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Valiant Russia's Industrial Might
With 27 Illustrations and Map — JOHN SCOTT

Life with Our Fighting Coast Guard
With 22 Illustrations — F. BARROWS COLTON

Coast Guard Patrol in Greenland
9 Natural Color Photographs — THOMAS S. La FARGE

Land of a Million Smiles
With 14 Illustrations and Map — FREDERICK SIMPICH

Work and Play in the Ozarks
20 Natural Color Photographs

Climbing Mighty Minya Konka, Landmark of China's New Skyway
With 23 Illustrations and Map — RICHARD L. BURDSALL AND TERRIS MOORE

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THE NATIONAL GEOGRAPHIC MAGAZINE

"Magnetic City," Core of Valiant Russia's Industrial Might

BY JOHN SCOTT

With Illustrations from Photographs by Sovfoto

FOR nearly two years the Russian armies have been beating off attack after attack, striking blow for blow.

There are many reasons for Russia's unexpected strength. One of the most important is the modern industrial base built up during the past 15 years in the Urals and Siberia (map, pages 532-3). The now gigantic factories of that area are today furnishing the Red Armies with the spare parts, new tanks, and munitions they need for fighting.

Until 1930 almost all of Russia's heavy industry was concentrated in the Ukraine and in western Russia. These territories were taken by the Germans in the first months of the war and held for more than a year. Had it not been for the new base in the east, the Russians probably would have been defeated six months ago, for no modern army can function unless it is backed by powerful industry.

In 1931 Stalin made a remarkable speech in Moscow. He said, in effect: "We (the Soviet Union) are 50 to 100 years behind the more advanced countries, industrially and militarily. We must overtake and surpass them in ten years or we shall be invaded and destroyed" (page 527).

Stalin achieved his program. For a decade the entire surplus of Soviet economy was invested in capital construction. Riding roughshod over all who disagreed with him, Stalin forced the immense country to strain every nerve and muscle to build mills and factories.

Many of them were built in Siberia and the Urals, for Germany had invaded the Ukraine once, and might do it again. The Leningrad district was a stone's throw from the frontier. But it was doubtful that anyone could thrust through Russia some 2,000 miles to invade Siberia. During the 1930's the Ural-Siberian industrial base came into being.

Centuries of Progress in 5 Years

I spent five years (1932-1937) in Magnitogorsk, one of the largest developments in the Soviet Union (pages 526, 534).

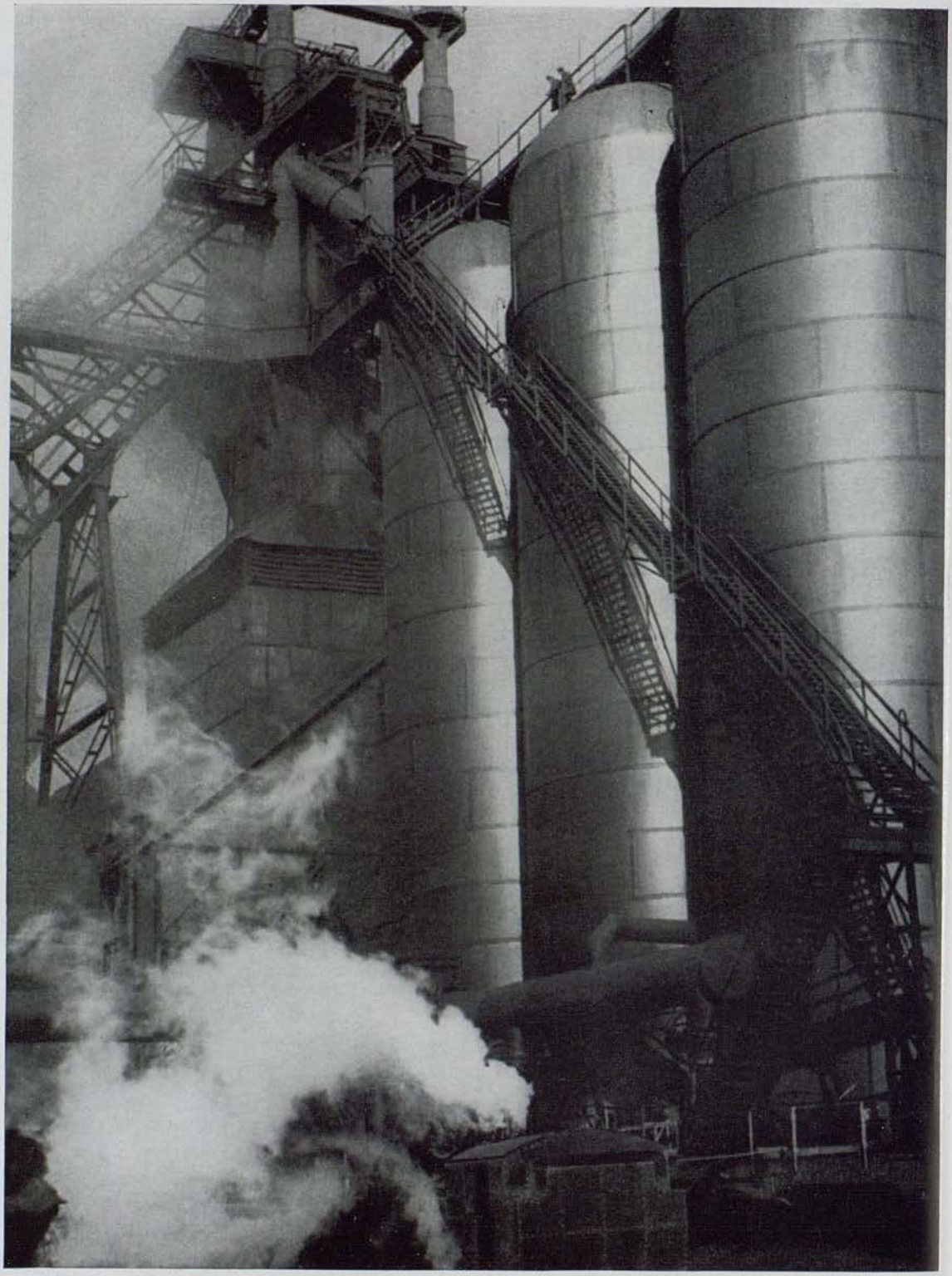
I saw a city spring from nothing, just as the railroad construction town of our Middle West, three-quarters of a century ago, sprang up on American soil. I saw primitive backward people in Magnitogorsk advance from the 10th to the 20th century in their personal lives and habits within five years.

It was an incredible saga, and it has become more unbelievable during recent months when Magnitogorsk has poured iron and steel at the rate of more than three million tons a year into tanks and guns for the Red armies.

Once in the misty past hordes of Mongols left their homes in teeming eastern Asia and surged over the Urals into Russia. Later other invaders rode their war horses back and forth to extend the sovereignty of the Mongols from the Danube to the Pacific.

At some time during those restless centuries a little village grew up on the Ural River just a few miles below its source. The inhabitants were Bashkirs and Kirghizi. They engaged mostly in cattle raising.

The village was situated on the extreme western edge of Asia, in the middle of the steppe, east of the watershed of the Ural



Symbols of Soviet Power—Towering Metal Stoves for a "Magnetic City" Blast Furnace

Coke, limestone, and iron ore are dumped together into the tower at left. Three cylindrical units heat air for forced draft. Pig iron emerges from the fusion. Here at Magnitogorsk the author helped build the first mammoth blast unit, in the 1930's. Last winter seasoned workers completed a fifth blast unit (page 556).

Mountains, which separate Europe from Asia. There were scarcely any trees for 50 miles around—nothing but barren, rolling steppe and an occasional high hill.

Some eight miles from the village there were two smooth mountains rising several hundred feet above the level of the river. The herdsmen called them Aider-Ly and Atach. But they paid little attention to them. They were more interested in the bare valley, which was just grassy enough in places to furnish pasture.

Pay Ore from the Russet Earth

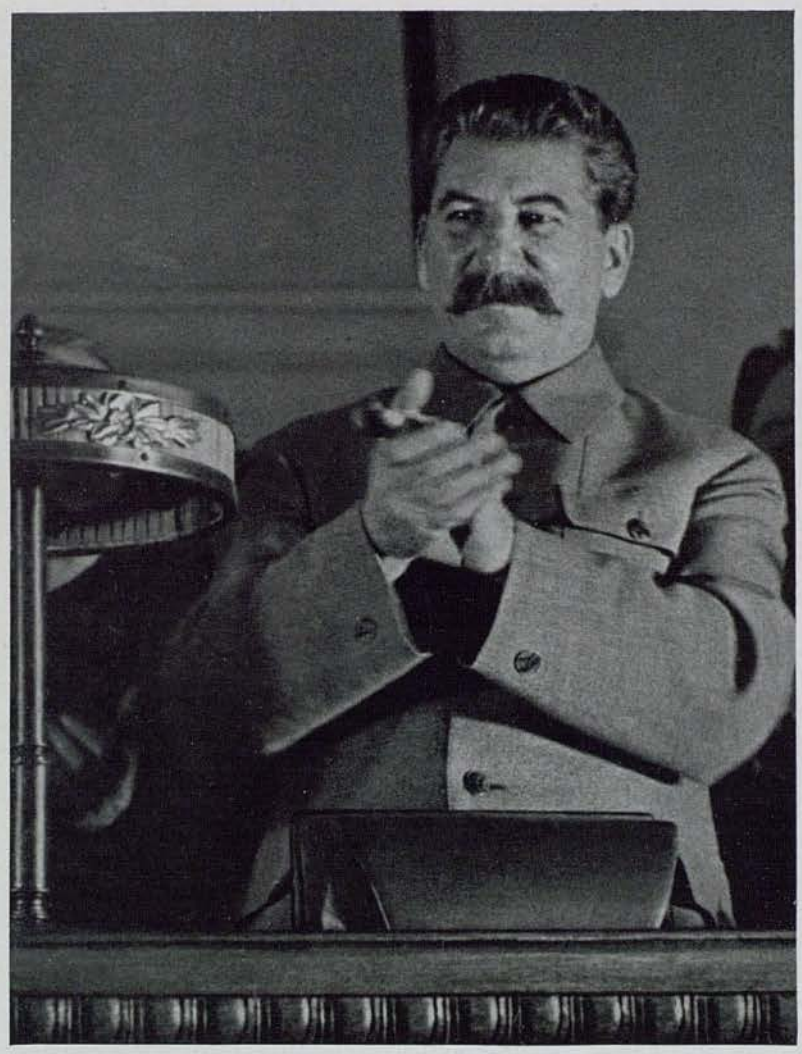
The bitter, stormy winters and the hot, dusty summers came and went. Centuries passed and there was little or no change in the lives of the villagers. In the beginning of the 18th century Russians came in and tried to collect taxes. Sometimes they succeeded. Sometimes they were killed by the herdsmen. They never stayed for long.

One of the Russians noticed that his compass needle was strangely affected by the mountain Aider-Ly. He called it Magnitogorsk, the "Magnetic Mountain," and the little village, Magnitnaya.

Then he went away. He returned with a party of serfs bearing shovels and supplies. They dug into the sides of Aider-Ly and found rich iron ore (page 530).

The Russians dug all summer, and when the winter came they loaded the lumps of ore on sleds and took it 60 miles over the steppe to be smelted with charcoal in the little samovarlike blast furnace in the near-by town of Beloretsk. The old mountain had begun to give up its riches.

But the Bashkirs and the Kirghizi in the village of Magnitnaya were not interested in the mining operations. They tended their herds and let the Russians dig up the heavy russet earth.



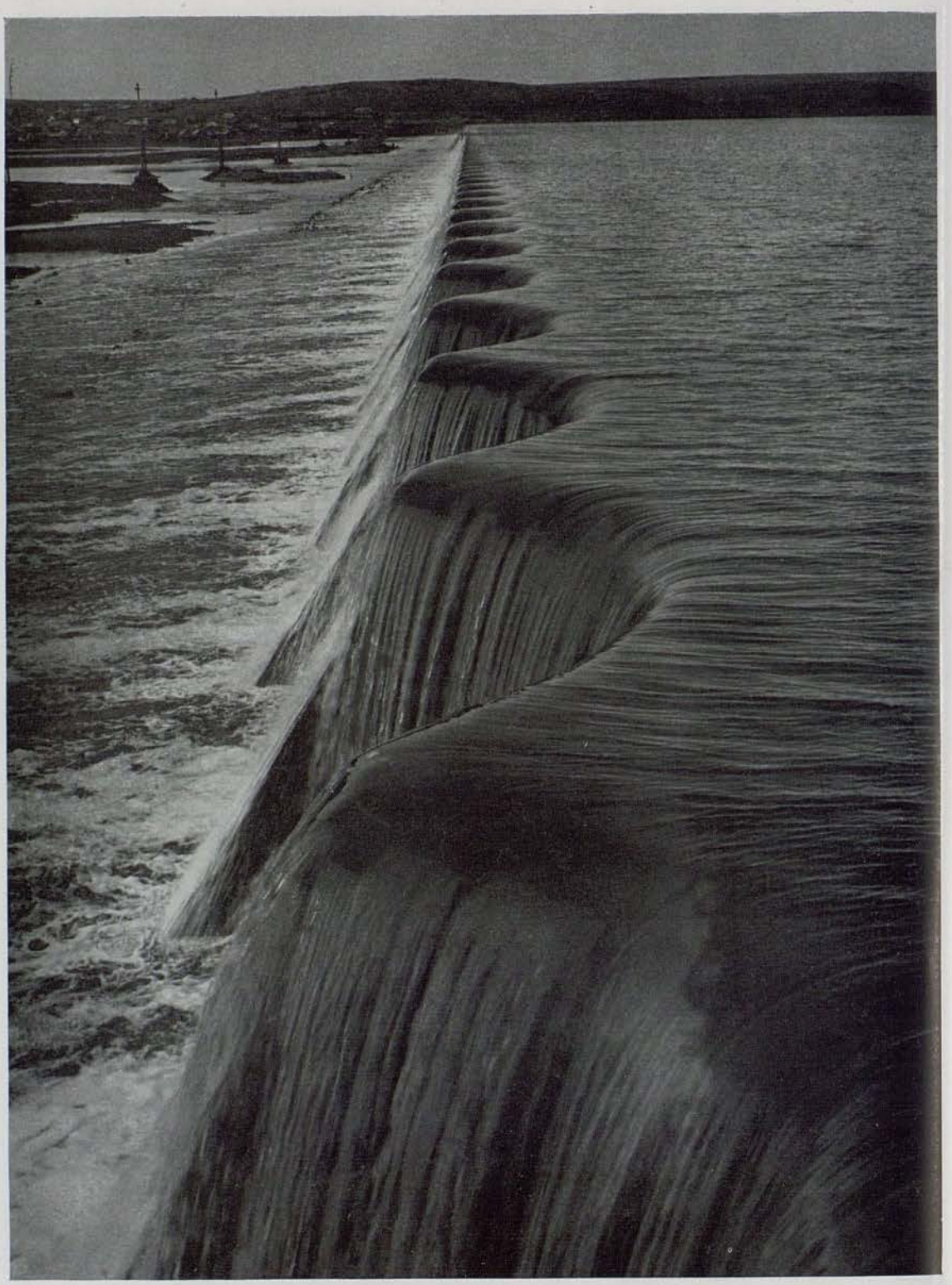
Russia's Iron Man Forged Siberian Steel That Stopped Hitler

A dozen years ago, when others clamored for consumer goods, Joseph Stalin began developing heavy industry in areas beyond reach of any foe. Relentlessly he industrialized the Urals and Kuznetsk Coal Basin regardless of cost or civilian comfort. At Stalingrad his policy paid big dividends.

The Tsarina Gave Away the Mountain

The mining went on. In 1747 an enterprising Russian industrialist named Myasnikov received the whole mountain as a personal gift from the Tsarina. It cost him a good deal to line the pockets of all the people in between, but it was worth while. He organized mining operations on an unprecedented scale.

In a good winter, some 250 tons of ore were mined and transported. The technique



Over the Jagged Spillway at Magnitogorsk Dam, Water Cascades in Graceful Semicircles

This modern design is stronger than a solid straight wall. The scalloped edge breaks up ice as it goes out in spring. Before a wheel turned in the steel plant, construction pioneers arrived in 1930 to lay out the dam. Damming the Ural River, a mere creek in summer, creates a big lake and provides water for plant and city.

Their Deeds Are Scored on the Blackboard for All to See: Magnitogorsk

Names of workers in crews of three, their quotas, and output records, are posted at the blast-furnace shop.

remained the same: remove the topsoil in summer, pick out the convenient-sized lumps, and ship them by sled during the winter.

Myasnikov died, but the work continued. For over a century and a half the mineral wealth of the Urals was worked in this way by young Russian industrial capital.

World War I was little felt on the steppe. The price of iron ore rose, but so did the price of salt and other things which had to be brought in from outside.

Then Came the Revolution

Then came the revolution of 1917. The Russians left their mine, and the villagers tended their stock in peace.

Later, in the hungry years of the Civil War, the Russians came back again, with rifles on their shoulders and strange talk about a new Soviet government and war against the Siberian Admiral Kolchak.

The Reds had not been there long, however, before the White army of Kolchak came up. After a few shots, the Reds retreated. The Whites were a good deal harder on the villagers than the Reds had been, and some of the young herdsmen ran off to join the Red partisan forces.

Then all the belligerents left Magnitnaya to fight where there was more wood to burn and more to eat. The Whites were finally driven out of the Urals and back through Siberia, but the villagers did not know about it until they were told—much later.

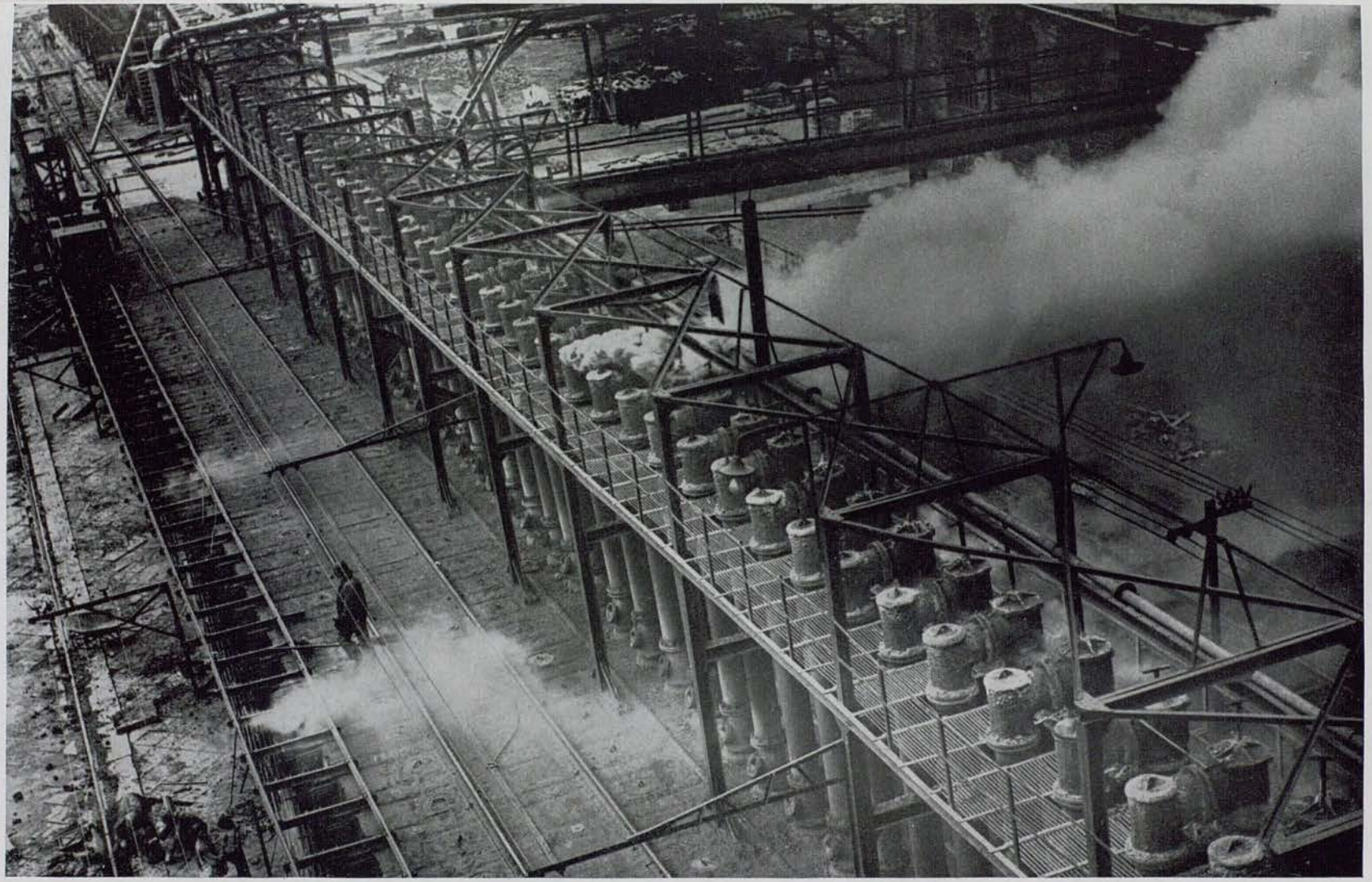
Little by little the mining started up again. Also, several parties of well-dressed men came in from Moscow. They brought transits and portfolios. They measured the deepest excavations and surveyed the neighboring country. Then they returned to Moscow and things went along in the old manner.

But the seeds of change had been sown. In Moscow, 900 miles away, plans were being drawn up, plans of industrialization. And in these plans the iron ore of Aider-Ly figured conspicuously.

In 1928 a large party came to Magnitnaya. They built temporary barracks in which they

An Electric Excavator Dumps a Mighty Mouthful of High-grade Iron Ore into a Car at an Open Pit in the Urals

Near Magnitogorsk the ore is 60 percent pure, and compares favorably with Minnesota's rich Mesabi Range. Also, surface mining is cheap. Under the early Tsars, Ural mines were worked with serf hand labor, and smelting was done in primitive charcoal-burning "teapots" (page 527).



Siberian Coal Baked in a Row of Ovens Emerges as Smelting Coke and Gas

Only porous carbon, producing tremendous heat when burned in blast furnaces, remains. The fumes are piped off to fire open-hearth furnaces and to feed the chemical plant. Here, in the Kuznetsk Coal Basin, tracks surmount the ovens. Gas belches from an open pipe.

STATUTE MILES 0 100 200 300 400 500

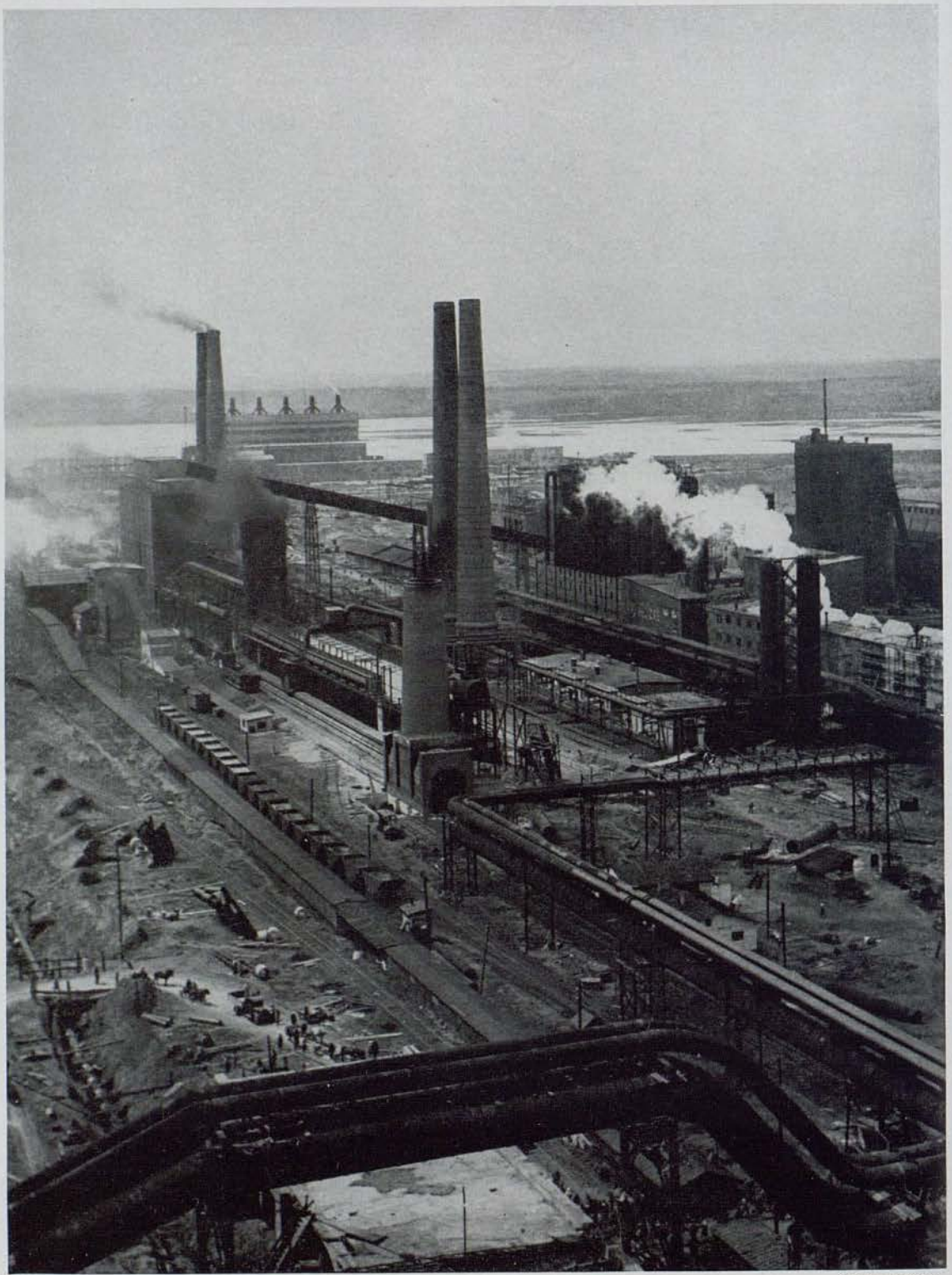
Railways
" under construction
Strategic roads
Outline of the United States of America

Russian-Siberian Industry Lies Far North of Ours

Move Detroit and Pittsburgh as far north as Moskva (Moscow) and Sverdlovsk, and they would be in Labrador. Siberia's factories equipped the Red Army after the Ukraine and Donbas had fallen. The Ural metallurgical zone revolves around its iron heart at Magnitogorsk.

The outline of the United States projected on the map by a broken gray line shows that Stalingrad is of the latitude of the United States-Canada boundary, that California extends as far south as Isfahan, Persia, and New England as far north as the Altai Mountains.

Drawn by H.E. Eastwood



Sovfoto (Kislov)

Towers, Chimneys, Pipes, and Tracks Compose Magnitogorsk's Sprawling Chemical Plant

Debris still littered the ground in 1934. Two years later the plant was much cleaner. Breaking down gas piped from coke ovens, it turns out toluol and naphthalene for explosives, benzol for solvents, and coal tar for dyestuffs. Sulfa drugs, medicine's modern miracle workers, are born of such coal tar.

lived and equipped a small laboratory. They carried on extensive investigations. They tested the rainfall, the water in the Ural River, its flow, the quality of the iron ore, and many other things. The Bashkirs and the Kirghizi were disturbed. Too many Russians were coming in.

Railroad's Arrival Changes Everything

A year later the storm of change broke. One day a black cloud of smoke appeared on the horizon to the south. Day by day it came nearer and nearer. It turned out to be a railroad construction gang laying rails over the steppe. They had an engine which belched forth black smoke.

At first the villagers were afraid, but later they came to work for the Russians, doing grading and filling with their scrawny horses and rickety wagons. They never went back to the peaceful herding of their ancestors.

The advent of the railroad changed everything. Trainload after trainload of supplies was unloaded in hastily made warehouses: machinery, wood, cement, steel, food, and even drinking water. There were trainloads of workers from other villages. They rode in freight cars. Also, there were international sleeping cars, carrying foreigners, men of vast experience in mining and metallurgy, men who had been all over the world.

Overnight a city sprang up, a city of wooden barracks, steam shovels, drilling machinery, and cement mixers. The new government, the power which had grown up out of the war and the revolution, had decided to reconstruct Russia and Siberia and to make a modern industrial nation.

They proposed to do what the Tsar had never even attempted: utilize the vast mineral wealth of the Urals and Siberia by combining the iron ore of Magnitogorsk with the coal of the Kuznetsk Basin, 1,500 rail miles to the east. They brought equipment and technical aid from all over the world to get started in their tremendous task (page 554).

Thus came into being the UKK (Ural-Kuznetsk Kombinat), which brought to Magnitogorsk coal in exchange for its iron.

Magic City Like a Mirage

In the fall of 1932 I approached Magnitogorsk in a plane from the north.

The swarming construction job and the great sprawling city rose up out of the barren steppe as the magical cities of ancient Persia and Tibet were said to have appeared to travelers. An oasis with nearly a quarter of a million inhabitants was linked with the rest of the world only by the single-tracked railroad to Chelyabinsk and by the air-mail service.

From the air one could see a great deal. A dam had been built across the Ural River, forming a lake some 10 miles long and a couple of miles wide. This water supply was insufficient and construction work was proceeding on a second dam which would double the size of the lake (page 528).

On the flat bottom land a big steel plant was already in operation. Two blast furnaces were working, belching their clouds of reddish black smoke into the sky. Two batteries of coke ovens emitted such quantities of smoke that it was clear the chemical by-products plant was not yet in operation.

The great mountain Aider-Ly was covered with a network of railroad tracks, and mining was going on at half a dozen different levels. The trainloads of ore were crawling along like little caterpillars. All around the plant there was activity. Steam shovels were puffing, locomotives were pulling trainloads of earth and materials.

Between the mine and the plant there was a space of several square miles covered with row after row of low whitewashed barracks, each with its many chimneys and its clothes-lines radiating like the spokes of a wheel. Even from the plane activity could be seen. People were hurrying; wagons and occasional trucks drove over the dirt roads.

Two days later I began work on blast furnace construction, became acquainted with the people on the job, and with the job itself.

Nearly 100,000 men and women were working in plant, city, and mine, on construction and operation. They were Russians, Ukrainians, Tatars, Bashkirs, Kirghizi, Uzbeks, Turkmen, Mongols, Germans, Americans, Chinese, Finns, Hungarians, Turks, Mordvinians, and others.

They lived in the barracks, tents, or mud huts, worked together, talked some 30 languages to each other. They represented peoples in all stages of social and cultural development.

The conditions under which they worked were usually similar. Only the foreign "valuta" specialists * lived in a special section of the city and were supplied with all the necessities and many of the comforts of life.

Great contradictions and paradoxes stood out at every hand on the job. On my second day in Magnitogorsk I saw on my way to work in the morning a brand-new electric excavator, brought at great expense from the other side of the earth. It loaded four or five

* That is, foreigners who were paid in gold.

A Battle of Wits Relaxes Steelworkers for Tomorrow's Factory Battle

Chess and other indoor games are popular during Siberia's 40-below-zero nights. Here at Magnitogorsk workers' club, alternating clocks time opponents' moves. Two women engage in a grim battle.

Such Stalwart, Smiling Girls Taught Nazis the Meaning of Total War

Russia's women did heavy work even in peacetime. Hitler told German women their place was in the nursery. War in Russia changed his mind. These girls lent a hand in digging a canal.

tons of earth at a time and purred like a contented cat. A few feet away a Turkman camel driver, with his stately long-necked beast, was working away at the same excavation.

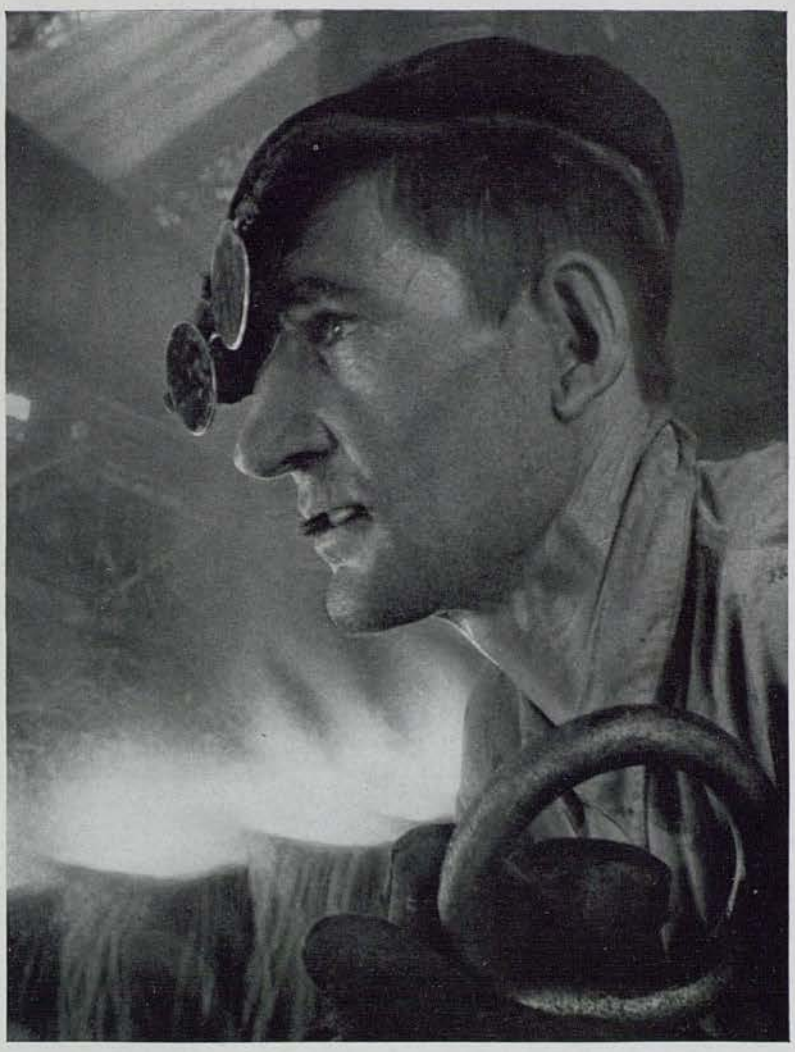
Blast furnaces 3 and 4 were being built simultaneously. The materials and equipment were largely imported, and many of the engineers and superintendents in charge of the work had come in from Germany or the United States.

Most of the workers, on the other hand, were newly arrived from farm or pasture, and were completely unacquainted with modern machines or even with simple hand tools.

Tatar Apprentice Had Never Used a Hammer

Such a man was Shaimat Khaibulin, a Tatar, who worked in our gang as an electrician. Shaimat arrived in 1932 straight from a village near Kazan. He was a shepherd. He had never seen an electric light, a locomotive, or a staircase. He had seen a hammer, but he had never used one. The only hammering he had ever done was to pound a tent stake into the ground with a rock. He spoke little Russian, could not read or write.

He walked into our gang's shanty with a slip of paper in his hand identifying him as our new electrician's apprentice. He was given two new German motor-generators to care for. Within a week he had spoiled both. In another week he spoiled two more. For six months he went around the plant, his ragged, lousy shirt hanging down outside his trousers nearly to his knees, gaping at blast furnaces and gas pipes as if he were in a dream.



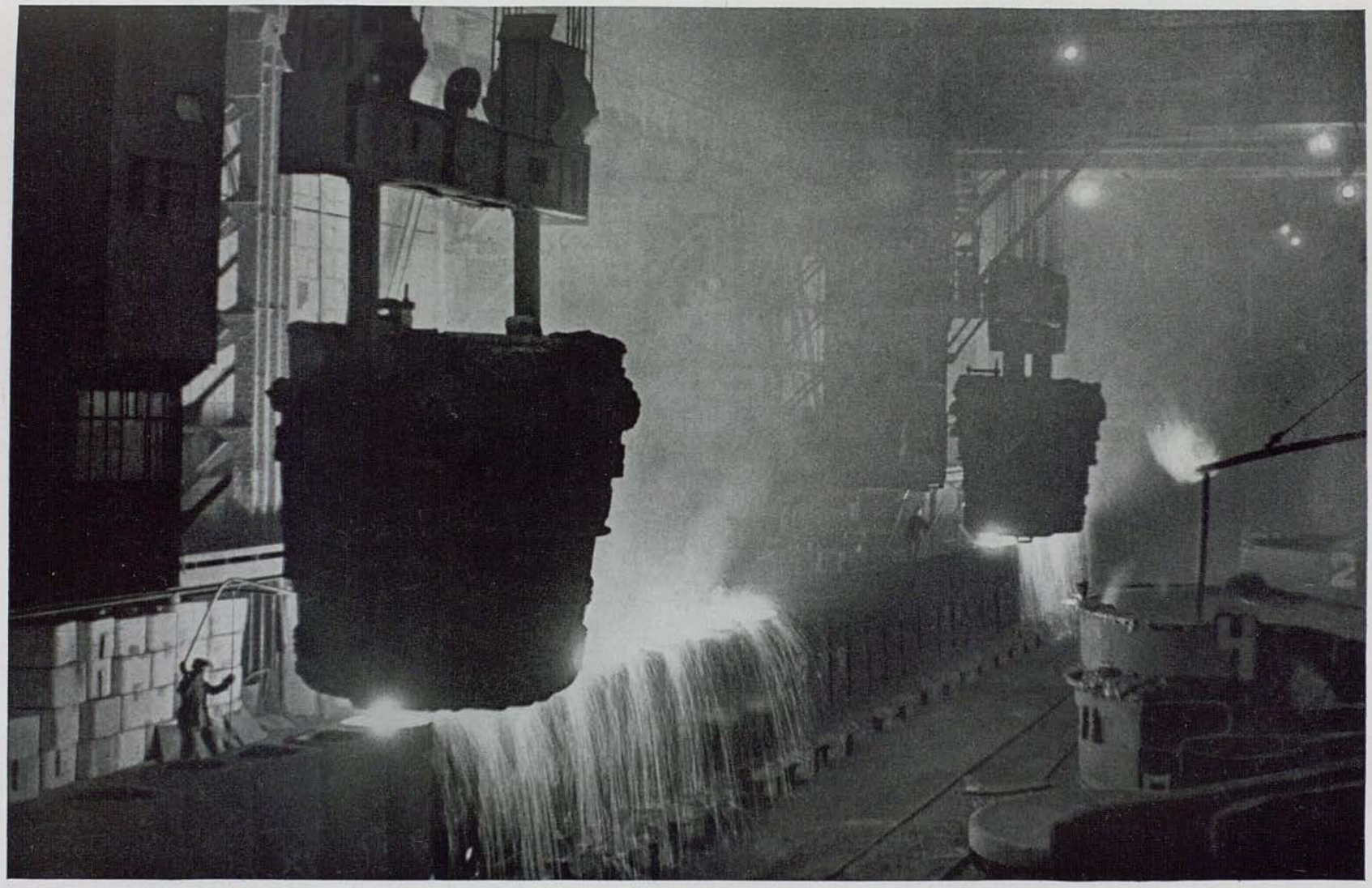
Through Colored Goggles He Watches Incandescent Ingots Take Form

A. Butuzov, of Magnitogorsk, pours steel in an open-hearth shop much as a steelworker might do it in Gary, Indiana. Because he has exceeded his normal output, Butuzov earns big bonuses and is a *stakhanovite*. The name is applied to those who follow the technique of Stakhanov, a coal miner who perfected the Soviet speed-up system.

About a year after his arrival, Shaimat began to find himself. He learned Russian well enough to make himself understood easily. He began to learn to read in a course for the illiterate in the barracks. He bought himself some new clothes, took to washing regularly, and began to understand something of the machinery with which he worked.

By 1937, when I last saw him, Shaimat was going to night school to learn physics and chemistry, had become thoroughly competent as an electrician, and had a fairly good idea of what was going on, not only in Magnitogorsk, but in the world around him. He had

In Red Square, Moscow, Spacious Setting for a Youth Parade, Columns Pass with Flags before Lenin's Tomb, the Reviewing Stand



Giant Ladles, Swung from Cranes, Fill a Train of Ingot Molds with Showering White Steel from an Open Hearth at Stalinsk

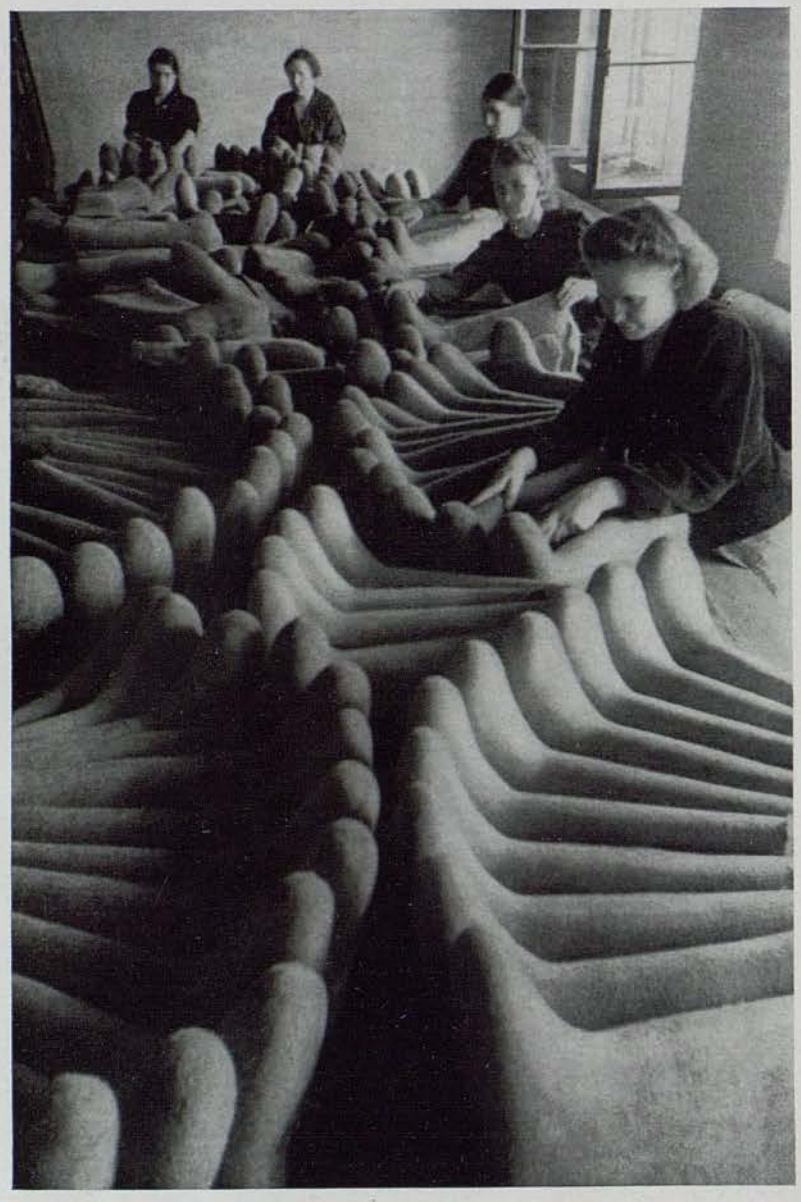
Dwarfing the worker, who controls its flow with a rod, the forward ladle pours molten metal through a valve in the bottom. When the last mold has been filled, the ingots will be stripped and sent to the blooming mill for rolling. Meanwhile, the open hearth, having been emptied, will receive another charge.

Siberia's Snows Remain, but Its Dreary Wastes Have Bloomed with Modern Apartment Houses

Who could have imagined in the time of the Tsars that some day Siberian cities would look not unlike newly developed sections of New York? Here at Stalinsk, center of the great Kuznetsk Coal Basin, women wear city berets. In the country they would have shawls instead.

Iron Soldiers in Single File Line Up in Chelyabinsk before Russia's Biggest Tractor Factory

Surround these American-designed machines with armor and guns, and you have tanks. Chelyabinsk remained unscathed in the Urals while war devastated Leningrad, Kharkov, and Stalingrad, other tractor centers. Under the Tsars, the town was a stopover for exiles (page 551).



Felt Boots Keep Russian Toes Warm as Feet of Leather-shod Invaders Freeze

Shapeless, clumsy *valenki* are perfect footwear for below-freezing weather. In melting snow they may become soggy. Sockless Russian feet, wrapped in layers of wool, slip up and down in the inflexible, heelless boots. Cruder sets have no right or left. American Lend-Lease has sent to the Red Army 3,000,000 pairs of heavy boots.

made more progress intellectually and culturally in five years in Magnitogorsk than his fathers and forefathers had made since the time of the great Tatar invasions.

But in 1932 when I arrived in Magnitogorsk and started to work, the Shaimats were still hopelessly inefficient. They fell from icy scaffolding and broke their necks. They dropped things on others' heads. They spoiled machinery and materials.

Job Alive with Workers—the Author Among Them

When I started to work, the third furnace was just getting to the point where you could tell by looking at it that it was going to be a blast furnace. The steel plates of the conical shaft were almost all in place. All around the job there was chaos. Drainage lines, steam lines, electric cables, compressors, compressed-air lines, overhead and underground gas pipes—all were going in at the same time.

Endless carloads of material were being brought in to the job: structural steel pipes, machinery, and bricks. The job was alive with workers. Most of them were young and were working at this kind of thing for the first time. They liked it. They sang and shouted, and swore in many languages, but with enough overlapping to be understood. The job was behind schedule and the foremen and superintendents were worried.

In October things took a turn for the better. It was partly because work was stopped for the time being on the fourth blast furnace and all efforts concentrated on the third, and also because the first two furnaces, which had been in operation for several months and had been working very badly, suddenly began to produce 600 and 700 tons of iron a day. That was something more than half of the project's capacity.

This encouraged all the construction workers. After all, they had made the first two

Foreman Signals Crane Operator: Sunlight Stabs through Open-hearth Windows

In the area around Stalinsk, 1,500 rail miles east of the Urals, the Soviet Union is developing a rich coal field. Its seams, 50 feet thick in places, nourish a thriving metallurgical industry.

A Blast Furnace Foreman Reads an Order to His Brigade at Magnitogorsk

A stoker (left) and his colleagues wear asbestos spark helmets. Their leader's leather cap is the sign of a worker. During the war these men work 11 hours a day. Willful absenteeism is punished.

Young Apprentices Who Yearn to Learn Pay Strict Heed to the Foreman's Teaching

They work in a Sverdlovsk machine-building plant. In spare time they attend trade school. Prospect of better pay may induce them to become engineers.

furnaces, and it was a deep satisfaction to feel that their work was beginning to show results. They would gather around at stopping time to watch the white iron running into the ladles, and grin with boyish pride.

There were still two months of good working weather for the structural ironworkers and they made the best of them. Often their work was not coordinated, but their enthusiasm and their spirit saved the day.

Everyone, even the laborers, felt that Magnitogorsk was making history, and that he, personally, had a considerable part in it. This feeling was shared to some extent even by the exiled *kulaks.**

Day by day we could see the job growing. The bleeder pipes, valves, cooling plates, brick lining, piece by piece were put together, and the furnace assumed the form that its designers, the best blast-furnace engineers in the United States, intended. The riggers, through their trade unions, voted themselves a nine-hour day until the end of the year, and the riveters and the drillers did likewise. The welders, who had a legal working day of six hours, often stayed on for two shifts.

Office Workers Help on Their Days Off

Every "free day" the volunteer workers came trooping in. At that time every sixth day was a general day off; Sunday was not recognized. They came in brigades as big as 200, organized by their trade unions or organizations. They laid roadbed, or picked up scrap, or pulled down old scaffolding which was not needed any more. Most of them were office workers, glad to get out and work with their hands one day a week.

Then it turned cold. Winter came to stay till May. With it came one difficulty after another. Air, water, steam, and gas lines froze. Cold hands and feet reduced efficiency. The temperature stayed between 30 and 40 below for weeks at a time. The first two fur-

* *Kulaks* were well-to-do peasants who often resisted collectivization and were arrested. Their property was confiscated and given to the newly organized collective farms. Many thousands of these ex-kulaks were exiled for five years to work on some construction job. In 1933 there were nearly 30,000 of these unfortunates in Magnitogorsk. Their lot was hard, some died of exposure and disease. Many others worked out their time, were reinstated in their civil rights, learned trades, and assumed important posts in the construction of Magnitogorsk.

naces had to be shut down very often. The cold paralyzed all the nerve centers of the mill.

On the first really cold day, I froze my cheek from my ear almost to my chin without knowing it. A blister appeared as thick as my finger. For a week my face was in a bandage and as sore as a bad burn. During that week I decided several times to go back to America on the next train. But I was ashamed to be beaten by a cold snap and stayed on.

Within a few weeks I had learned how to protect my face from freezing and was no longer terrified by the biting Siberian wind that seemed to go through the thickest clothing.

Construction work went on despite the cold. The workers were given felt boots (page 542) and sheepskin coats. When their hands were cold they built a fire and warmed them, or else just grinned and bore it. The riggers working high, except those who were still too young, grew beards.

The girls who heated rivets up on top came to work with their faces so wrapped up in shawls that you could not recognize them.

There were many accidents because of the ice and cold, and also through the carelessness of the peasants and herdsmen who had become ironworkers overnight. During that winter we lost four welders out of our gang of forty. Others had to take their places by working overtime.

Money Plentiful, But Little to Buy

Food was very scarce. Each worker had a card which entitled him to buy a meal in a particular dining room. He had to pay, of course, but this was incidental. The main thing was the card. All the workers had money, but there was nothing to buy with it.

A dinner in the dining room cost about a ruble, and consisted of a chunk of bread, a plate of soup of indefinite derivation, and a plate of potatoes with one small piece of very bad fish. Everyone tried to get two dinners on one card, but it seldom worked. The waitresses knew all the tricks.

In the early 1930's there simply was not enough to eat in Magnitogorsk, or, for that matter, in the Soviet Union. Nor was there enough to wear. The stores were empty except for bread and perhaps salt, or occasionally a little tea or some rocklike candy. Sugar, meat, butter, eggs, vegetable oils—these things were almost never seen from one year to the next in Magnitogorsk.

State dry-goods stores were always sold out. The only thing to do when one needed a pair of pants was to go to the bazaar on a free day and buy a pair from someone who had a pair to sell, for as little as he was willing to take. There were ten buyers for one seller, and prices were fantastically high.

The reason for the scarcity was simple. A large portion of the grain, and of the cotton, wool, leather, and dairy products which the Russian people would normally have eaten or worn, were being exported by the Government to buy machines.

Income into Capital Construction

In 1932, some 56 percent of the national income of Russia was reinvested in capital construction. In the latter part of the 19th century, when we in America were building our railroads and heavy industries, we recapitalized a maximum of about 14 percent of our national income. And at that time we had large sums of capital flowing into the country from Britain, France, Germany, and the Netherlands, and many workers coming in every year from Yugoslavia, Poland, Ireland, and elsewhere.

In the 1930's the Russians got almost no credit and had no immigration of cheap labor power. The construction of industry during those hard years was squeezed from the sweat and blood of the Russian people.

There was some grumbling. During the early thirties many leading Soviet citizens, responsible functionaries of the party and the Soviet Government, were convinced that Stalin was making a fundamental mistake; that he was running the country into the ground.

They expressed their opinion, "We should first supply our workers with shoes, then build factories." Many of these men were thoroughly sincere. They had spent years in the revolutionary movement, fighting for ideas which they believed Stalin was betraying.

Stalin dealt with these opponents with vigor. Some were shot, others exiled. All were relieved of important posts and deprived of the opportunity to spread their ideas. Some of them undoubtedly then did the only thing a defeated opponent can do in the Soviet Union: they went underground and worked as best they could, with the aid of whatever allies they could find, for the overthrow of the government with which they disagreed.

Many of these men were shot in the political purge of 1936-38. Some of the best minds in the country were snuffed out during those years. It was a part of the price which the Russian people had to pay for their vast new industries in the Urals and Siberia.

Life was hard in Magnitogorsk during those months. On the way home from the mill, almost all the gang would carry bundles of wood to burn in the little stoves in the bar-

racks. There was not enough coal to give it or sell it as home fuel; the result was that everyone picked up what he could find: ties, planks, blocks. It was much more expensive than coal would have been.

Often we would stop in the store, to find no meat, no flour, no cereals, no sugar; there was only black bread, sold by card, 1,000 grams a day to workers, 400 grams to dependents. We stood half an hour in a queue to buy bread. Our pockets were full of money. The bread cost only a few kopeks; very often if there was change, no attention was paid to it. Money had little meaning.

Some of the welders would stop in the milk station where each was entitled to a pint of milk a day. Usually there was no milk, as it had to be brought in frozen chunks and carried in burlap bags, then melted down on the little iron stove in the station.

We walked between rows of low barracks and finally reached home. Our barrack was divided into 40 rooms, with an average of 100 square feet of floor space each. Just over a hundred souls lived here. About half were working in the mill, the rest were children and housewives.

A New City of Young People

There was not one person in the barrack over 35 years old, and not many were over 25. Magnitogorsk was built by young people.

There was no running water or sewage system. Water was carried in pails from the water station about a quarter of a mile away. Each room had its little stove. There was one clubroom where classes for illiterates were held. There were still 16 illiterate adults in our barrack, but most of them were studying.

Rent was free; the workers owned the barrack, which was a present to the blast furnace brigade for good work. Most of the other barracks had no rooms; all lived in one immense room and there was no privacy.

Of an evening, a group of young workers would gather in the clubroom with a couple of balalaikas and guitars. They would sing old Russian folk songs.

At 3 o'clock in the morning, the third shift would come home from work. Some conversation in the hall. There had been a bad breakdown on the first furnace. Four men were awakened and went down to the mill to work until morning. Unfortunately this happened very frequently.

In midwinter conditions got very bad in the mill. Tons of ice hung all over the furnaces. The coke conveyor froze up solid and coke had to be hauled practically by hand. Pipes froze and cracked and then dripped, forming icicles, the weight of which eventually collapsed whole columns.

There were many accidents, production was almost at a standstill, and wages were consequently low. The winter dragged on—a long nightmare of malnutrition, cold, and defeat. Beefing there was, but no organized discontent. The whole administration of the plant was removed, and new men came in from Moscow.

Then spring arrived and with it everything came to life. The railroads disgorged tons and tons of food which had been sidetracked somewhere in snowdrifts. The nutrition situation improved and the mill began to work better. Lines were repaired and the furnaces began to produce more than ever before.

By May, 1933, a half pound of sugar was given on every ration card. The turn had come. From then on conditions improved steadily.

Price High, But Results Magnificent

Five years passed. The Magnitogorsk mill and the surrounding city grew. Four blast furnaces were working and working well. They produced a million and a half long tons of pig iron a year, which was more than 10 percent of the production of the whole U. S. S. R., and nearly 8 percent of the production of the United States.

The ore mine was worked according to the best practice. The ore was transported in modern 75-ton dump cars pulled by electric locomotives. During the 1930's the old mountains, Atach and Aider-Ly, produced nearly 40 million tons of high-grade iron ore. The mountains systematically were eaten away by electric excavators which loaded five tons of ore a scoop, as easily as a man lifts a spoonful of soup to his mouth.

During these five years a great open-hearth department was built. There are 12 furnaces producing more than 5,000 tons of steel daily.

Sixteen rolling mills were built and worked well. Angle irons, light rails, strips, channels, and other structural shapes were made and shipped out in large quantities.

But it was not only an industrial plant which grew up during those five years as the result of the privations and efforts of a whole people. A city appeared. Symbolically the old village of Magnitnaya was submerged in the second lake in 1936. The inhabitants moved their houses and stock, and took up life in more modern and sanitary, if less picturesque quarters.

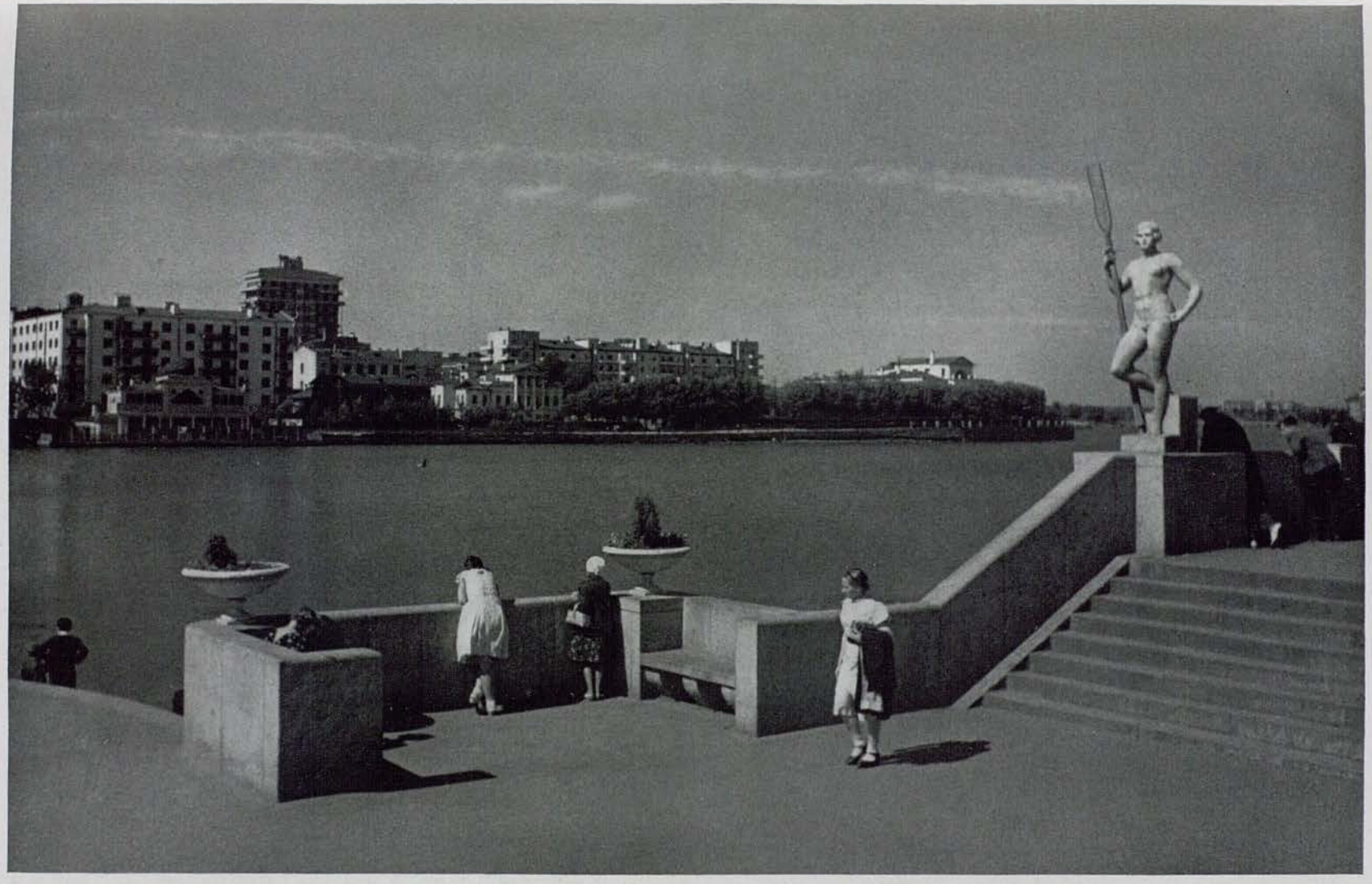
It was a queer city, running for more than 10 miles along the valley. The city planners did a bad job. The railroad station was more than five miles from the center of the city, and

Nazis Took Only the Scorched Walls of This Aluminum Plant at Dnepropetrovsk

As Hitler moved into the Ukraine, vital electrolytic units were taken to Kamensk, 1,280 miles away in the Urals. The huge American-designed dam across the Dnieper (Dnepr) River, source of power for the vast plant, was wrecked. Despite this loss, Russia has regained its prewar aluminum output. Here a painter numbers metal bars.

Circular Office Building and Square Apartment Houses Make One Expect a Pentagon Building Just around the Corner at Sverdlovsk

This gleaming white St. Louis of the Urals is the junction of seven railroads. Its factories turn out electrical apparatus, machinery, and machine tools. Dynamo, name of a sports organization, appears on the office front. Sverdlovsk lived in modern comfort when boomtown Magnitogorsk had only tents and barracks.



Can This Be Florida? No, It Is Sverdlovsk Basking in Siberia's Hot Summer Sun

Shortly after Tsar Nicholas II was executed here in 1918, Ekaterinburg was a city of 70,000 people. Now, renamed for Sverdlov, a revolutionary hero, it numbers more than 500,000. The marble figure with the oar shows the popularity of water sports.

eight from the main workers' residential district. However, there was a streetcar line running the length of the town.

The population of Magnitogorsk stayed close to 200,000. Most of the people were young. One saw few with white hair. The birth rate was high in 1937, about 38 in 1,000. Attempts were made to give the children everything they needed. The best and cleanest buildings in the city were its 50 schools.

Living conditions differed widely, and in this sphere lay one of the main incentives to work. About half the population still lived in barracks, one- or two-story wooden houses, usually without plumbing and heating. Their quarters were crowded and unsanitary.

From Huts to Apartments

Several thousand families lived in earth huts made by the workers themselves with material taken from the mill. They were usually dirty, crowded, and unhealthy.

The "Socialist City," the home of some 20,000 people, was a large district of four- and five-story apartment houses, made of brick and stone, equipped with running water, steam heat, modern plumbing and electric light. The apartments were crowded, but fairly comfortable, even from an American standpoint. For those Russians or Asiatic peoples used to living in huts or yurts, they were palaces.

Several thousand of the more skilled workers and engineers occupied permanent homes built of stone, with all conveniences, gardens, and large yards. These, however, cost from 15,000 to 20,000 rubles, and were constructed on loans made to the workers by the administration of the plant. The loans were to be paid off over 20 years, although often part of the expense was contributed by the administration as a gift for good work.

Even farther above the average were the houses occupied by the more responsible officials and technicians, people who had been "successful." In fine two- and three-story houses, built on American standards, lived the 20 leading men of the city, including the director of the plant and the chief engineer, the head of the political police, and the secretary of the Party committee. Each house had its own garden, and in the case of the director's house there was even a small deer park.

This range of housing standards was not the only spur to good work. Piecework was the rule, with docking for poor work. And in 1937 there was something to buy with money earned.

A real effort was made to plant trees around the mill and the city, to make both look more pleasant. Most of the thousands of trees planted and transplanted died, or were cut down for firewood by a population more interested in being warm than in the beauty of the city. The next year they were planted again.

Magnitogorsk boasted a fine theater, part of the big metallurgical workers' club, which cost several million rubles. The theater was done in marble, and in good taste. The company, composed of actors from Moscow and Leningrad theaters and theater schools, was remarkably good. The repertoire was limited but sound, and there was no question of the theater's popularity.

One could see hundreds of young people, Russians and Asiatics who came several years before from obscure villages, going to watch a play by Shakespeare or Schiller, or some modern Soviet drama, with keen interest and understanding.

Education was the principal occupation of Magnitogorsk outside of the mill. Hundreds of adults attended the technical high schools, teachers' college, medical school, or the mining and metallurgical institute. Most of these adult students were part-timers, working their regular shifts in the mill and studying at night.

All workers had to attend study courses, then pass technical examinations covering knowledge of their trade. Nearly half the total population of the city attended some school or study circle.

Hospitalization was poor and inadequate. There was a tremendous lack of equipment and good doctors, or even of bad doctors, for that matter.

During the five and a half years that I worked at Magnitogorsk, both city and mill changed unrecognizably. More important, the people changed. Tens of thousands of plowboys became mechanics, pipe fitters, welders. They learned to work with tools, to handle machines.

Thousands of them are now in the Army fighting. Their mechanical training in Magnitogorsk made it possible for them to master so well the science of modern mechanized warfare.

Modern Plants Back Fighting Forces

Magnitogorsk was only one of many industrial enterprises constructed during the 1930's in the Urals and in Siberia. About 200 other plants and mills were built to mine and refine the ores of iron and all the important nonferrous metals, to manufacture everything from flashlights to tanks and submarines.

The several score 18th-century charcoal-using metallurgical plants in the Urals were

Asiatic Airmen Receive Instruction on Flying Their "Kirghiz Air Club" Trainer

Valorous Asiatic divisions helped stem attacks on Moscow and Stalingrad. One generation ago such men were nomadic herdsmen.

reconstructed, and four large modern metallurgical giants were built to supplement their work.

In Magnitogorsk, in Chelyabinsk, in Khalilovo, and at Novo Tagil (the new section of Nizhni Tagil), big blast furnaces began to work, using coke from three brand-new coke plants. The coal came from the Urals, from the Kuznetsk Basin in Siberia, and from Karaganda in the Kazakh Republic.

At a dozen places in the Urals, in western Siberia, and in the Kazakh Republic, copper, lead, zinc, chromium, cobalt, vanadium, tungsten, and manganese plants were constructed. Oil wells were drilled in the basin between the Volga and the Urals. Production by 1940 reached two million tons.

At Ufa and at Ishimbai, as well as at Orsk, large, powerful oil refineries were constructed and began producing lubricating oils and high-octane gasoline for Soviet planes and tanks.

Manufacturing industries grew up by leaps and bounds. Two of the largest were at Chelyabinsk and Sverdlovsk, both of which towns I visited several times.

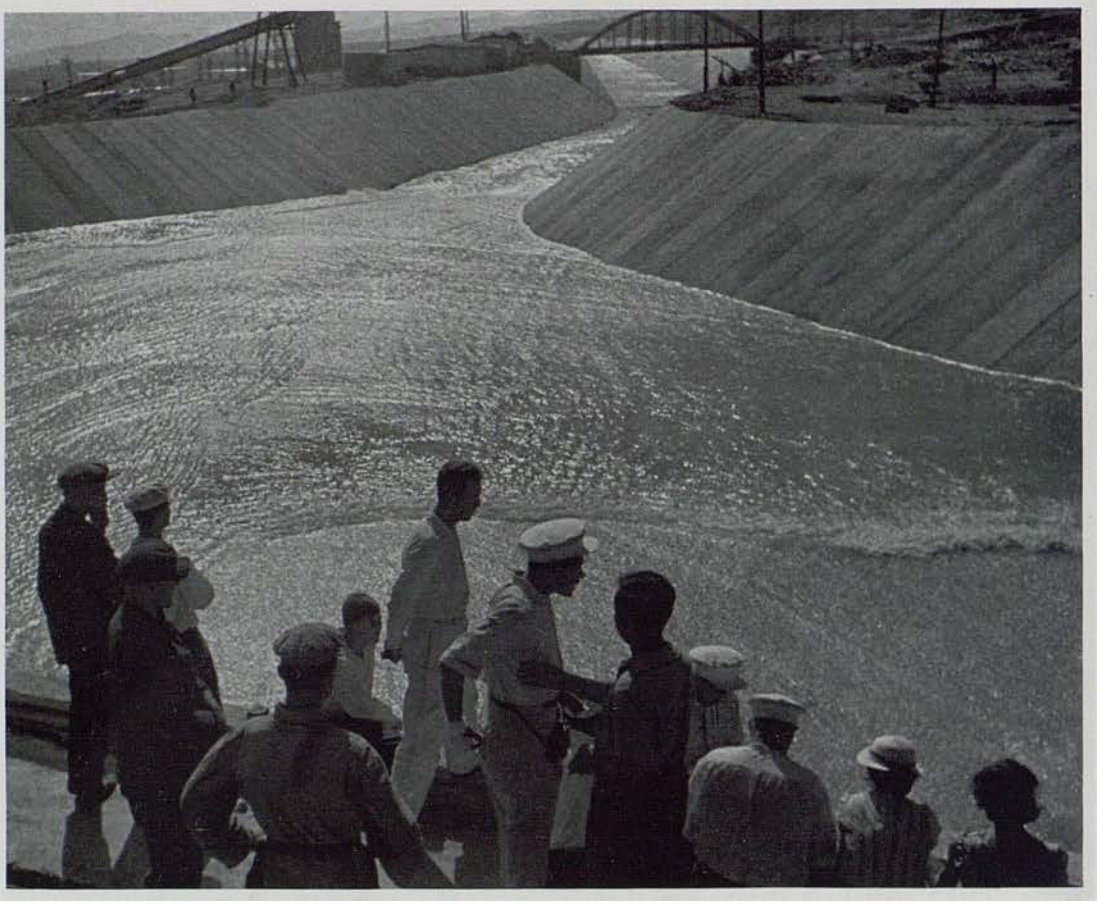
In Chelyabinsk an immense tractor plant was constructed during the early thirties. The plans were American, the equipment for the most part American and British. The plant made the large 60-horsepower *Stalinets* tractors. About 1936 these tractors were equipped with Diesel motors and were able to burn crude oil, thus saving precious high-quality gasoline for the air fleet (page 541).

Near the Chelyabinsk tractor works was another plant called Stankostroi. The word means "machine-tool plant," but actually Stankostroi made tanks.

I visited the plant in 1936 and learned to my own satisfaction that at that time it was putting out tanks on a conveyor line. I believe Germany started making tanks on conveyors in 1937 or 1938.

Soviet generals had the vision, as did General de Gaulle, to foresee that the coming war would be fought with large quantities of mechanized equipment. Unlike De Gaulle, however, the Russian generals had the support of their Government, which made for them the factories needed to make a tank army. Many of these factories were in the Urals.

In Perm, now called Molotov, in the central Urals, immense artillery and ordnance plants were constructed. These plants have not been seen by any foreign observers. I know of them because some of my friends in Magnitogorsk were transferred there.



Water and Nitrogen Are Harnessed to Enrich Cottonfields

Astride this canal in the Uzbek Republic, Central Asia, the nitrogen-fixation plant uses power and water from the Chirchik River. In near-by Tashkent thriving mills weave the cotton.

North of Perm, in Berezniki and Solikamsk, large chemical plants were constructed, using the deposits of carnallite and sylvinite found there in almost inexhaustible quantities. These plants produce metallic magnesium, so important for incendiary bombs and shells. They also manufacture explosives, using local nitrogen-fixation plants, and toluol from the chemical by-products plants in Magnitogorsk, Tagil, and Gubakha.

Building Machines and Submarines

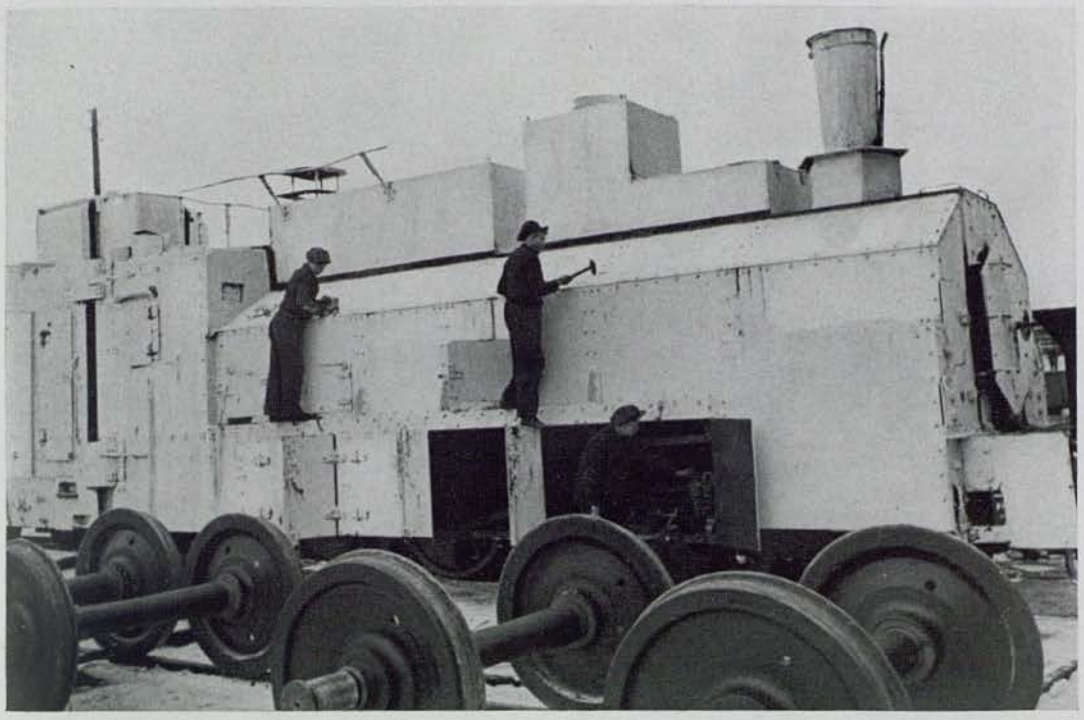
In Nizhni Tagil, a part of the largest railroad car plant in the Soviet Union was built and by 1940 was producing somewhere between 20,000 and 30,000 four-axle railroad cars a year. When completed, it should produce 57,000 60-ton four-axle cars a year. The steel and plates needed for the manufacture of the cars come from the Novo Tagil metallurgical plant, as well as from Magnitogorsk. The wood comes from local lumber mills.

In Sverdlovsk, previously known as Ekaterinburg, the city where the late Tsar and his family were shot during the Revolution, nearly a score of machine-building plants were constructed (pages 548, 549). The largest is the Uralmashzavod, which I visited in 1933 and again in 1935. It was then an immense enterprise equipped with the finest imported machinery. It turned out rolling mills, cranes, excavators, and other heavy equipment.

After 1936 it was taken over for the most part by the military and naval services and used for the production of artillery, and also, I heard on good authority, of submarines.

These were made and assembled and tested in tanks, then taken down and shipped by rail in sections to one of the several seacoasts around the Soviet Union. Russia had thought of the lesson which the Germans are now learning—to move their vital submarine industry away from the frontiers out of reach of enemy bombers.

Also in Sverdlovsk were half a dozen light machine-tool plants, a turbine works, several



Workers Test Doors and Rivets of an Armored Train for the Red Army

Russian "cruisers on wheels" speed to an enemy strong point, pour in a heavy fire, and swiftly withdraw. Only heaviest antitank guns pierce their tough hides. They carry turret-mounted fieldpieces.

Asiatics in Quilted Coats and Sheepskin Hats Lay Rails through the Desert

All Russia rejoiced in 1930 when construction of this 930-mile Turkestan-Siberian line heralded success of the first Five-Year Plan. It linked Central Asia's cotton with Siberia's grain and timber.

For the Record, Bards Dictate from Memory the Kirghiz Folk Ballads

The narrator at left boasts of knowing 400,000 lines of his national epic. Soviet scholars have originated alphabets for some Asiatic tribes. Illiteracy is vanishing. Women work—many at war jobs—but no longer are they their husbands' serfs.

electrically equipped factories, and a number of research organizations studying the geography and geology of the Ural district.

Farther out in Siberia, in the rich Kuzbas (the abbreviated term for Kuznetsk Coal Basin), another important base of heavy industry grew up. The coal reserves in the Kuzbas are fantastic, running to 400 billion tons. The veins are unusually thick, and the coal therefore cheap to produce.

According to the original concept of the UKK, Magnitogorsk ore was to be shipped to Kuzbas, and the same cars were to bring coal back. The long haul (about 1,500 miles) was to have been made by electrified railroad, getting its power from peat-burning or hydroelectric power stations.

This was a grandiose plan and might eventually have been worked out satisfactorily had it not been for the discovery of rich iron-ore deposits at Temir Tau, just south of the Kuzbas, and of good coking coal in the Kazakh Republic and in the Urals, much closer to Magnitogorsk than Kuzbas.

Because of these new discoveries, the original UKK idea was abandoned, and the Urals and the Kuzbas industrial districts were developed as independently as possible.

South of the Kuzbas, in the Altai Mountains, rich deposits of lead, zinc, and silver have been worked for centuries.

There are indications that some prehistoric people mined silver in the region around Ridder (now Leninogorsk) in the Altais. But until the last decade the resources were not systematically exploited, and modern equipment was almost unknown. By 1940, however, these enterprises had been thoroughly reconstructed, and the most up-to-date equipment had been installed and begun operating.

Two other widely separated and important new developments in the heavy industry of Soviet Asia are the polymetallic metallurgical enterprises in Norilsk, in the far north, and the immense copper refineries around Lake Balkhash in the Kazakh Republic.

In both instances few, if any, foreigners have been permitted to see what is going on, but from occasional articles in the Soviet press, and from the testimony of a few Russians of my personal acquaintance who are in a position to know, both these enterprises are large, and will become vital parts of the Siberian-Ural industrial base.

Such is the wealth of minerals in the Urals and in Siberia, and so well have the Russians

"There, Son, Lives Marshal Stalin, Head of the Government"

Surrounded by battlemented walls, the Kremlin was a fortress for the early Tsars. In vain Napoleon tried to demolish it on retreating from ruined Moscow in 1812. German armies in December, 1941, were almost within sight of its towers. Cathedrals at right are museums now.

worked for ten years, that even in 1940 the new industries received almost all their raw materials from local sources and did not depend on the old Ukrainian industrial base.

Thus it was that when Hitler's armies came across Russia in the summer of 1941, seized the Ukraine, and all but took Moscow and Leningrad, the new industrial base was able to continue operations normally, and even to increase production.

When the German invasion started, Stalin announced his policy: evacuate everything you can from the areas taken by the enemy; destroy everything else. His policy was carried out to a very large degree in spite of the difficulties involved and the hardships suffered by those unfortunate Soviet citizens who remained in occupied areas without the wherewithal to live.

Immense factories whose machinery was movable were evacuated to unnamed places in Asiatic Russia. The large Putilov works in Leningrad, for example, was moved complete with machinery, raw material, stocks, and skilled personnel right across European Russia to the other side of the Volga. The Rybinsk aviation factory was moved to the Urals, as were a number of machine-tool plants in the Ukraine.

The Dnieper hydroelectric plant was too large to move. Some of the equipment was dismantled and taken away, but the bulk of the plant and the dam itself were blown up by the Russians. The Nikolaev shipyards and the Dnieper aluminum works met a similar fate.

During the last year, tens of thousands of railroad cars loaded with equipment of all kinds arrived in the Urals and in Siberia, and in many cases this apparatus was assembled and in operation within a couple of months.

Nameless Detroits of the Urals

Usually the skilled personnel of the plants accompanied the machines to their destinations, helped assemble them, and went right to work. Sometimes, as in the case of besieged Leningrad, the evacuation took place partly by plane. Thousands of tons of industrial equipment were flown from Leningrad, with the workers who knew how to run it, to new places.

In most cases the Soviet Government has not announced the names of the new cities of the large evacuated factories. Dispatches refer to previously nonexistent cities such as "Aviagrad," "City of N," "City of M." It is

known only that most of them are in the Urals. It is a safe guess that production in these plants is good enough so that the sum total of Soviet production of military equipment and ordnance has not decreased absolutely since the outbreak of the Soviet-German war.

Another important thing has taken place since the outbreak of the war. The Soviet workers have been working 12 to 14 hours a day, and have attained higher productivity than ever before.

In Magnitogorsk the daily production of pig iron from the blast furnaces was higher in 1942 than in any previous year. The open-hearth workers toiled long hours to make up for the labor of those departed for the front, and at the same time mastered the production of a number of special steels required for tank and artillery manufacture.

For a number of years the Russians have been working hard at nickel and other alloy steels with qualities of lightness and resistance for the manufacture of armor plate. During the last twelve months the scientific workers of the Academy of Sciences, which has moved temporarily to Sverdlovsk and Ufa, working in collaboration with the steelworkers of Khalilovo, Chelyabinsk, and Magnitogorsk, have solved some of the toughest problems they were facing.

The open-hearth furnaces of the Urals and Siberia, as well as the electric metallurgical plant "Ferrosplav" in Chelyabinsk, are producing quantities of the finest armor plate, made from local Ural ores and turned into tanks and artillery equipment in new plants located only a few miles away.

The building industries have not been able to make walls and roofs fast enough for the machines. The workers have lived in tents, as they did in the early days in Magnitogorsk. Others have been housed in flimsy temporary buildings.

Food is scarce, and the transportation system is overburdened with evacuation and military freight. In the central Russian districts today, workers get 600 to 800 grams of bread a day and some salt fish. This is a little less than what they got in 1932 in Magnitogorsk.

The Soviet people working on the Urals and Siberian industrial front today are putting up with more or less the same conditions of material scarcity and overwork that they did a decade ago. They survived that crisis and constructed a magnificent base. Today they are even more likely to survive and achieve great things, because they have the benefit of ten years of study.

The Soviet worker today is no longer the illiterate plowboy that came from the village to Magnitogorsk, looking for a job in 1931.

Much new construction had been going on in the Urals and Siberia since June 22, 1941. Only occasional bits of information are announced officially. For example, the Soviet press stated in December that the fifth blast furnace in Magnitogorsk went into operation just before the end of the year (page 526).

Another more recent dispatch stated that the Bakal metallurgical plant in Chelyabinsk began operations. This plant was projected in early 1930 and construction began several years later, but now production has actually started.

It is a safe guess that sizable new aluminum plants have been built in the Urals and in the neighborhood of Lake Baikal, where new hydroelectric plants working on the Angara River should soon begin the production of cheap power.

Mineral Riches of Asiatic Russia

It is probable that the war will change fundamentally the planning of Soviet industry, and will turn its development almost completely into the Asiatic parts of the Soviet Union, including the Central Asiatic Republics of Tadzhik, Turkmen, Uzbek, and Kirgiz. Much Lend-Lease industrial equipment is being delivered by the U. S. A. to Asiatic Russia.

A recent traveler over the Trans-Siberian from Moscow to Vladivostok reported that the railroad line was filled with trainloads of evacuated equipment of all kinds as far east as Chita. It seems unlikely that such equipment would have been taken so far had not the Soviet Government authorities made up their minds that, no matter how the war ends, it will not be brought back.

In almost every respect, Asiatic Russia is richer than European Russia. The Kuzbas coal deposits are several times larger than those of the Donbas. The oil reserves of the Volga-Ural region are more than twice as large as those of Baku.

Siberia's great rivers offer excellent sources of power, and highways for transportation. The immense fertile plains of southern Siberia could feed a population many times larger than that of all the Soviet Union combined.

Strategically, Siberia is almost unassailable. It is a vast area capable of supporting an entire nation. It will be, in my opinion, the center of the future planning of the Soviet Government, even if Russia after the present war extends its western frontiers into what used to be Poland and Romania. It is safer in Siberia. And Stalin is a man who likes to play safe whenever he possibly can.