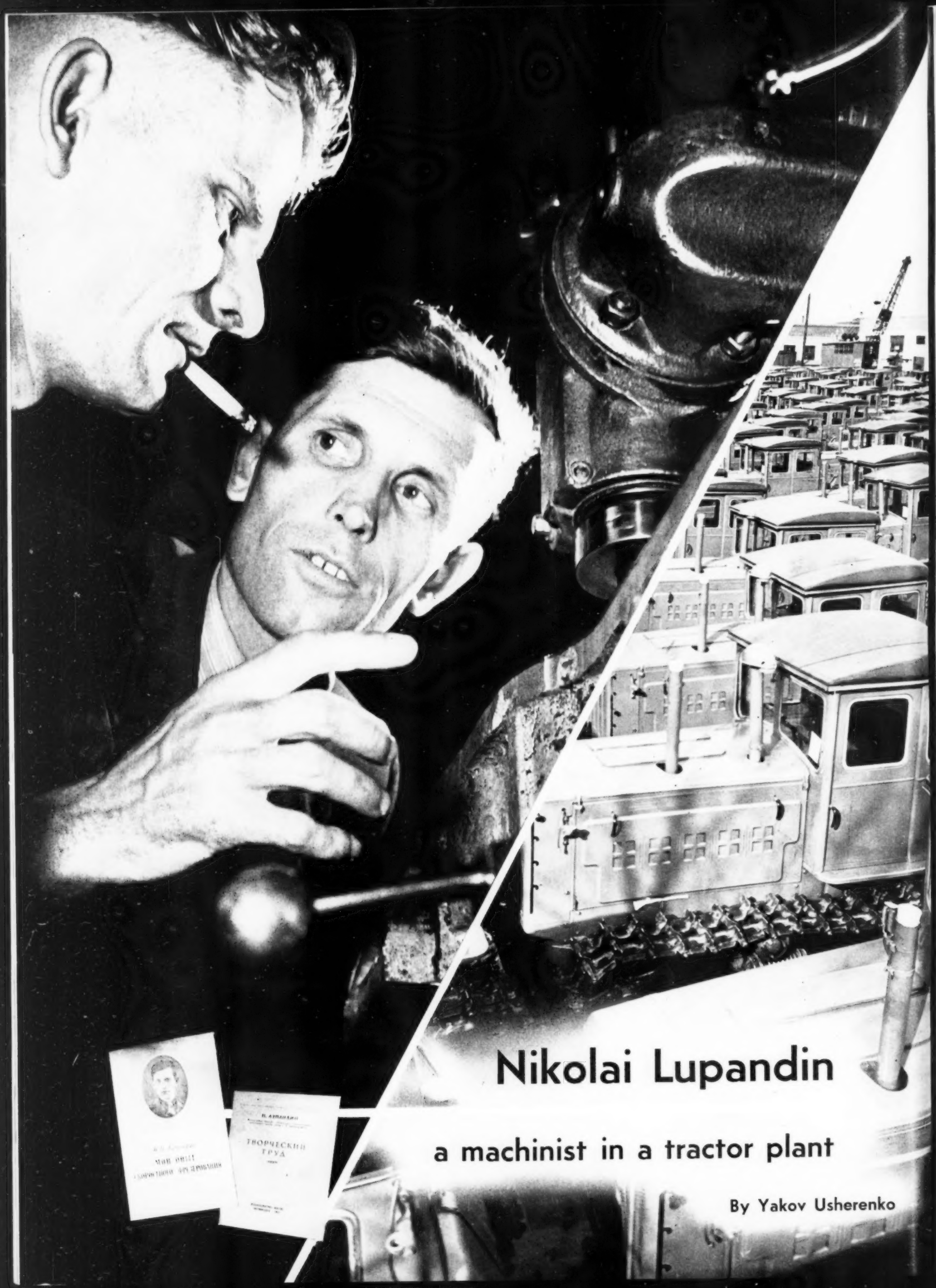
The pay for the days of sick leave depends upon the length of time a worker has been employed in the industry. Workers with less than three years' service are paid half their average wages; after three years—60 per cent, after five years—70 per cent, after eight years—80 per cent and after twelve years—90 per cent. If a worker is incapacitated as the result of an accident at the plant, he is paid his full wages, regardless of length of service.

The money to pay for sick leaves comes from the social insurance fund made up entirely by the industry and administered by the trade unions. No contribution to this fund is taken out of the worker's pay envelope.

A sick leave certificate issued by the attending physician will specify whether the patient can be up and about or whether he is to stay in bed. For more serious cases that require close medical attention, the clinic has its own fifty-bed hospital and, if necessary, the facilities of the larger town hospital. The plant clinic and hospital are supported out of government funds—about two million rubles annually.

Clinic physicians are free to call on specialists at the town hospital for consultation and on the services of a clinical research institute in Moscow if they think it advisable. When the occasion warrants it, patients are sent to the institute for examination and diagnosis.

For all except the most critical cases the plant clinic facilities are altogether adequate and the clinic staff admirably qualified to take care of the health of Kolomna plant workers.



Nikolai Lupandin

a machinist in a tractor plant

By Yakov Usherenko

NIKOLAI LUPANDIN READS THE MANUSCRIPT OF HIS NEW BOOK TO ENGINEER VLADIMIR VOLOSHIN.

AS A PRODUCTION EXPERT, HE LECTURES AT AN ENGINEERING SCHOOL.

NIKOLAI LUPANDIN is a milling machine operator at the Kharkov Tractor Plant. Everyone in the shops knows him as a man who can't look at his machine without trying to figure out how it could do a better job. His innovations have introduced much that is progressive in the technology of milling and have brought him the admiration of apprentices and the respect of veterans.

Lupandin is not an engineer by training. He is a practical worker and a very good one. But he has the inventive and the generalizing turn of mind that is the hallmark of the creative engineer. Besides devising a number of original gadgets, he has worked out an approach to milling machine operation based on his experiences which has proved helpful to thousands of workers in his trade.

Lupandin frequently lectures to future engineers at the Kharkov Polytechnical Institute on advanced methods of milling. He has written several books on his experiences in the trade which are used in Kharkov's machine engineering schools. Czechoslovakian machine builders found one of them, *My Experiences in High-Speed Milling*, useful enough to have it published in Prague in a Czech translation.

Machinist by Choice

For several years now Lupandin has been working in the modeling department of the factory's foundry. He talks of his work in phrases a sculptor might use: "Our milling machine operator is really a modeler of metal who takes a piece of ordinary pig-iron or aluminum and makes an intricate model from it. In the foundry shop it is shaped and molded, and then, in the machine shops, thousands of tractor parts are turned out."

How did Nikolai Lupandin come to choose milling machine operation as a trade out of the many thousands of others he had open to him?

"Partly accident," Nikolai explains, "but mostly conscious choice. I saw my first tractor when I was about twelve. This was in 1930 and our family lived in the village of Tolokonnoye, in the Belgorod Region of the Ukraine.

"It was the first tractor to come to our newly-formed collective farm. The whole village turned out to have a look at the machine and we children, of course, were way in front. We were all crazy to drive it, but I had an even wilder idea. I wanted to build machines just like it.

"It was some little time after that—this is the accident part—that the people in charge of the construction of the Kharkov Tractor Plant visited our village. They told the villagers about the big plant that was being built to make tractors and asked people who were interested in construction jobs to come to Kharkov.

"Our family was one of those that moved to Kharkov. My father wanted me to follow his trade as builder, but by the time I finished seven-year school I knew very definitely what I wanted to do—I was going to make tractors. I applied for the apprentice school at the plant and learned milling machine operation. And that's what I've been doing for 22 years."

It's His Plant

The first innovation proposal Nikolai Lupandin made was in 1940 when he had been working at the milling machine for a relatively short time. He noticed that old and worn-out cutters which had been replaced were scrapped. This set him thinking.

Cutters are expensive items, and it seemed to the young machinist that more could be done with the worn-out ones than to throw them in the scrap metal bin. He talked to some of the older hands and to the engineer who was head of the shop. Then he tried making a new cutter from an old one. It did the job when he used it on his machine.

Word got around at once, and the management congratulated Lupandin on the money-saving idea. After that all the milling machine operators began to use the renovated cutters, and Lupandin received his first bonus.

Among Lupandin's latest innovations is one on which he collaborated with Alexander Savitsky, a mechanic in his shop. It is a new method for production of models of links in the track of the DT-54 tractor. Casting these parts by the new method cut the production cycle by as much as nine to ten times and eliminated 65 different milling operations which had been necessary before then.

With Ivan Tkachyov, another mechanic in the shop, Lupandin worked out a new method of milling pivot boxes which increased productivity almost eleven times over and was responsible for a large saving in metal, electric power and tools.

HE OFTEN VISITS THE BOOKSHOP NEAR THE PLANT.

LUPANDIN'S GARAGE ADJOINS HIS APARTMENT HOUSE.

NIKOLAI LUPANDIN

Lupandin's work has stimulated other workers in the modeling shop to suggest innovations, but the very character of socialist production lends itself to this kind of thinking, and figuring out ways of doing a job better and faster.

The modeling shop in which Lupandin works holds regular production meetings in which the operators consider working problems, discuss better ways of using equipment and make suggestions for improvements. The shop management is obligated to report at these meetings what has been done with the proposals submitted by the workers.

This personal concern with the way the shop is doing is the psychological factor which accounts, perhaps more than any other, for the otherwise impossible-to-explain rate of development of Soviet industrial progress. Lupandin has this very personal interest and so does the shop manager, engineer Voloshin, who, by the way, was formerly a metal worker, and so does the very newest apprentice learning the trade.

Day Machinist—Night Student

Nikolai Lupandin, like the other workers at the plant, puts in a 46-hour week—eight hours Monday through Friday, six hours on Saturday. Now the plant is in process of switching over to a 40-hour week.

This changeover to a seven-hour working day in industry without reduction in pay is being put into effect throughout the country. Some of the factories in Kharkov have already made the switch. The Tractor Plant needs a little more time for the transition on account of its size.

The plant's machinists are all paid on a piece-rate basis. Lupandin's earnings for 1955 were 23,100 rubles, in 1956 he made 25,600 rubles and in 1957 almost 26,000 rubles. In 1958 he earned less—24,000 rubles.

"I didn't get as many bonuses in 1958," explains Lupandin. "This is my final year at the plant's division of the machine engineering school, and my studies don't leave me much time to work on gadgets."

Four evenings a week, from six to ten, milling machine operator Nikolai Lupandin turns student. Of the 400 enrolled at his school, a good half are men who work at the Tractor Plant, the rest come from plants in the area.

Study isn't the easiest thing in the world, especially after a full day's work. In spite of the difficulties, however, one worker out of every three at the Tractor Plant is studying at one or another of the evening and correspondence schools.

To explain his studying, Lupandin says simply, and perhaps that's all that needs to be said, "I'm studying because I want to know more."

Family Life

As for Nikolai Lupandin's private life—he lives seven or eight minutes away from the plant with his wife Taisia and two young daughters in a three-room apartment. He pays 95 rubles' rent a month. The apartment house he lives in has an attached garage where he keeps his car.

By the time Nikolai gets home from the plant his wife and children are already eagerly waiting for him. While the family has dinner, Nina, the elder daughter, who is in the fifth grade, and Nellie, who is in the third grade, tell their father all the latest school news. Saturdays and Sundays are days for family outings: the theater, movies, museums, exhibitions and book affairs.

Everybody in the family loves books and reading is a favorite pastime with the Lupandins. Nikolai is an inveterate newspaper reader and feels he's missing something if he doesn't go through the Moscow *Pravda* and the local Kharkov paper every day. He is also an omnivorous novel reader and covers a wide range of authors from Leo Tolstoy and Mikhail Sholokhov to A. Conan Doyle and Jack London.

Social Work

Lupandin has been active in one way or another in social work ever since he can remember. At school he was a member of the editorial board of the wall newspaper. During his apprenticeship he helped organize amateur art circles and in the shop he has always been an active trade unionist.

It was during the war that Nikolai decided to take on the social responsibilities and duties involved in Communist Party membership. The Kharkov Tractor Plant and its workers had been evacuated to Chelyabinsk in the Urals. Times were difficult. Everything was subordinated to the needs of the front.

Work at the plant went on unceasingly seven days a week. When Lupandin wasn't at the plant, he was doing something else that would contribute to the war effort. It was the least a man who was not actually fighting at the front could do, he felt.

Nikolai Lupandin has been a party member for 15 years now. All these years he has fulfilled with honor and distinction the duties of a Communist. In 1956 he was nominated by the workers in the plant and elected deputy to the Kharkov City Council.

For legislator Lupandin we might very well say, as we did previously of his activity as innovator—he is a man who can't sit at a city council meeting without trying to figure out ways in which the city administration will do a better job for the people.

THE FAMILY NEVER MISSES AN OPPORTUNITY TO GET OUT FOR A PICNIC OR HIKE IN THE WOODS.

Vladimir Savchenko (left) and Vladislav Zaitsev, students of the Moscow Aviation Institute, built a tape recorder of their own design. It carries almost 3,500 feet of tape.

Marina Grachova (left) explains her new TV set to Natasha Vasilyeva in a club laboratory.

Radio Hams

By Boris Dunayevsky

An amateur-designed combination radio-TV set and tape recorder equipped with remote control.

RADIO HAMS are a world-wide fraternity, unhampered by customs, boundaries or frontiers. They did yeoman service in tracking the first earth satellites. Moscow central tracking station was flooded with reports from radio hams all over the world who had established contact with the baby moons.

Scientific exchange is an old and honored tradition with radio amateurs. So is service in emergencies.

About 30 years ago the Soviet flyer Boris Chukhnovsky failed to return to the airfield from an Arctic flight. The powerful radio stations were unable to establish contact with the lost plane. It was the radio ham Nikolai Schmidt in the city of Archangel who caught the weak signals through a barrage of static with his homemade radio receiver.

Radio ham Schmidt was the sensation of the hour, and he deserved to be, considering the simple detectors of 30 years ago.

You don't have to look far to find a radio ham in the Soviet Union. In small village or big metropolitan center, you'll find schoolboys and staid pensioners, workers and farmers, men and women of all ages and inclinations busy fabricating their own outfits in one or another of the thousands of radio clubs.

The workshop is the heart of the club and always a scene of concentrated activity. Here amateur designers get the expert advice they need, the parts, the instruments and tools. The dues are minimal—a quarter of a ruble monthly for hams still at school, a ruble for those on jobs. Subsidies for club quarters; equipment and tools are provided by various social organizations, since the dues are too small to keep the clubs going. Besides the clubs, workshops and equipment are made available at schools, colleges and factories.

Many of the hams gravitate naturally into the technical trades and professions, carrying their interest and skills with them.

Boris Khorkov was a high school student and ardent radio ham when I first met him ten-odd years ago. He makes his living now as industrial training foreman at the Moscow Electric and Radio Mechanics Technical School No. 7. His old passion for tearing apart and putting together old radio sets to get something new and different is still with him. When I met him last, he had designed a very interesting type of combination that can simultaneously get radio and TV broadcasts, can do sound recording and can be operated by remote control.

Another radio amateur I know, Laimonis Puce, is a foundry worker by trade. He works in a plant in Riga and spends most of his leisure time at the city radio club. He has designed an intricate musical instrument built around multi-vibrators, called a cametaphone, that can reproduce the sounds of a whole orchestra.

Instruments like it have long been produced by factories, but Puce seems to have given it a new twist. Now he's off on another idea that may or may not be the last word in radio engineering. A radio ham never forgets that the audion tube was invented by a fellow amateur.

Exhibitions of work done by radio amateurs are regularly shown in the larger cities. At an amateur exhibition recently held, the fourteenth of its kind in Moscow, there were 400 displays of sound-recording mechanisms, television sets, short and ultra-short wave devices, radio sets and other apparatus. The exhibits and their builders came from places as distant as Siberia and Central Asia.

These designs and inventions of radio amateurs always attract general interest and attention since both Soviet science and industry are constantly on the lookout for fresh ideas and imaginative concepts.

RUSSIAN MINK IN A LOOSELY FITTING COAT.

PERSIAN LAMB WITH LEG OF MUTTON SLEEVES.

FULL BACK AND NARROW HEM IN MOUTON.

NUTRIA COAT CARRIES A YOKE BACK.

Fashions in F

STRAIGHT LINES AND SET-IN SLEEVES IN KOLINSKY FUR.

PRINTED LAMBSKIN IS VERY NEW.

WHITE FOX SETS OFF THIS PERSIAN LAMB.

THE SCALLOPED HEM IS A NEW TOUCH IN THIS MUSKRAT COAT.

Fur

WARM SQUIRREL PELTS MAKE UP THIS STYLISH MODEL.

MARTEN WITH A FLARED SKIRT.

SPEED SKATING in the Soviet Union

By Victor Kapitonov, *Master of Sport*

WITHIN the past ten years Soviet speedsters have broken 44 world ice-skating records and tumbled their own national marks 214 times. Of a total of 13 world records maintained in ice skating, 11 are held now by Soviet athletes.

Male skaters have swept to victory in four of the six world championships and in four of the five European championships in which they competed. At the Seventh Winter Olympics they won in the 500-, 1,500- and 5,000-meter races, establishing Olympic highs for these distances.

On the distaff side we find that Soviet stars have triumphed in each of the nine women's world championships they entered. These wins were contributions of many fine contestants, including the outstanding abilities of Maria Isakova, thrice world champion; Lydia Selikhova, who held the world crown twice; Tamara Rylova, world record-holder in two events; and Inga Artamonova, present world champion.

The men can show three-time world champion Oleg Goncharenko who also is a double winner of the European title; Boris Shilkov, another speedster who held both the world and European crowns; Yevgeni Grishin, the winner of two events in the Seventh Winter Olympics and the European champion; Yuri Mikhailov, Olympic champion; and Dmitri Sakunenko, the over-all world record holder (counting the total number of points for the 500-, 1,500-, 5,000- and 10,000-meter contests).

Back of this rather impressive record of skating successes lies the story of long hours of tedious training and of competition that is both widespread and bitterly fought by thousands of deserving youngsters. Each new season finds new talent rising to the ranks of principal contenders. For example, last season Boris Stenin and Valentina Stenina of Sverdlovsk; Vladimir Shilykovsky, Gennadi Voronin and Valeri Larionov, all of Moscow; and Lydia Skoblikova of Chelyabinsk moved into the top flight list of skaters.

TABLE NUMBER 1

USSR Sports Qualifying Standards for Men's Speed Skating
in ordinary rinks

Sports Categories	Distances in meters — Time in minutes and seconds				
	500	1,500	3,000	5,000	10,000
Master of Sport	42.5	2:16.5	*	8:25.0	17:30.0
First	*	*	*	8:50.0	18:20.0
Second	49.0	2:37.0	5:25.0	9:25.0	19:35.0
Third	53.0	2:43.0	5:50.0	10:00.0	21:00.0
First Junior	56.5	3:00.0	6:15.0	10:50.0	*
Second Junior	59.0	3:09.0	6:36.0	*	*

*The distance is not contested in this sports category.

Millions of Skaters

This wealth of talent springs from the fact that skating and skiing are the two most popular winter sports in the Soviet Union. It is difficult to say which is preferred by the majority of the population, but ice skating rinks are available everywhere—in the cities and towns as well as in the most remote villages and hamlets. They range from small ones in playgrounds and little parks, to the vast stadiums and the king-sized

rinks such as that at the Central Recreation Park in Moscow which can accommodate as many as 20,000 or more skaters daily during the winter season.

There are speed-skating divisions in every athletic association and club. Official membership in these divisions alone comes to approximately half a million, not counting the usual fans. All told, the number of people on skates runs into the millions.

Other sources from which skating stars have been developed include the junior training schools which draw school children from the ages of ten years and up, and the youth training centers that attract budding speedsters between the ages of 17 and 20.

The annual USSR speed-skating championships draw a field of 400 challengers from the top talent of the country. Last season 74 skaters had point scores of better than 200 in the over-all competition and 75 speedsters finished the 10,000-meter event in less than 18 minutes. Contests are frequently held on the famed Alma-Ata high-altitude course in Kazakhstan where most of the Soviet successes have been registered.

Boris Shilkov, world and European champion for 1954 and winner of the 5,000-meter event in the Seventh Winter Olympics.

Sports Qualifying Standards

To promote systematic training and athletic growth of skaters, there is a system of sports qualifying standards for both men and women. The standards are, of course, different for various age groups and are divided in accordance with the skating skill.

The system of sports qualifications is uniform for all athletic organizations of the country and it covers all kinds of sports. As an athlete keeps improving his skill and achieves better results in contests, he is promoted from one sports category to another. The requirements for each category are set by the USSR Sports Qualifying Standards *(see Tables No. 1 and No. 2)*.

Sports writers find that Soviet ice skaters have built a school of their own with some technical features that differ from the others. Our skaters' carriage is low, permitting a more effective springy and softer stroke over any distance. Most of our speedsters keep their arms clasped on their backs during the straightaway stretches and then swing one arm when cutting turns.

Yevgeni Grishin, champion of the Seventh Winter Olympics in the 500- and 1,500-meter events and European champion for 1956.

Oleg Goncharenko, world champion for 1953, 1956 and 1958 and European champion for 1957 and 1958.

TABLE NUMBER 2

USSR Sports Qualifying Standards for Men's Over-all Skating
in ordinary rinks

Sports Categories	Distances in meters — Rating in number of points		
	500, 1,500, 5,000, 10,000	500, 1,500, 3,000, 5,000	500, 1,500, 3,000
Master of Sport	197	*	*
First	207	*	*
Second	220	216	*
Third	236	232	*
First Junior	*	248	182
Second Junior	*	*	192

*The distance is not contested in this sports category.

Tamara Rylova, world record-holder in the 500- and 1,000-meter events in the women's division and USSR over-all champion for 1955 and 1957.

Dmitri Sakunenko, holder of the world record in the over-all skating competition. In the 500-, 1,500-, 5,000- and 10,000-meter events he scored 184.638 points.

SPEED SKATING in the Soviet Union

Vladimir Shilykovsky, USSR national champion for 1958 in the 10,000-meter event.

TABLE NUMBER 3

Distribution Between Countries of Top 25 Places in World Over-all Speed Skating

	in ordinary and high-altitude rinks	
USSR	—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 20, 22, 23, 25	all in all, 20 places
Norway	—16, 18, 19, 21	4 places
Sweden	—24	1 place
	in ordinary rinks	
USSR	—1, 2, 3, 6, 7, 8, 10, 11, 14, 16, 20, 25	12 places
Norway	—4, 5, 12, 13, 15, 18, 23	7 places
Sweden	—9, 19, 22	3 places
Finland	—21, 24	2 places
Australia	—17	1 place

System of Training

Our ice skaters view the sport as recreation or fun and usually turn to other activities in warmer weather. But those athletes who wish to improve their standing are devoted to year-round programs of training. The work is generally divided into three periods: there is a preparatory phase from May through September, the main period running from October through March, and a transitional phase in April.

In the preparatory period the skater devotes himself to all-round physical and special training. The intensity of workouts is increased as are the number of practice sessions during the week. The training includes cross-country running, alternate periods of fast and slow running, imitation skating on grass, roller skating, cycling, rowing, swimming, gymnastics and court games along with body-building exercises.

The main period is split into preliminary, pre-competition and competition stages. During the first dozen workouts on the ice, the skater restores and improves his style, first on the long then on the shorter runs. As the first month comes to an end ice practice is stepped up to 25-30 minutes of uninterrupted skating.

At the beginning a rest day follows three days of practice and later a day's rest follows two days of training on ice. The skater, however, must still do his cross-country running during his "off" day, keeping his muscles toned up and his breathing under control.

There are three or four weeks of this work before the skater turns to pre-competition training, which is more intensive. In the latter part of this stage there are some competitive events that grow increasingly difficult. Much stress is placed on building endurance. But as the pre-competition stage nears an end practice is reduced, and the schedule of two days of workouts and one rest day is alternated with two practice days and two "off" days.

Beginning about mid-January, the competition stage finds actual racing events replacing most of the training sessions, with coaches paying particular attention to the skating form of their charges.

The present skating season promises many interesting events, including the world and European championships for men and the world championship for women. In addition there will be various international matches, such as Sweden vs the Russian Federation, Finland vs Leningrad, Oslo vs Moscow, and the German Democratic Republic vs the Russian Federation.

There is no doubt that from these and other matches, new stars will emerge to challenge the leading contenders who made their reputations in last season's events.

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