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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

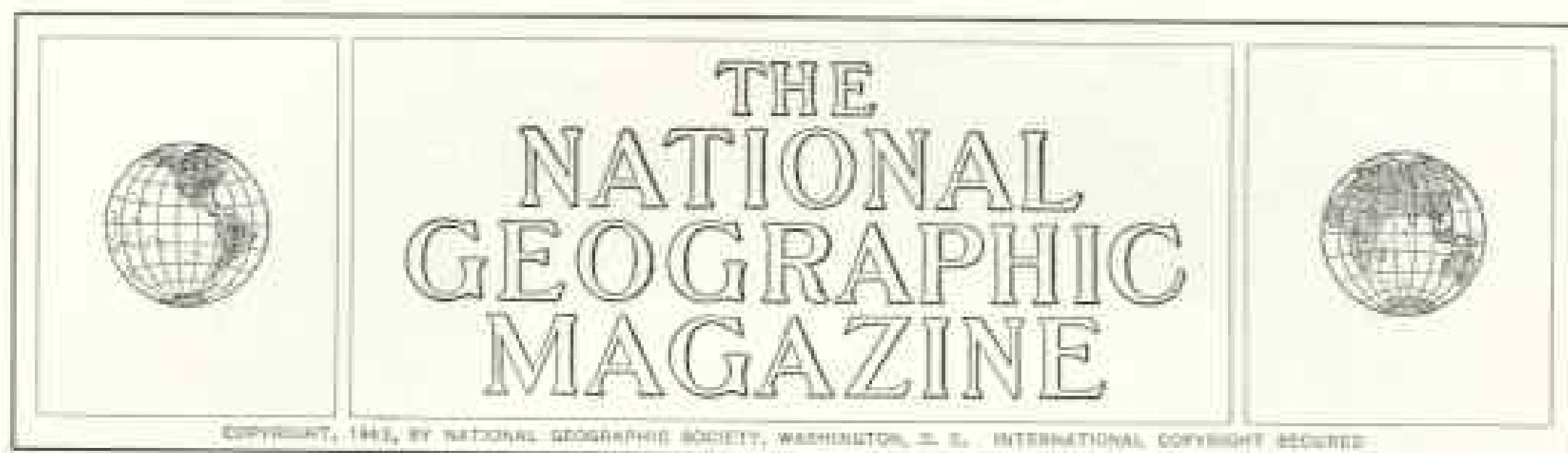
RICHARD L. BURDSALL
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“Magnetic City,” Core of Valiant Russia’s Industrial Might

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).

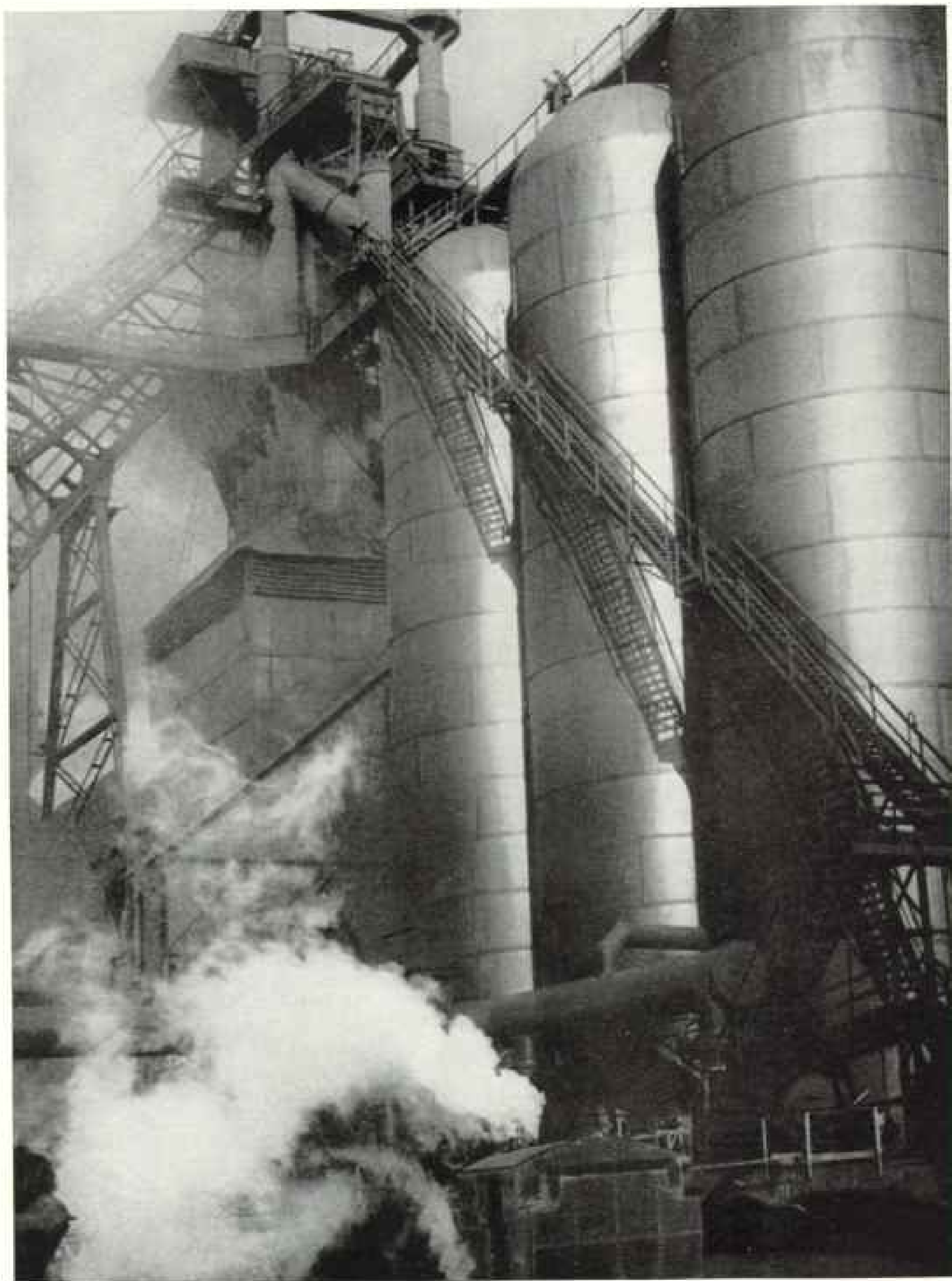
I saw a city spring from nothing, just as the railroad construction town of our Middle West, three-quarters of a century ago, sprang up on American soil. I saw primitive backward people in Magnitogorsk advance from the 10th to the 20th century in their personal lives and habits within five years.

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



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.

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

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

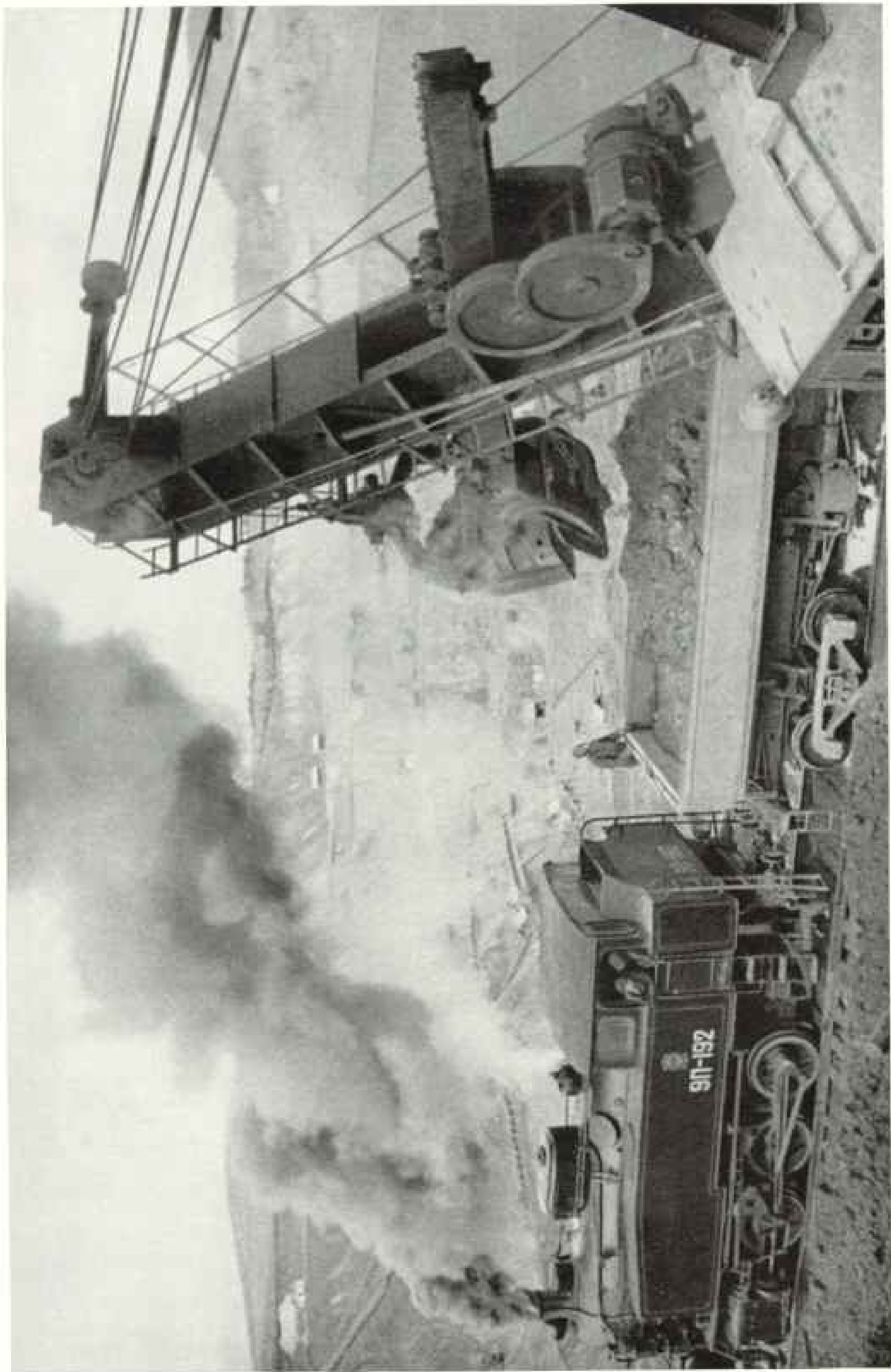
Whites were a good deal harder on the villagers than the Reds had been, and some of the young herdsmen ran off to join the Red partisan forces.

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.

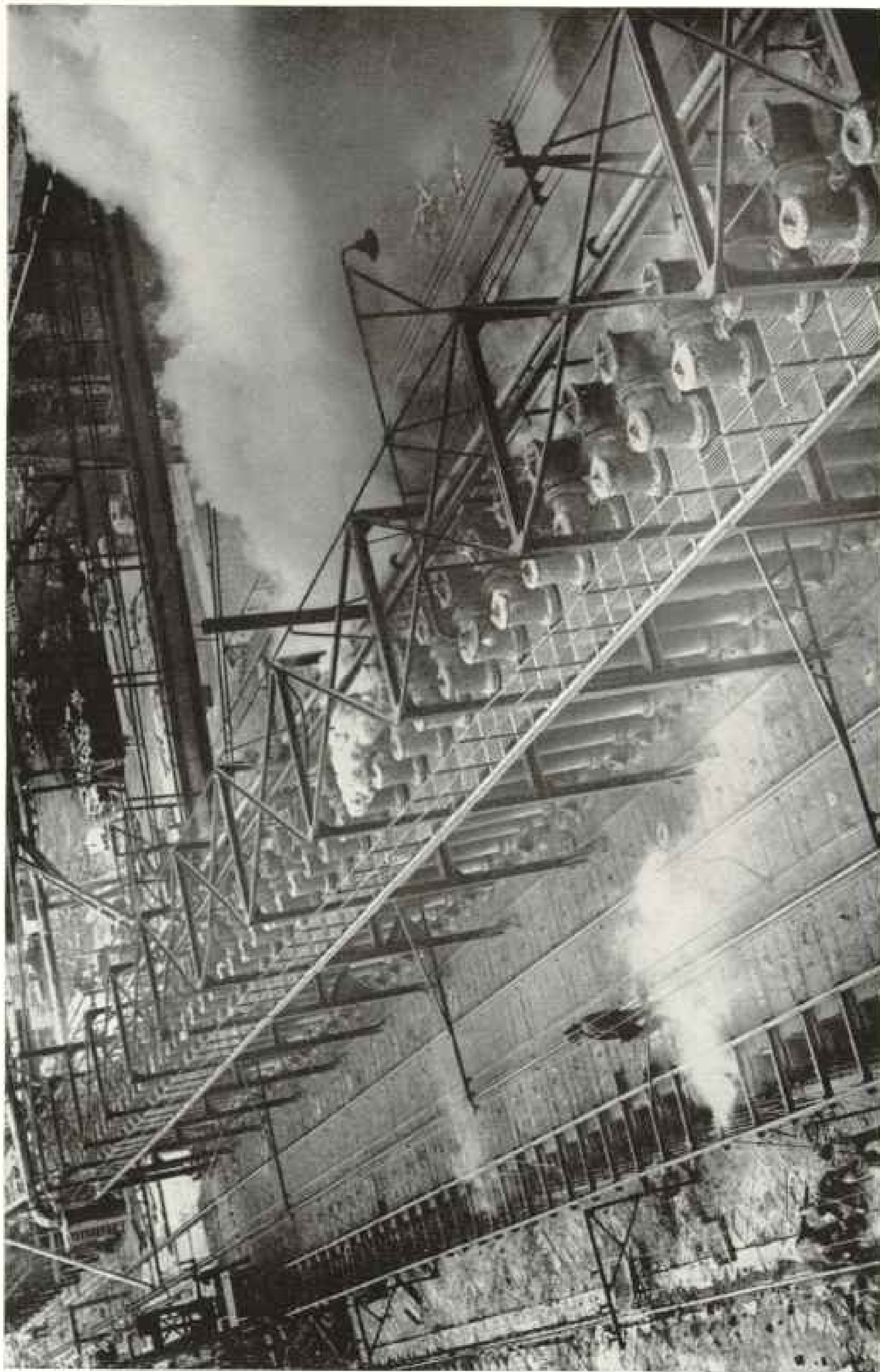
But the seeds of change had been sown. In Moscow, 900 miles away, plans were being drawn up, plans of industrialization. And in these plans the iron ore of Aider-Ly figured conspicuously.

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



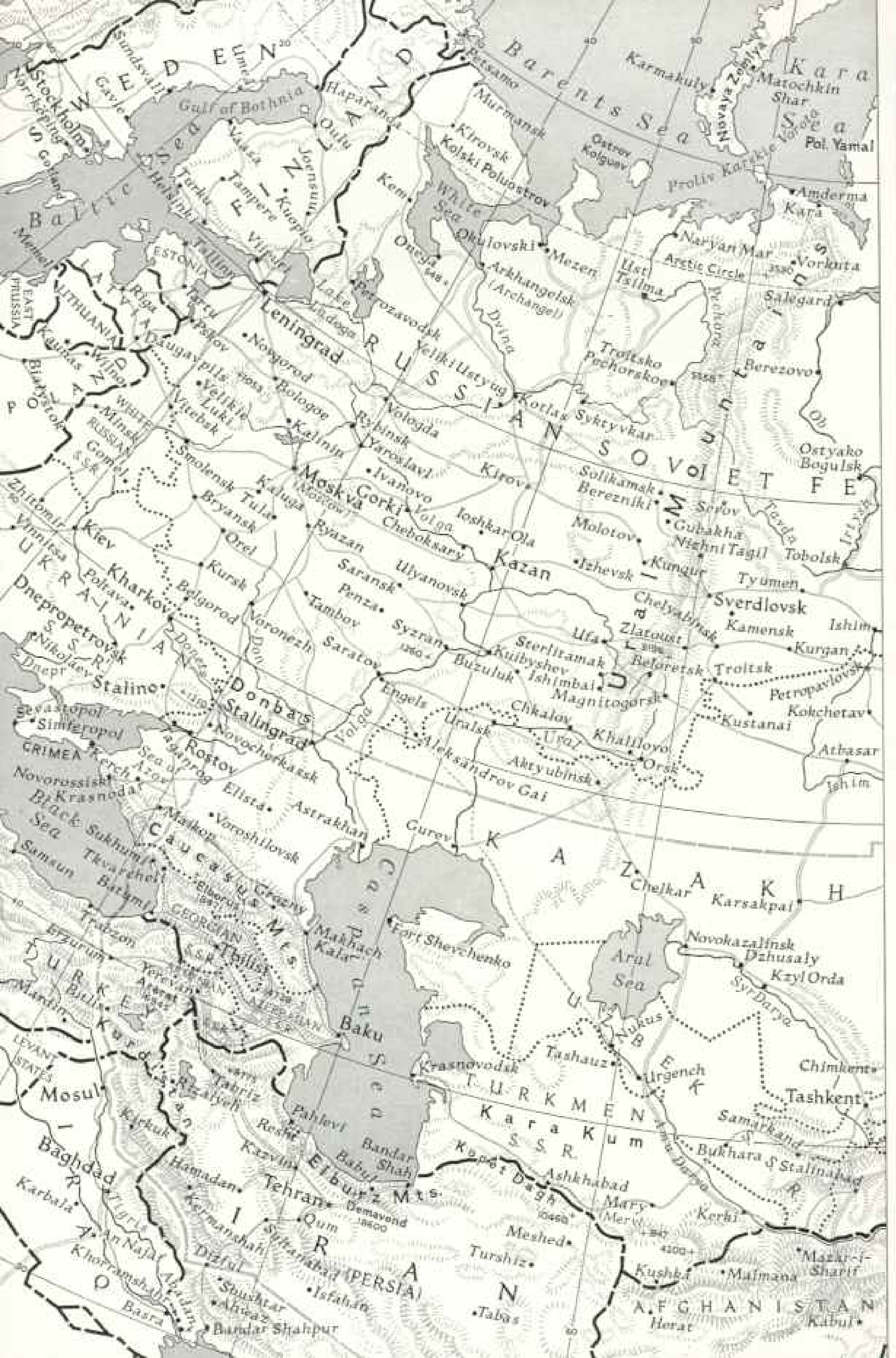
An Electric Excavator Dumps a Mighty Mouthful of High-grade Iron Ore into a Car at an Open Pit in the Ureals

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 Tuans, Ural mines were worked with ref 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 five 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.





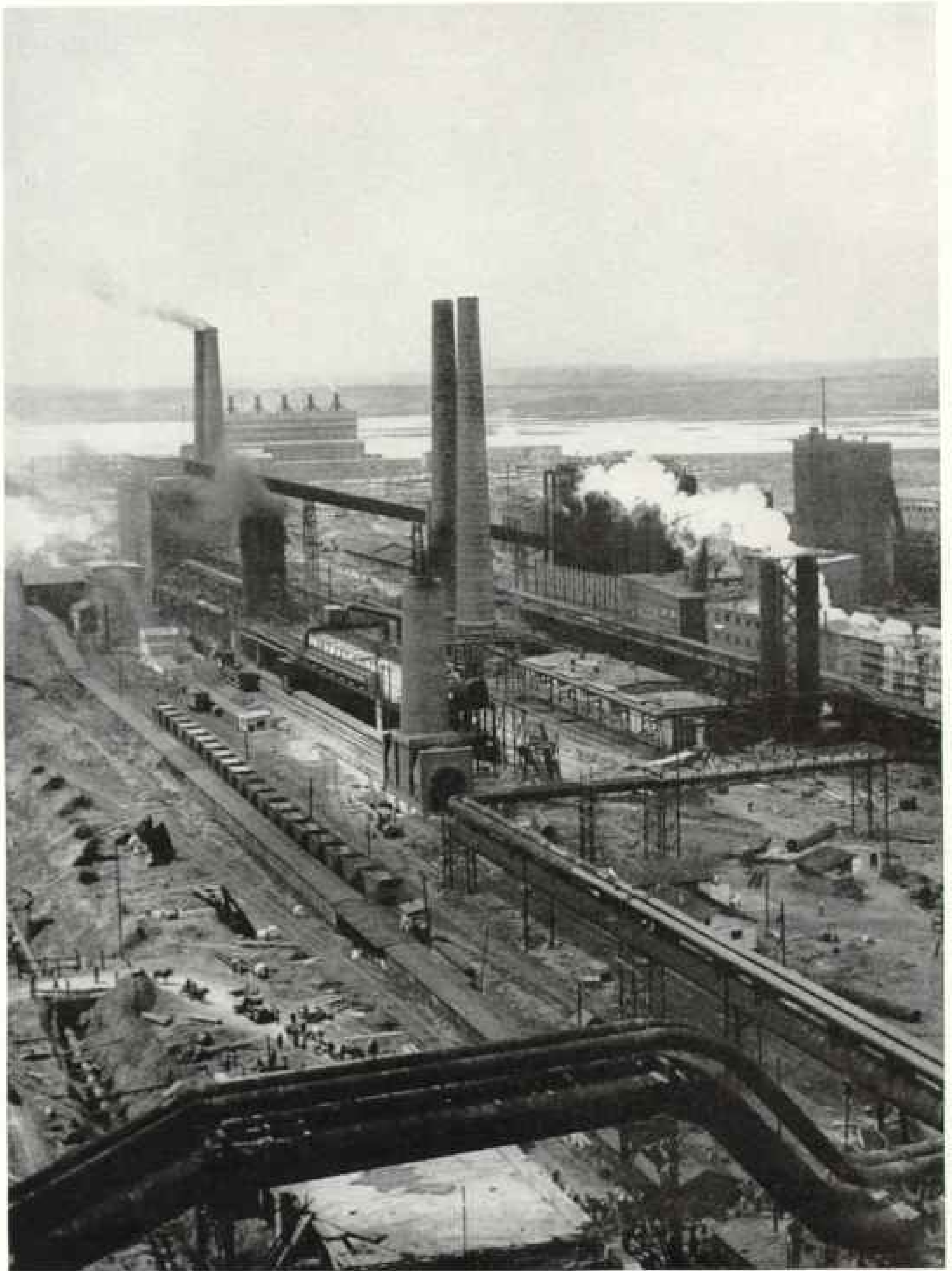
Railways ———
" under construction ———
Strategic roads ———
Outline of the United States of America ———

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 W. L. Latham



BarPolo (Kistlov)

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 rail-

road 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 clotheslines 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, gazing at blast furnaces and gas pipes as if he were in a dream.

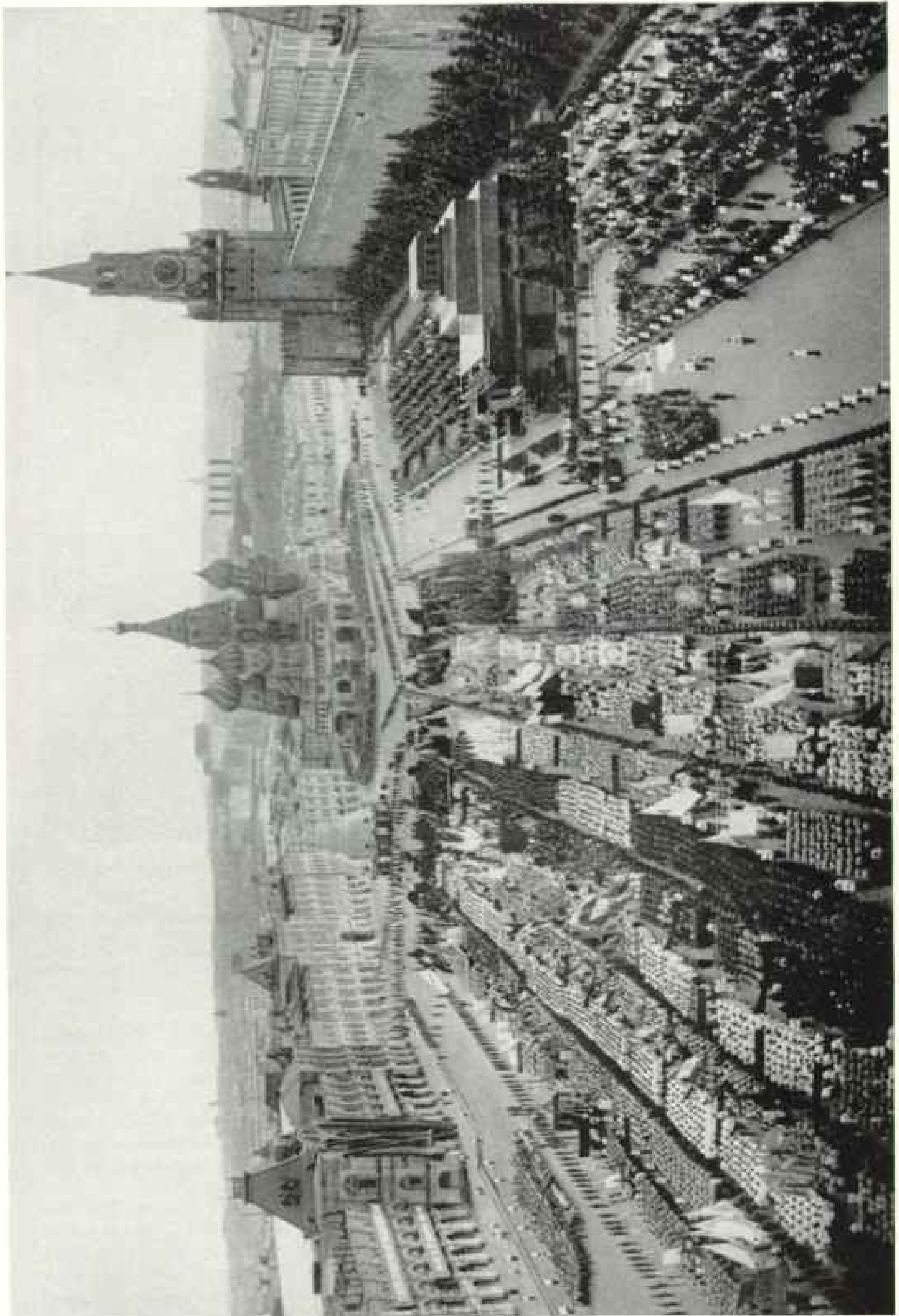


Through Colored Goggles He Watches Incandescent Ingots
Take Form

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

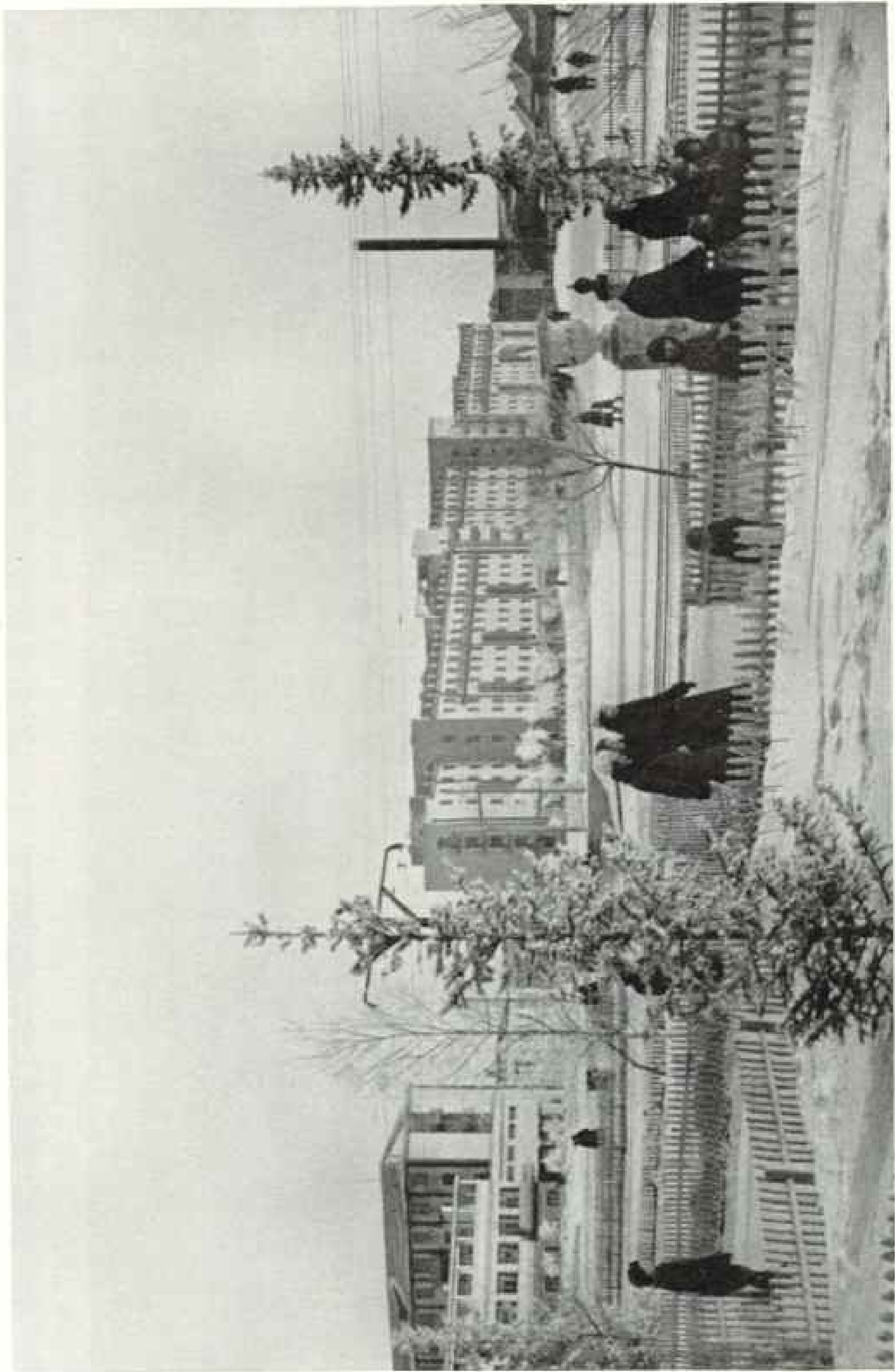


In Red Square, Moscow, Spacious Setting for a Youth Parade, Columns Pass with Flags before Lenin's Tomb, the Reviewing Stand



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.



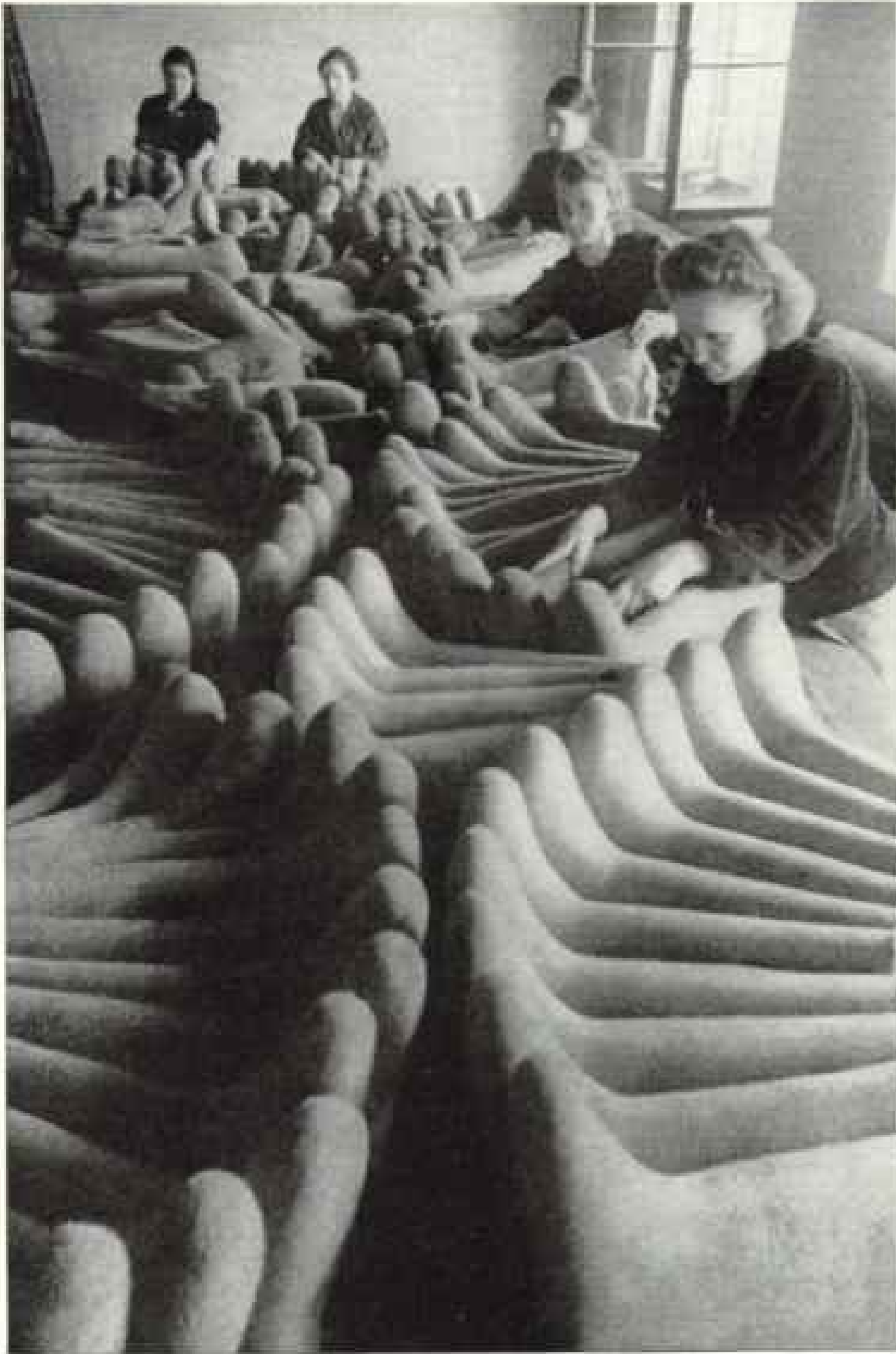
Siberia's Snows Remain, but Its Dreary Wastes Have Bloomed with Modern Apartment Houses

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 Kuznetak 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, Khabov, and Stalingrad, other tractor centers. Under the Tsars, the town was a stopover for exiles (page 251).



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

* *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.

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-

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. Beggings 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.

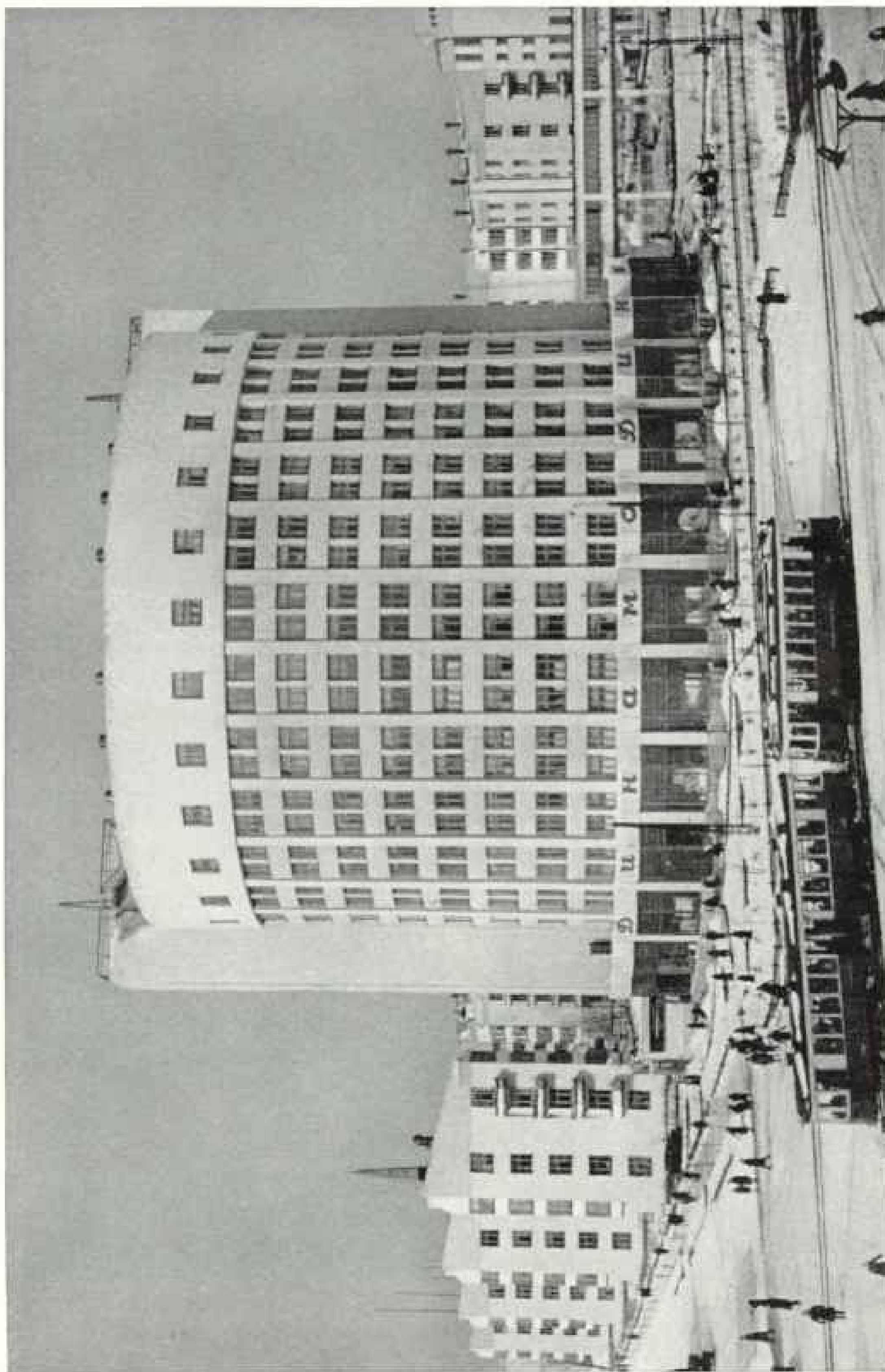
But it was not only an industrial plant which grew up during those five years as the result of the privations and efforts of a whole people. A city appeared. Symbolically the old village of Magnitnaya was submerged in the second lake in 1936. The inhabitants moved their houses and stock, and took up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



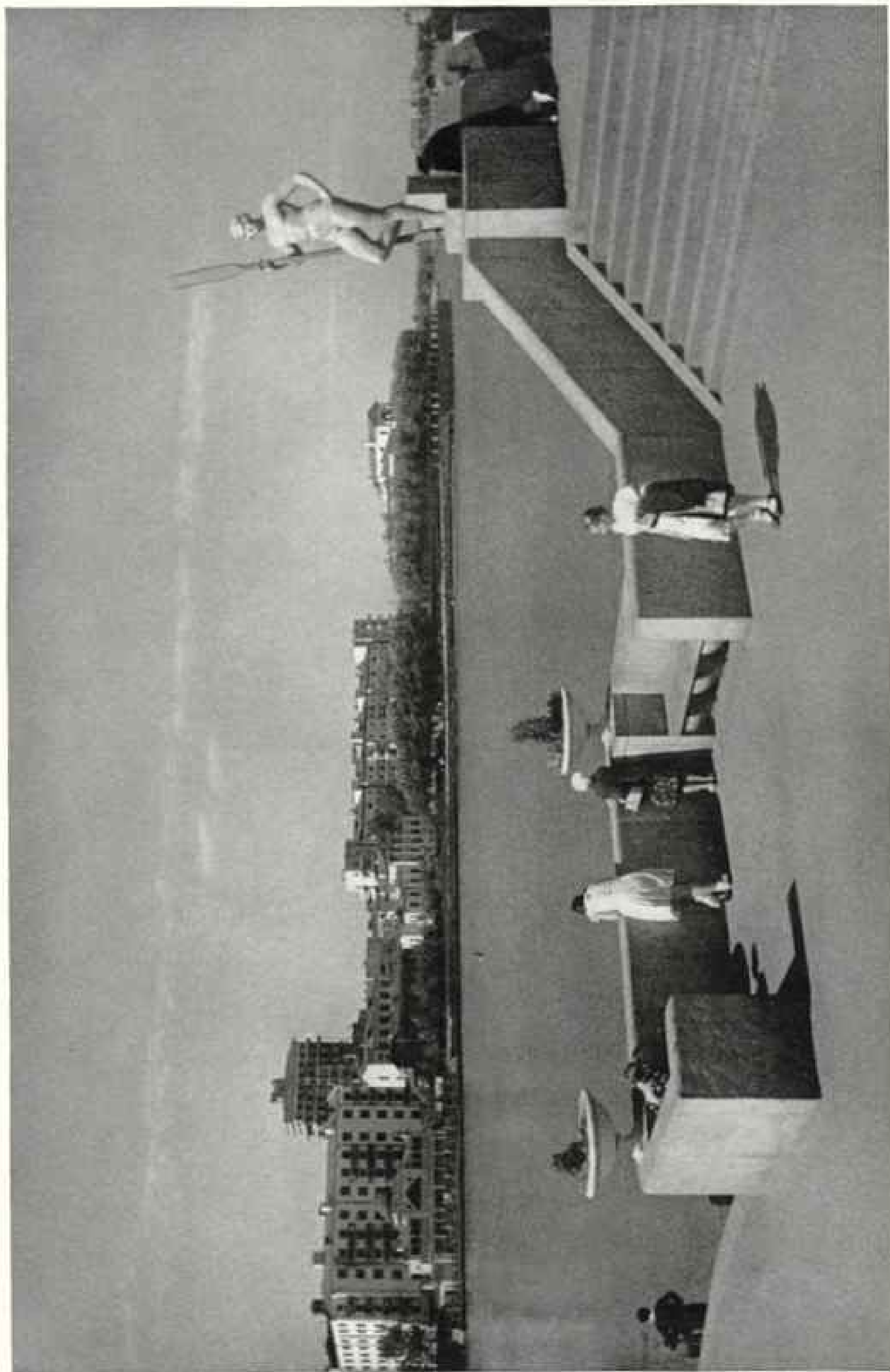
Nazis Took Only the Scorched Walls of This Aluminum Plant at Dnepropetrovsk

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 non-ferrous 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 Khali-lovo, 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 sylvinit 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.

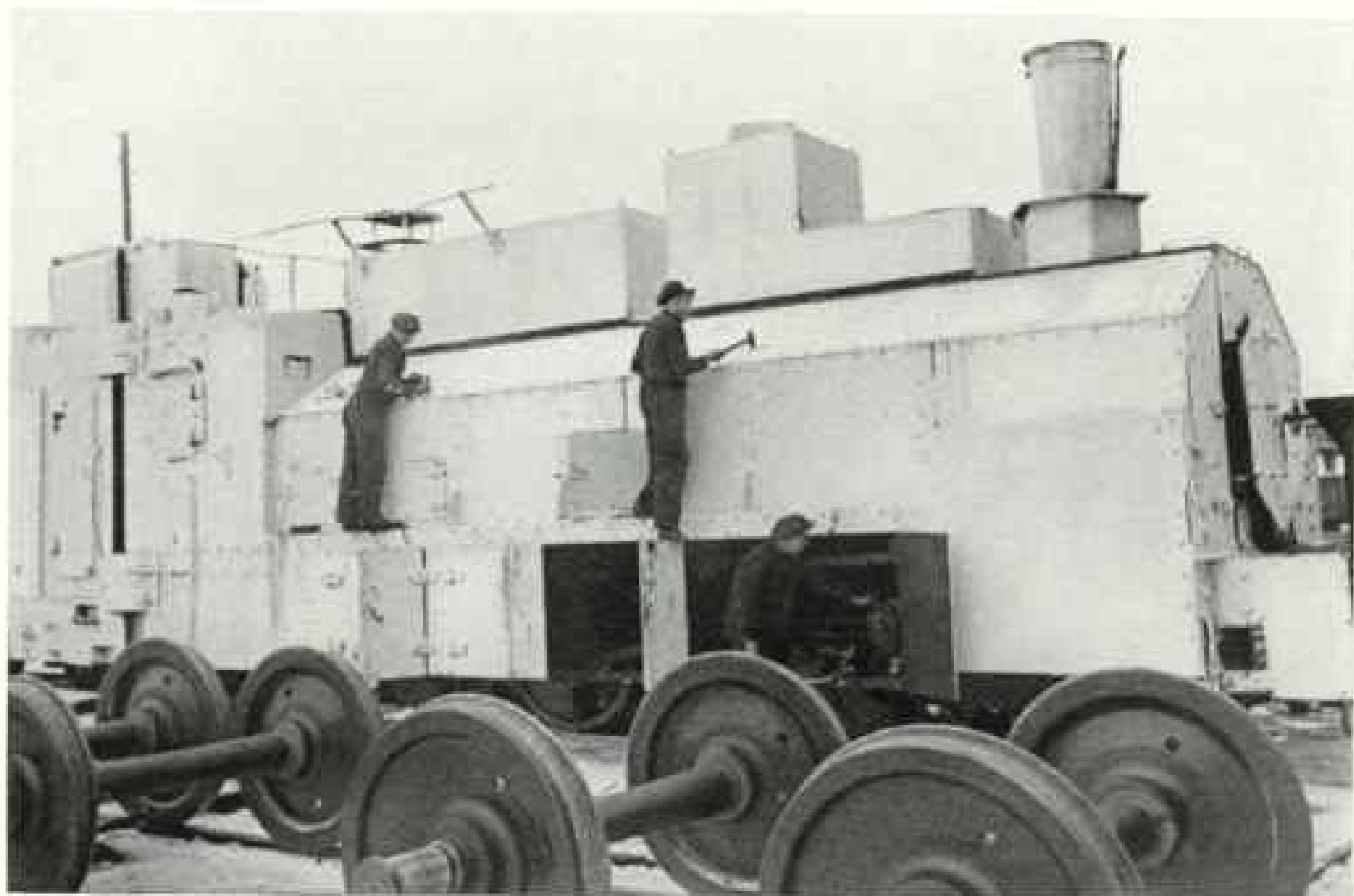
In Sverdlovsk, previously known as Ekate-

rinburg, 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 Altai. 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 "Aviograd," "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 "Ferrosplay" 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 Rumania. It is safer in Siberia. And Stalin is a man who likes to play safe whenever he possibly can.

Life with Our Fighting Coast Guard

BY F. BARROWS COLTON

"HANG ON!" somebody yelled. I grabbed a machine-gun tripod for support and ducked as a cloud of salt spray whipped over the bow from the heaving, slaty-gray North Atlantic.

Our little 85-foot Coast Guard cutter slid down the steep side of a wave that was bigger than she was and rolled like a log at the same time. Nobody needed to tell me to hang on!

In the distance wallowed the sluggish gray ships of the convoy we were escorting along the coast. The stern of one ship pitched so high that her rudder came almost entirely out of the water. "Dat ole devil, sea," was in a rough mood.

Despite the wet weather the canvas covers had been removed from the machine guns mounted on our deck. They were exposed to all the spray and rain, with cartridge belts threaded in, ready for instant action.

"Isn't the dampness bad for your guns?" I asked the chief bosun's mate, who was bracing himself against our 30-degree roll.

"Yes, but we can't take chances," he shouted back against the whine of the wind.

"If a sub should surface near us, she could get her heavy deck gun into action in 40 seconds and blow us right out of the water. Our only chance would be to machine-gun her gun crew before they could start firing. That means we must get our guns going in less than 40 seconds. We've got to be always ready."

Bosun's mates don't go around quoting mottoes, but "Always Ready," *Semper Paratus*, happens to be the motto of the Coast Guard. In fact, it's the Coast Guard's way of life.

Coast Guard Sees Action the World Over

I saw it in action, ashore and afloat. Alert youngsters in lookout towers swept ocean, sky, and beach with powerful glasses, keeping watch for unwelcome visitors by air or sea. Fat-bellied surfboats, mounted on wheels, stood ready like fire engines to roll to the rescue of torpedoed or shipwrecked seamen.

Beach patrols slogged through heavy sand in lonely darkness, with eager, keen-scented dogs on leash. Tough seamen laughed at hardships, never knowing when the call to battle stations might bring death face to face.

And they're ready on distant battle fronts as well. The Coast Guard's job is far more than just watching the coast. Its men and ships, forming a part of the Navy in wartime, are serving the world over.

Coast Guard men, expert at handling small

boats, manned the barges that landed marines under fire at Guadalcanal, and more were wounded while landing our soldiers in North Africa (page 575). Coast Guard men, forming the crew of the U. S. transport *Wakefield*, fought and died at faraway Singapore. Coast Guard men learned to know Greenland's bleak coastal waters while patrolling for icebergs in peacetime (Color Plates I to VIII).

They used their knowledge to find and capture a German weather-reporting station there in 1941. It was the first U. S. naval capture of the war.

Our little boat, bouncing on the choppy swells of the midwinter Atlantic, was ready, too—and with more than just her menacing machine guns (page 565).

"Ash Cans" on Afterdeck

On her plunging afterdeck were lashed her deadly "ash cans"—depth bombs—with their launching racks run outboard, ready to be rolled over the side to bring blasting, shattering destruction to any submarine that might attack under the surface.

Below, in the "sound room," a stuffy cubby-hole no bigger than a broom closet, a sailor sat wearing earphones, turning wheels, and forever listening—listening for signs of an enemy beneath us.

Every few seconds, out through the sea around us, his sound-detector apparatus sent a probing sound wave, resembling a high-pitched "ping-g-g!" If it struck the hull of a submarine (or a whale!) it would echo back, and the listening sailor would hear in his earphones a faster "ping-ping."

If the pings came strong and often the ship's "howler" would sound "general quarters," and seamen would scramble up the ladders to their posts, perhaps, as once happened, clad in nothing but life jacket and long winter underwear!

With the sub's position located, all the boats in the convoy escort would speed back and forth over it, dropping their ash cans in a pattern designed to catch the enemy in a net of explosions.

It was 4 a.m. when the master-at-arms routed out several young officers and me from our warm beds at the shore base. He had hot coffee ready in the big, thick, handleless Navy cups. Soon we were off.

Sailors off watch stirred sleepily in their bunks as I clumsily donned the cold-weather gear that the skipper broke out for me—long



J. Baylis Roberts

When Pots Have to Be Lashed to the Stove, Cooking Becomes a Balancing Act

The cook in the tiny galley of an 83-foot Coast Guard cutter braces himself while he stirs the soup in stormy weather. Even the rail around the stove top does not always hold the pots in place. Pump handle at left is used to empty waste water from the sink behind the cook. Racks, above, keep dishes from falling off shelves. On opposite side of galley are dining table and two bunks (page 559).

woolen underwear, double-thick wool socks, heavy blue windproof pants that tied at the ankles like ski pants, flannel shirt, zipper jacket with wristlets, wool scarf, and cloth helmet that covered ears and cheeks.

On my hands I wore wool-lined leather mittens, with trigger finger and thumb separated, and on my feet heavy black overshoes that buckled high up around the ankles. Everyone on board wore this same outfit.

In pitch darkness, taking the wheel himself, the young ensign commanding our boat steered us down the harbor, through the mine fields, out to the rendezvous where we would meet the convoy. Only now and then a light winked at us—another boat or a channel buoy.

Once as a mysterious light blinked a message from the blackness a green seaman was slow in answering with our blinker.

"Hurry up! Do you want to get us shot at?" the skipper barked. Not long out of

Harvard, he handled his little ship with the sureness of a veteran, though he had had only four months' intensive training as a Reserve cadet at the Coast Guard Academy, plus some boating experience off the New England coast. He was the only commissioned officer.

The chief bosun's mate, second in command, was an ex-real estate dealer who had owned boats all his life.

Our crew of a dozen men included a lanky engineer from the Missouri Ozarks, a tough-spoken gunner's mate from Brooklyn, a friendly Arkansas youngster with the thickest southern drawl I ever heard, a dark-haired cook from New Orleans who had started working on tugboats when he was only eleven.

Joking around the mess table in their cramped quarters below, they seemed more like a bunch of high-school boys lounging at the corner soda fountain than men whose job was to hunt down and kill other men.



J. Warner Roberts

With a Sea-sharpened Appetite, You Don't Mind Crowded Quarters.

There is hardly room for even half the crew of an 83-foot Coast Guard cutter to eat at once around the small mess table. Bunks at right are folded back to make room to sit down. The cook's galley (page 558) takes up the other half of this space amidships. Ladder at right leads up to deckhouse.

When they came off watch, cold and wet, blowing on stiffened fingers, they would get in their bunks and relax with "comic books" portraying adventures of Terry and the Pirates or Don Winslow of the Navy!

Such are the lads who play watchdog to the coastwise convoys that bring in what little coffee you still are drinking, and, if you live in the East, what little gas you still have in your tank. Because they're always out there, with their deadly gray-blue ash cans ready, merchant ship losses have been reduced on both our Atlantic and Pacific coasts.

Think of them with appreciation sometimes, when you sit before your cozy fire with the wind howling outside, and be glad that they, at least, have all the coffee and sugar they need. I know they earn it, for I've seen them at work.

Our boat rolled and pitched increasingly as we moved out into the choppy, open sea in the pitch darkness just before dawn. The

odor of frying eggs came up the forward hatchway, but I discovered I wasn't interested. Just as the sun rose, I went to the rail and quietly deposited my early-morning coffee in the deep. The chief bosun's mate caught me in the act.

"Guess I'm no sailor, chief," I said sheepishly.

"Don't let that bother you," he laughed. "Only five of the crew ate any breakfast this morning." I felt better to know that even Coast Guard men can get seasick!

"Those 83-foot cutters ride like a jeep with square wheels," the officers at the shore base had said laughingly when they learned I was going for a cruise on one.

"And aren't much bigger than a jeep," they might have added. Amidships, below, in a space half the size of your dining room, are crowded electric stove, big icebox, sink, table seating six, and two bunks. A rail around the stove top keeps pots from sliding off, but

sometimes they have to be lashed down as well (page 558).

"In heavy weather," they told me, "you open the icebox door only an inch or two at first, so you can feel inside to see if anything has tipped over or broken. Sometimes even the cook gets seasick, and then we live on sandwiches, coffee, or whatever we can rustle for ourselves.

"The engine room aft is known as the 'Chinese laundry.' It's the only place on the ship that's always dry, so everybody hangs their washing in there. Nobody bathes or shaves when we're at sea. In the fo'c'sle, bunks are so close together you can't turn over if there's a fat man sleeping above you."

Constant Talks Between Ships

A constant hoarse chatter of voices came from the loud-speaker of the radio telephone. The salty air around us was filled with talk between ships, planes, and shore, and we heard it all. It was like listening on a party line running from Cape Cod to Hatteras.

"Baker. Roger. X-ray," a voice would chant, identifying the initials B. R. X., the call letters of some ship. "Baker. Roger. X-ray. What is your position? What is your position? Answer. Answer."

In the deckhouse the skipper sat in a high-legged chair fastened to the rolling, pitching deck with four stout guy wires. The gyrations of that chair reminded me of the motion of a howdah on a circus elephant's back.

Looking out at the choppy, tumbling green water and overcast sky, he sighed contentedly and said: "Boy, I'd sure rather be doing this than sitting in some office on shore!"

On our crowded little boat there was neither space nor time for the formalities of a large warship.* The only salutes were when the skipper came aboard. But his orders brought a snappy "Aye, aye, sir" and quick response.

There was no room for the skipper to eat his meals alone in accord with ancient custom. He sat at the same table with the men, joking and laughing easily with them, but always he was served first and no one ever began to eat before he did.

Larger Coast Guard cutters, as big as Navy gunboats, are helping escort convoys to Britain (page 561).

"Once, on a trip across, we hit a hurricane that was doing 120 miles an hour when the wind-recording instrument carried away," an officer told me. "In mid-Atlantic, in winter, it's so cold you never are warm while you're out on deck.

"The racks are up most of the time on the officers' wardroom table, to keep dishes from

sliding off. On one trip the officers off duty had a continual card game going. When 'general quarters' sounded, they'd lay their cards in the racks, rush to battle stations, then resume play later. One time, when subs were thick off Cape Hatteras, we were called out nine times in three hours.

"We try to give the men a chance to work off their tension. In heavy weather, once, I saw several sailors naked except for their caps, letting the seas wash right over them on the quarter-deck, whooping like kids."

Service Older Than the Navy

The fighting men of the Coast Guard are carrying on the traditions of a service that goes back to 1790 and is older than the Navy. Every war in our history has seen the Coast Guard (originally the Revenue Cutter Service) in the midst of action.

For a time, before the War of 1812, a few revenue cutters were the only sea fighting force we had. In the World War of 1914-18 the Coast Guard performed important convoy work and its officers suffered the largest percentage of loss of life of any of the armed services.

A Coast Guard man in the Solomon Islands in 1942 volunteered to lead an expedition of ten small boats under heavy enemy fire, to take off a group of marines from a dangerous position on a beach. He was mortally wounded, and his last words were: "Did they get off?"

Organization and uniform of the Coast Guard are the same as the Navy's, but enlisted men wear "U. S. Coast Guard" in gold letters on their caps and a white shield on the right sleeve (blue shield on summer whites). Officers wear the same gold stripes to indicate rank as in the Navy, but have a gold shield instead of a star above the stripes on sleeves and epaulets. The uniform of the SPARS, women's auxiliary, resembles that of the WAVES.

People who don't know better sometimes call the Coast Guard the "five-fathom navy," suggesting it never ventures far from the coast.

Actually the Coast Guard is at home anywhere you can float a boat, whether it be trailing skyscraper-sized icebergs in the North Atlantic shipping lanes, "riding herd" on migrating seals in the Pacific to keep off poachers, or navigating lifeboats in a Mississippi flood among floating buildings, telephone poles, and under live wires or low bridges.

As for coastal waters, any real seafaring man knows it takes far more skill to negotiate the treacherous tides, currents, shoals, rocks,

* See "Life in Our Fighting Fleet," by F. Barrows Colton, NATIONAL GEOGRAPHIC MAGAZINE, JUNE, 1941.



U. S. Coast Guard, Official

Rolling Her Rail Under, a Coast Guard Cutter Bucks Angry Seas.

The picture was taken on Christmas Day, while the ship was escorting a transatlantic convoy. Ships of this type are considerably larger than the 85-foot cutters that guard coastwise convoys (page 563). Depth charges, better known as "ash cans," are ready to be dropped over the side if an enemy submarine is detected.



V. H. Green House, official

On Lonely Beach Patrol, Coast Guard Sentries Watch for Hostile Planes, Enemy Landings, or Torpedoed Ships

Such alert watchers first spotted saboteurs landed from German submarines on the Atlantic coast in 1942. At night the men lead fierce dogs on leash (page 284).



U. S. Coast Guard, (Contd.)

Ready for Action, a Coast Guard Cutter Escorting a Convoy Combs the Sea for Signs of Submarines

Small cutters like this, only 83 feet long, protect coastwise ships bringing oil and other supplies to American ports (page 557). Forward machine gun is manned. Stripped to the waist for warm weather, helmsman and lookout stand between searchlights. In foreground is stern of another cutter showing depth charges.

and breakers near shore than to sail the open sea.

Plans were complete, in 1939, to send out a joint expedition of the Coast Guard, National Geographic Society, and University of Virginia on the cutter *Alexander Hamilton* (since torpedoed off Iceland) to spend a year among islands of the South Pacific studying oceanography, geology, earth's magnetism, gravity, and marine life. Outbreak of the war postponed it.

The typical Coast Guard man, they say, is a "jack-tar of all trades, and *master* of all!" In peacetime, when the Coast Guard operates under the Treasury Department, its job is enforcing maritime law on the coastal waters, Great Lakes, and navigable rivers, and saving lives and property in peril (page 581).

In carrying out these duties, Coast Guard men have nursed sick Eskimo babies in Alaska, fought forest fires, chased smugglers with airplanes on the Mexican border, drained radiators of cars and tractors as floods receded, so they wouldn't freeze, dug a path four miles long through snowdrifts so a man with a broken back could be moved to a hospital, rescued countless small motorboats in distress because of storms, lack of fuel, or incompetent seamanship, flown injured sailors to hospitals from ships at sea, and even reported the locations of schools of fish, to save time for fishermen.

In normal times the Coast Guard saves an average of 15 lives a day. It maintains over 30,000 aids to marine navigation, including 500 lighthouses, plus lightships, buoys, radio beacons, and fog signals.

Patrol of 60 U. S. Harbors

But let's see more of the Coast Guard at war.

One day—and night—I prowled around New York harbor on the patrol boats that guard its teeming wartime business. Some 60 important harbors of the United States are ruled with relentless vigilance by the Coast Guard in wartime. The harbor waters, all the traffic that moves upon them, and the piers that line them are controlled by a Coast Guard officer, the Captain of the Port.

"First, I'll show you where ammunition and explosives are loaded on convoy ships," said the ensign who was my guide. "Supervising that job is one of the Coast Guard's specialties."

On a tiny picket boat we sped off through a chilly fog to a remote section of the harbor, where a long narrow pier jutted far out from shore. On it stood long strings of freight cars, and tied up alongside were gray, rusty

cargo ships, with heavy guns mounted on their afterdecks and machine guns on their bridge wings.

The pier was thick with sentries carrying rifles. Long rows of huge yellow-painted airplane bombs, cases of shells, and boxes of cartridges were stacked everywhere.

"Those big bombs are 'block-busters,'" said the ensign. "Notice that all the ammunition is hoisted into the ships in cargo nets. Hooks might slip and let something drop. Too dangerous."

"See the screens over the ships' smokestacks? They keep sparks from flying. For the same reason electric instead of steam locomotives are used to move trains on and off the pier. Holds of ships carrying explosives are all lined smoothly with wood, with the nail heads countersunk, to avoid snagging ammunition cases."

"There's no smoking allowed, of course, and the stevedores and other workers are always searched before they come on the pier, to make sure they have no matches."

"Look at today's logbook," he said later back at headquarters. "It shows a few of the different kinds of incidents the Coast Guard is called upon to deal with."

Most of the reports had come in by radio telephone from patrol boats in the harbor.

"Ship has leaking gasoline aboard. No fire, but fireboat standing by."

"Put gun crew aboard a merchant ship."

"Boat anchored in forbidden area and damaged underwater cables."

"Two unidentified men going ashore at Pier —. Detail to investigate."

"Call to send five aliens to Ellis Island."

"Woman reports husband left Oyster Bay last night about 18:00 (6 p. m.) in 18-foot open boat for East Norwalk, Conn. Unreported since. Known to be having engine trouble."

"Raft floating off 11th Street, Queens, menace to navigation."

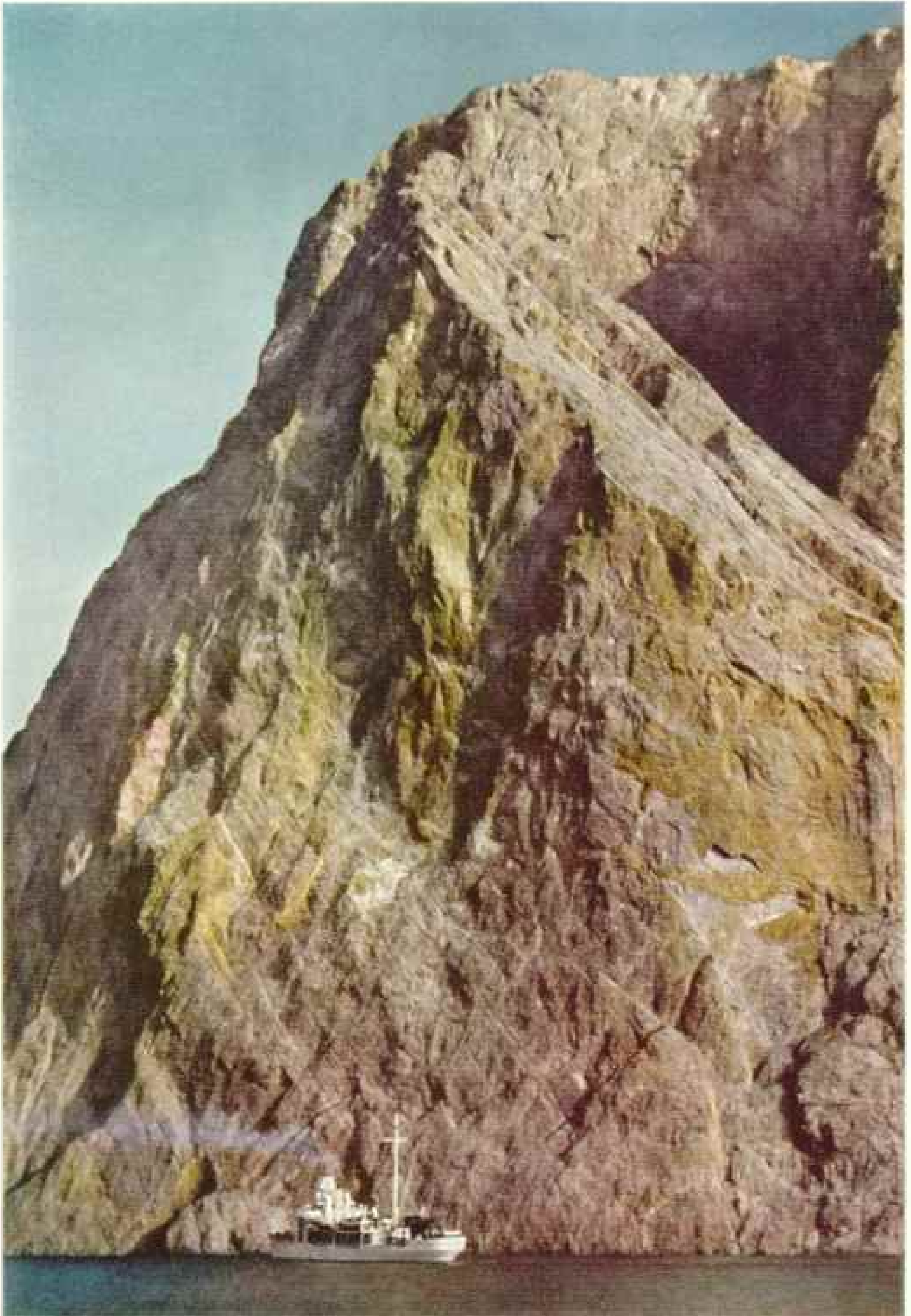
"John Doe, foreman employed by Blank and Company, arrested for smoking on S. S. *Nameless* at Pier 16, Brooklyn."

As the cold dusk settled down, I started out again with a lieutenant on his night patrol of the harbor. In the wheelhouse a signalman picked up a microphone and reported by radio telephone to the base:

"Negat Option How. Negat Option How. William Charlie One One. Proceeding on regular night inspection patrol. Time: seven four five. Answer."

Below in the galley, over ham and eggs and apple pie, the lieutenant told some of his adventures.

Coast Guard Patrol in Greenland



© National Geographic Society

Reduction by Lieut. Thomas S. La Fater, U.S.C.G.R.

Towering Cliffs of a Greenland Fjord Dwarf a U. S. Coast Guard Cutter on Patrol

Such passages, lined with steep rock walls, sometimes lead far inland along the northeast coast.



© National Geographic Society

McIntyre to Hunt, Thomas S. La Farge, U.S.C.G.B.

Almost Surrounded by Stranded Icebergs, a Coast Guard Cutter Visits a Lonely Camp in Northeast Greenland

Lieutenant (J. R.) Thomas S. La Farge, who made the Kodachromes in this series, has been reported "presumed lost" in the Atlantic with the cutter *Natash*, which he commanded. In civil life he was a well-known artist, noted for his murals, stained glass, and mosaics. His home was in Cornwall, Connecticut.



© National Geographic Society

Photograph by Lt. Col. Thomas G. La Forge, U.S.M.C.

Eskimos of All Ages Form a Reception Committee When a Coast Guard Officer (right) and Seaman Go Ashore

Print dresses of the women are made of cloth brought from Denmark. Greenland is a Danish colony, but since Germany invaded the mother country it has been placed under the temporary military protection of the United States.



© National Geographic Society

Collaborator: Lt. Thomas H. La Forge, U.S.C.G.B.

What's Beyond the Horizon? A Coast Guard Seaplane in Greenland Waters Takes Off on a Scouting Mission

Such aircraft, carried by cutters in the north, can survey vast areas of coast and adjacent waters, looking for signs of enemy activity like the German weather station captured by the Coast Guard in Greenland in 1941. The planes are lowered into the water by cranes.



© National Geographic Society

Tobinhouse in Greenland. Thomas B. La Pierre, U.S.C.G.S.

Plants in the Window Add a Homey Touch to This Eskimo House Built with Lumber Brought from Denmark

Greenland villagers like these make a living by raising sheep, fishing, and farming a little. In summer many move out of their frame houses and live in tents. A Coast Guard officer basks in the sun with an Eskimo grandmother. Colorful boots, left, are made by the Eskimos.

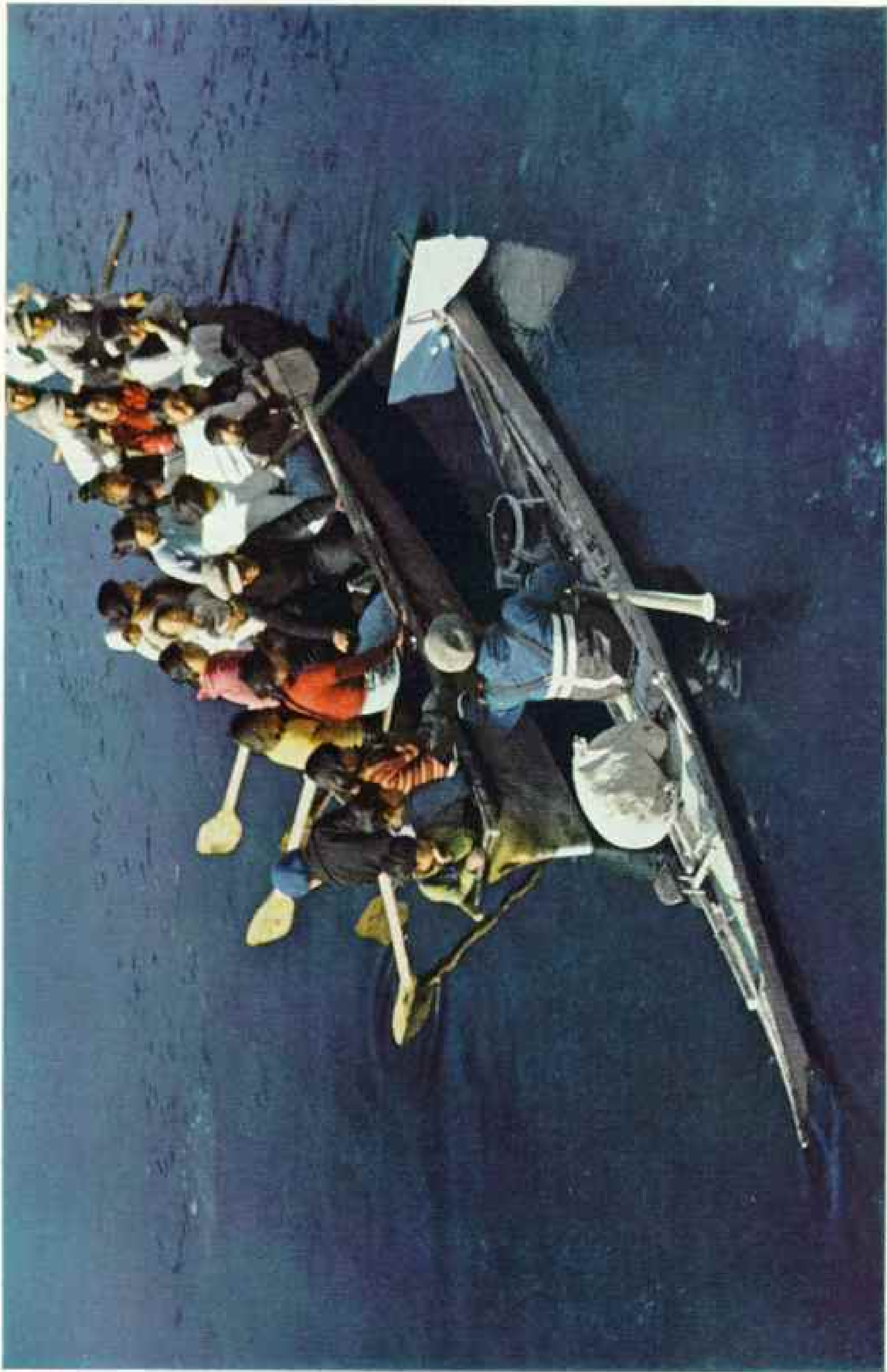


© National Geographic Society

Hunting for Seals, a Greenland Eskimo Paddles His Frail Kayak in the Lee of a Giant Iceberg

Bergs are formed when masses of ice break off from glaciers moving slowly from Greenland's interior down to the coast. U. S. Coast Guard cutters in peacetime maintain the International Ice Patrol, warning ships in the North Atlantic of the presence of icebergs.

Underground by Idmit. Thomas H. La Forge, U.S.C.G.B.



© National Geographic Society

Kashobonus in Boat. Figure 8. La Forge, U.S.G.N.B.

In His Kayak an Eskimo Hunter Paddles Alongside an Umiak, or Women's Boat, to Pass the Time of Day

Both boats are made of skins. White screen on the bow of the kayak is to conceal hunter and make his boat appear like a piece of floating ice while he is hunting seal or walrus. Inflated seal skin on the stern is attached to the harpoon line to prevent a dead seal from sinking in the water.



Fearless of Man, These Walrus Would Not Move Off until Poked with a Pole.
The animals were seen by Coast Guard men in northern Greenland waters.



© National Geographic Society

Kayakers by Lieut. Thomas S. La Farge, U.S.C.G.R.

A Bearded Mixed-blood Eskimo Is Among These Visitors to a Coast Guard Ship

Few pure Eskimos have whiskers as luxuriant as those of the man, upper left. The natives come alongside to trade, or in hopes of receiving American cigarettes. In the foreground is an umiak (Plate VII). Others are kayaks.

"Once we were summoned to board a merchant ship and take off a seaman who had delirium tremens. He fought like a demon and somehow got my forefinger in his mouth and bit it hard. When I pulled my finger away, all his teeth came out with it! I was flabbergasted for a minute until I realized they were false.

"Another time we caught a night watchman asleep on the end of a pier. We came in close but couldn't wake him with our shouts. So finally we started throwing potatoes at him, while we cruised up and down off the pier-head. We threw about a peck before we finally hit him and woke him up!"

Back topside, we saw a small boat ahead without lights. Our searchlight picked her out. Quickly she snapped on her identity lights.

"We Check on Everything"

"We check on everything," said the lieutenant. "We watch the water for floating bombs that may be thrown off ferryboats to drift down and blow up ships. And I can tell you this is more than just a possibility.

"If we see lights in the wrong places, or people on shore where they aren't supposed to be, or signals from anchored ships that we can't read, we check up right away. We know most of the boats that operate in the harbor, but we board strange ones to see if the crews have Coast Guard passes and permission to operate at night. Of course we board and inspect all inbound ships. We keep an eye out for smugglers, water thieves, and saboteurs.

"Sometimes a ship will drag her anchor and drift down on another. Barges break loose, too, and we have to stand by until tugs come to pick them up. We keep an eye on the coal-barge keepers, who live on board with their families. They anchor far out in the bay, and have no radios; so, if someone gets sick aboard, they have no way to call help. Now and then we do taxi service for merchant seamen who have to get back to their ships at the last minute."

Our boat bumped something.

"Another log," said the Oregon boy at the helm. "I always wanted to be a logger, but I never thought I'd be doing it in New York harbor!"

We threw our searchlight on other Coast Guard boats and exchanged signals with a mine sweeper. Passing an anchored Navy tanker, we ran our light along her waterline, just to make sure that all was well. One of the harbor forts blinked an order to identify ourselves as we passed. Some lights ahead

showed where the submarine nets, closing the harbor mouth, were under constant watch by Coast Guard craft.

Circling, we chugged back up the bay, close to shore, shining our light along the pier edges and into odd corners. There are 1,900 piers in New York harbor. Some barges were tied up in a position blocking entrance to a basin between two piers. Fireboats would be unable to enter should they be needed. We radioed a report to headquarters.

In the gloom we passed a whole line of cargo ships, heavily loaded and lying low in the water, at anchor awaiting departure of the next convoy.* On each ship two Coast Guard sentries were stationed. It was our job to check up on them.

As we steered alongside, our lookout would shout through his megaphone: "Ahooy aboard! Any Coast Guard men aboard?" A lonely uniformed figure, a pistol at his side, would appear at the rail or on the stern.

"Aye, aye, sir."

"Okay."

One of the ships, a tanker, had a red light at her masthead, warning that she was heavily laden with highly inflammable gasoline. Hardly had we hailed the sentry on the fore-deck when we saw on her stern the faint glow of some seaman's cigarette. The lieutenant's wrath exploded.

"Get that man smoking there! What the hell's the idea, smoking with that red light up there?" The sentry sang out: "Aye, aye, sir." The cigarette disappeared.

Bright floodlights suddenly dazzled us as we turned into a ship-repair basin where work was going on at full tilt through the night. A merchant vessel tied to a pier had a hole near her bow twice as high as the wall of your living room, and wider; yet somehow she had limped home. Sparks from welders' torches drifted down across the black, gaping wound.

Behind us only a few scattered lights showed in Manhattan's dimmed-out skyscrapers as we moved down the bay.

Manhattan's Dim-out Really Helps

"That dim-out really helps," said the lieutenant. "Subs aren't spotting merchant ships silhouetted against the sky glow as they used to. In the old prohibition days the Coast Guard used to catch rumrunners by the same method."

Scattered over the waters off our coasts, forming a far-flung chain of floating lookout stations, are hundreds of small boats of the Coast Guard Reserve and Auxiliary, keeping

* See "Convoy to Victory," by Harvey Klemmer, NATIONAL GEOGRAPHIC MAGAZINE, February, 1943.



© N. Y. Daily News

Sometime They May Have to Splint a Broken Leg on a Storm-tossed Ship at Sea

A class of Coast Guard men learns how to give first aid. Because rescue work is an important part of their job, this knowledge is especially useful. Coast Guard flying boats are specially equipped to remove ill or injured people from ships and fly them to hospitals ashore if necessary.

watch for submarines. If they see a periscope they report by radio, and cutters, blimps, and planes take up the chase. Their presence makes it difficult for submarines to approach the coast undetected, and they also keep an eye out for suspicious surface craft and planes.

Sailboats, small powerboats, former luxury yachts, almost any craft that can stay at sea for a few days, are helping to do this job. On one of them a truckman and bank president stand watch side by side. A restaurant cook patrols with a member of the New York Stock Exchange.

Ex-world champion Lieut. Comdr. William H. (Jack) Dempsey showed me some Coast Guard "boots" (recruits) working out on the gym floor at the big Manhattan Beach training station, where he's in charge of physical conditioning (page 577).

"Some of these 'drugstore cowboys' from the cities are pretty soft when they first come here, and have a tough time until they get

in shape," he said. "Most of 'em smoke too much, but after they get hardened up they automatically cut down on it. We teach the boys to fight and be aggressive, and their courage increases as they become toughened physically.

"One West Virginia mountain boy took his fighting *too* seriously! He got so mad at the fellow he was boxing with that he said he was going home and get his gun and shoot him! We persuaded him to save it for the Germans."

The recruits on the gym floor were practicing throwing their opponents face down and then kicking them in the nerve center at the base of the spine. If you ever slipped on the ice and sat down hard, you know how that feels.

"That will paralyze a man temporarily," said Commander Dempsey. "It's not clean fighting, but this is no gentleman's war. We teach our men dirty fighting because the



U. S. Navy, Official

A Coast Guard Boat Crew Takes a General and Admiral Ashore in North Africa

The ensign, foreground, is in charge of this landing craft in which Major General George S. Patton, Jr., U. S. Army (left center) and Rear Admiral John L. Hall, Jr., U. S. Navy (behind him), are starting for the beach. Coast Guard men operated boats which put our forces ashore both in North Africa and the Solomon Islands (page 557).

enemy fights that way—especially the Japs.

"A Jap will creep up through the brush, throw some dirt in a man's face to blind him, then jump in and rip his belly with a knife. Against such people you can't be fussy about not hitting below the belt.

"We teach our boys how to break a man's arm, leg, hand, foot, or neck, to use a knife, club, and gun, to wrestle, box, and defend themselves against jujitsu tactics. A lot of these boys are being specially trained for guard duty along water fronts, where they may be attacked by saboteurs or marauders while they're alone in the dark. They learn to beat off such attacks and to injure the attacker rather than kill him, so that information can be got out of him."

Now and then the ex-champion puts on the gloves himself to correct faults in a recruit's boxing, and the amazed youngster realizes with a shock that he's

actually in there with Jack Dempsey!

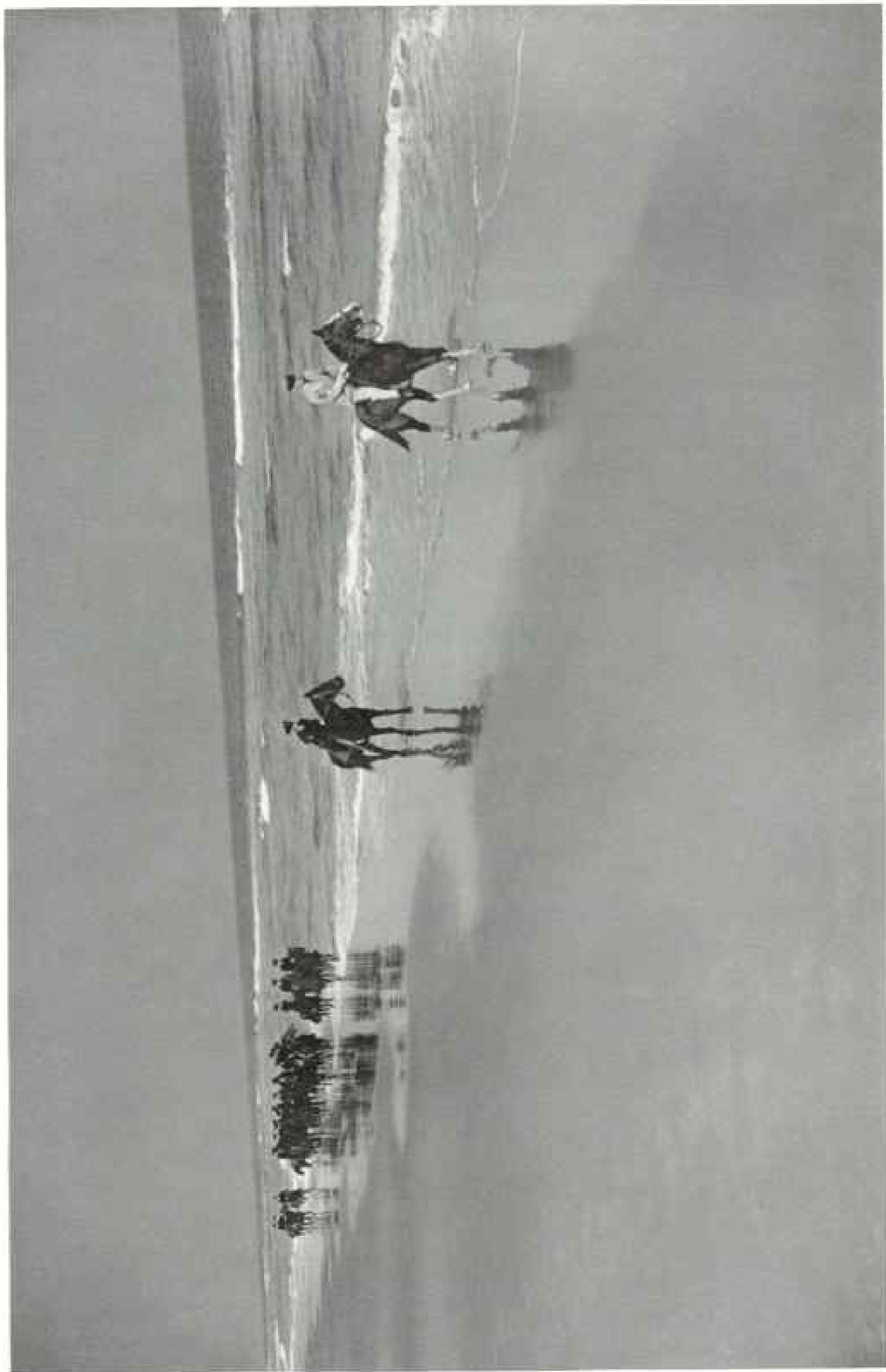
Negro recruits, also in training there, are especially smart on parade or at drill. One colored petty officer addressed his men as follows:

"You are not civilians any longer. You are in the Coast Guard. When the man says to you 'right face,' you do right face. When the man says to you, 'jump,' you jump! Who is the man? I'm the man! When I tell you 'eyes right,' I want you to do eyes right, and I want to hear them eyeballs click!"

"Boots" Have a Right to Be Hungry

When the "boots" aren't drilling or wrestling they're rowing boats or practicing with guns. No wonder they daily consume menus such as this:

Breakfast: Prunes, dry cereal, milk, boiled eggs, toast, butter, honey. Dinner: Celery soup, grilled frankfurters, boiled potato, sauer-



U. S. Coast Guard, Official

Coast Guard "Cavalry" Now Guards Our Shores; Mounted Patrols Can Cover More Ground with Less Fatigue

After these men complete their training in horsemanship, they will be assigned singly or in pairs to ride over sections of the coast line, watching for hostile landings, shipwrecked sailors, or law violations. The horses were obtained from the Army.



Before He Knows What Hit Him, He's Sailing Through the Air in Jack Dempsey's Rough-and-tumble Class

Under the watchful eye of the former world's heavyweight champion (left), now a Coast Guard Lieutenant Commander, recruits watch a demonstration at Manhattan Beach Training Station near New York City (page 574). These men are trained to protect themselves against sneak attacks and in hand-to-hand encounters.

J. Huhler Roberts



J. Taylor Roberts

Hundreds Owe Their Lives to the Equipment in This Old Coast Guard Boathouse

Built in 1848 at Spermaceti Cove, on Sandy Hook, New Jersey, the building is now a museum. In left foreground is an early model of the Lyle gun, used to shoot a line from shore to wrecked ships (page 581). The line is carefully coiled on pegs (right) so it will run out freely. At upper right is a life car, a sort of covered boat in which people could be pulled through surf too dangerous for an open boat.

kraut, cole slaw, finger rolls, butter, apple turnover, milk. Supper: Grilled ham, mashed potatoes, celery and peas, hearts of lettuce with dressing, bread, butter, spice cake, apple sauce, milk.

"What's the toughest thing about boot training?" I asked one lad.

"Shots in the arm," he laughed. "We got vaccinated for smallpox, and inoculated for tetanus and typhoid all the same day, then went out and rowed boats with those sore arms!"

Down on bleak Sandy Hook, where the damp wind penetrates to the marrow of your bones, is preserved the original boathouse of the Spermaceti Cove Life Saving Station, built in 1848, with boats and gear that saved many a life in the last century when 100 large sailing ships might run ashore in a single year. In the ancient logbook is this typical entry for February 15, 1885:

"This Day at Life Saving Station all Day John Myrick came from No. 3 L. S. Station and had dinner with us Schooner Lida Hancock came a Shore this morning Between No. 15 and 16 L. S. Stations at 4.35 a. m. She went to Peses crew Saved Joseph Riddle Shot a wild Goose this morning on the Beach it wade 9 Pounds we had clam chowder for Dinner."

Apparently the saving of lives was all in the day's work, unworthy of special mention. The Lifesaving Service became part of the Coast Guard in 1915, bringing with it a fine tradition.

That old boathouse, with the waves pounding on the windy beach a few yards away, reminded me of the Coast Guard song:

We're always ready for the call,
We place our trust in thee,
Through surf and storm and howling gale,
High shall our purpose be.



U. S. Coast Guard, Official

"Give Way Together! Stro-oke—Stro-oke—Stro-oke!"

Men of the Coast Guard's lifesaving stations become expert at rowing a boat through heavy surf. Even if the boat overturns, they can right it with little loss of time (page 586). All Coast Guard men learn to pull an oar, although many lifeboats now have engines.

*Semper Paratus is our guide,
Our fame, our glory, too,
To fight, to save, to fight and die,
Aye, Coast Guard, we're all for you.*

None of the services has a finer, more stirring song. Listen to it sometime on a Coast Guard radio program. There's even a place in the music where you can hear the whistling of the wind.

Watching Our Far-flung Shore Line

Along all the coasts of the United States today there is a continuous string of Coast Guard stations. From high towers their crews keep unceasing watch over the many thousands of miles of shore line—and sky, too—from Blaine, Washington, all the way around to Eastport, Maine.

"To keep the tower men on their toes," one station commander told me, "I often go down the shore two or three miles away and signal with a blinker without warning. I

expect them to spot it and answer within about three minutes."

All night the beaches are patrolled by armed Coast Guard sentries with specially trained dogs, so fierce they will leap at any stranger's throat at the spoken command "Get him!"* Each dog is handled and trained by only two men and taught to regard all other persons as potential enemies (page 584).

On the dark beach at night, they can spot a stranger by his scent. They don't bark, but will lead the sentry silently toward the intruder, even crawling on their bellies if necessary for better concealment.

"One dark night I hid behind that sand dune to test a sentry and see how keen his dog was," said an officer, as we stood out on the beach. "He was a little late, having lingered over the coffee and sandwiches that are brought to the sentries at night.

* See "Your Dog Joins Up," by Frederick Simpich, NATIONAL GEOGRAPHIC MAGAZINE, January, 1943.



No More Scrubbing Clothes in a Bucket—Just Drop a Dime in the Slot!

The smile on the recruit's face suggests the popularity of these electric washing machines at Manhattan Beach Training Station. In former days every man did his own washing.



Future Boatswain's Mates Learn to "Pipe the Skipper over the Side"

The thin, shrill note of the boatswain's pipe is sounded as a preliminary to commands or to render honors on Coast Guard and Navy vessels. Tone of the pipe varies with position of the fingers.

J. Harley Roberts



U. S. Coast Guard, Official

How Many Such Looks of Gratitude Have Rewarded Coast Guard Lifesavers!

Marooned on a rooftop by flood waters, a boy and his dog are rescued by a member of a Coast Guard lifeboat crew patrolling the inundated area. Coast Guard men have saved many lives and much property during floods on the Mississippi and other rivers. Their boats are shipped overland from stations on the Atlantic coast and Great Lakes.

"The wind was blowing from me toward the dog, but at an angle, so at first he didn't catch my scent. I thought both man and dog had fallen down on their jobs. But just then the dog did smell me and came for me like a flash.

"I told the man that if his dog hadn't done so well, he would have lost some leave for being late. He went out to the kennel later and kissed the dog!"

The cook's cry "Chow down!" sounded just as we returned to the station, and the hot lamb stew smelled good. But before we started to eat, the station commander said: "Pass the grace, Jones," and one of the men quietly asked a blessing on our food.

Out on the beach again, they showed me how sailors are rescued from ships that have run ashore, when waves and surf are too rough to launch a boat. When that happens, the Coast Guard men rush their Lyle gun and breeches buoy to the scene (page 578).

The gun, a stubby little brass cannon, is loaded with a powder charge and a lead slug weighing about 20 pounds to which is tied the end of a light cord, coiled in a special way so it will run out freely. The slug is

shot out over the wrecked ship, taking the line with it.

Men on the ship haul in the line, to which is fastened a two-inch hawser. This is secured high up on a mast. Then the Coast Guard men rig the breeches buoy to travel on the hawser. It consists of a ring like a life preserver from which hangs a capacious pair of canvas pants. This is hauled out to the ship, a sailor climbs into the pants, is hauled back to shore, and so all are rescued (page 587).

The Boats with Holes in Their Sides

But often only lifeboats can be used in rescue work, and for this job the Coast Guard uses—of all things!—boats with holes in their sides.

These are the famous self-bailing surf-boats, propelled by either oars or engines. Their bottoms are decked over just above the water line, and at this level are openings called "freeing ports."

When the boat ships much water, or capsizes and is righted, the water drains out through these ports in 20 seconds. Of course some water comes in, too, but a few inches



U. S. Coast Guard, Official

Off Duty, Men of a Coast Guard Cutter Relax in Their Crowded Quarters

Playing cards, reading, or just lying in a bunk, they enjoy a respite from ship's work. Every man on this large cutter has his own bunk. When the alarm gong sounds "general quarters," these men will grab life jackets and run to battle stations.

of it on the bottom don't interfere with the boat's operation.

Along the gunwales of the lifeboats are built-in floats of light balsa wood. This helps keep them upright and to right them faster if overturned. If such a boat, equipped with an engine, turns bottom up, the engine will keep right on going, for it is housed in a water-tight box.

Fastened to the gunwales, at each oarlock, are light ropes, or lines, which float free when the boat capsizes. The men in the water then throw these lines over the bottom of the boat as it floats upside down.

One man grasps the end of each line, pulls it toward him, and "walks" up the side of the boat. The men's weight pulls it right side up, and the water runs out through the ports (page 586).

Mounted on rubber-tired cradles, the surfboats are always ready to be towed by truck or tractor to any point where they may be needed. When floods like those of recent years on the Mississippi or Ohio Rivers occur, the Coast Guard rushes surfboats from the east coast and Great Lakes by flatcar or over the highways towed behind fast trucks to the flooded areas.

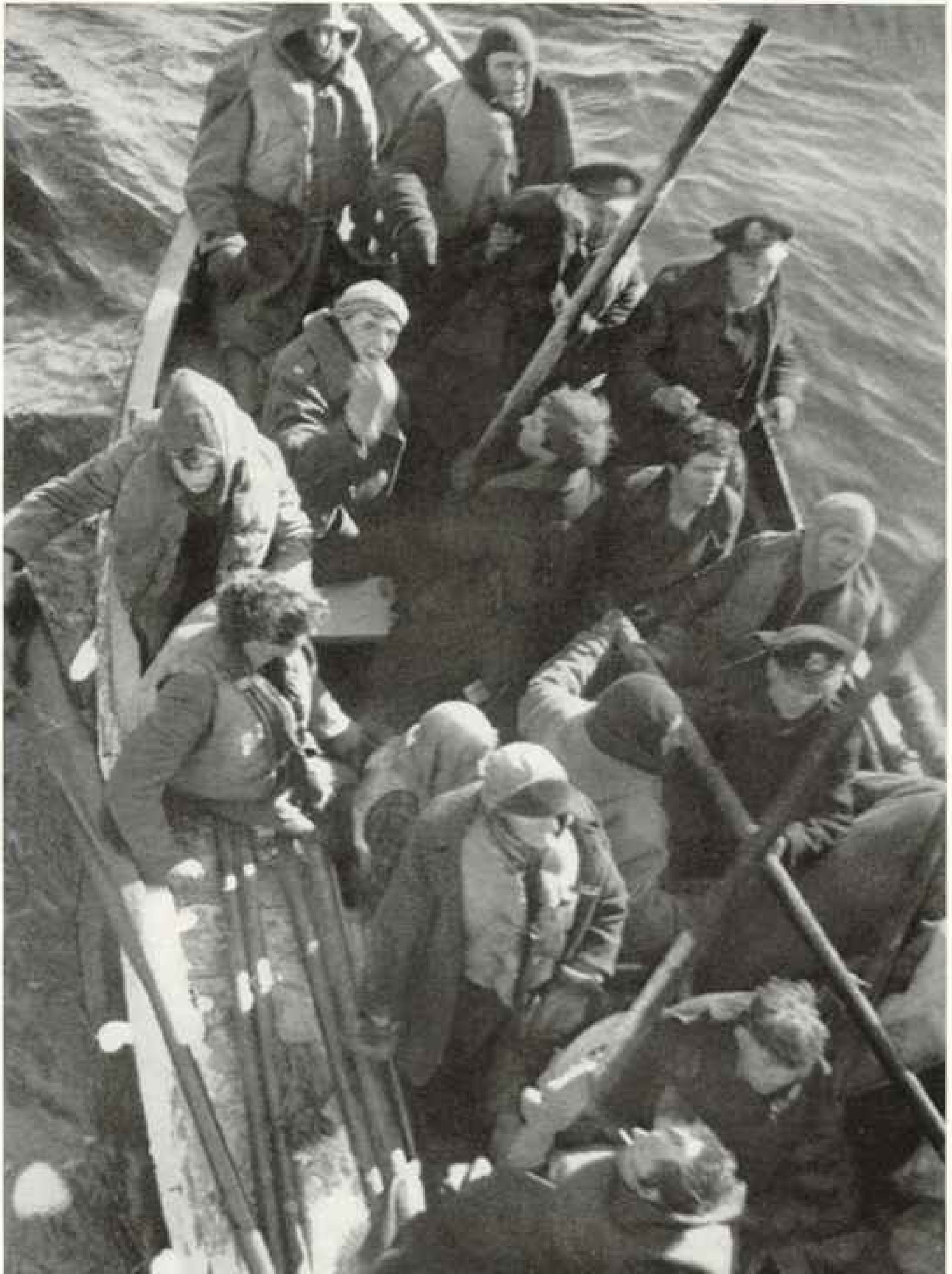
Many lives of torpedoed seamen are being saved by the new Coast Guard rules for equipping and provisioning lifeboats and life rafts. Lifeboats now carry 10 quarts of water per person, pemmican, biscuits, and chocolate and milk tablets enough to keep people alive for ten days; first-aid kits with tannic-acid jelly for burns, and sulpha drugs; blankets, bilge pumps, wooden bullet-hole plugs, and mirrors, and smoke-making apparatus for signaling.

Fishing Kits for Men on Rafts

They carry fishing kits, too, with pork-rind bait, and seamen are advised that all open-sea fish are edible and, when squeezed, provide drinkable juice. Men are told how to swim in burning oil, that the best place to hit a shark is on his tender nose, and that bats, snakes, and grasshoppers are edible if there's nothing better obtainable on desert islands.

In the skies along all our shores and borders are planes of the Coast Guard on constant patrol. They help protect convoys, keep an eye on stretches of lonely coast, and radio for aid for torpedoed ships.

But their main job today is spotting and attacking submarines, and for this purpose



U. S. Coast Guard, Official

Rescue At Last! Survivors of a Torpedoed Ship Saved by a Coast Guard Cutter

These men, members of the crew of a British merchant vessel, show the effects of cold and exposure after many days at sea in an open boat. Salt-water ice has formed on the gunwales. Picture was taken just before they were helped aboard the rescue ship. Many such scenes are being enacted in this war.



F. Barber Roberts

On the Darkest Night His Sensitive Nose Will Smell an Enemy on the Beach

Such dogs, trained to attack any stranger, are led on leash by Coast Guard sentries patrolling the beaches at night along all the shores of the United States (page 579). So savage is their onslaught that one Coast Guard man told the author, "I'd rather be shot at than tackled by one of those dogs."

Coast Guard aviation is being greatly expanded.

Coast Guard flying boats, especially designed to land and take off in heavy seas, serve as ambulances to take sick or injured seamen from ships to shore hospitals. They carry stretchers, first-aid kits, even strait jackets.

Flying over remote mountains, Coast Guard planes spot illicit liquor stills and radio directions to agents on the ground. They bomb derelicts at sea that menace navigation, and even have dropped food, water, and snake-bite serum to people lost in the desert in the Southwest. When hurricanes approach, they drop warnings to fishing boats not equipped with radio.

Lighthouse Lights Are Dimmed, Too

War is cramping the style of the Coast Guard's lighthouse keepers. Most of their lights are dimmed, their signals altered, or even shut off entirely.*

I visited one famous lighthouse which must remain nameless.

Coming back from Europe, in far-off days of peace, you may have seen its 9,000,000-candlepower beam shining 22 nautical miles out to sea.

Its series of great glass lenses produced this powerful beacon by concentrating the mere 2,500 candlepower of only three small 500-watt electric bulbs. But even this light cannot penetrate a heavy fog. Today a small light takes its place for the duration.

"Those big lenses concentrate sunlight in the daytime like a burning glass, the same as they concentrate the electric light at night," the keeper said. "I got a nasty burn on my leg one day, so after that I kept the lenses covered. We have an oil lantern ready if the electric power fails.

* See "New Safeguards for Ships in Fog and Storm," by George R. Putnam, NATIONAL GEOGRAPHIC MAGAZINE, August, 1936.



Masked Against Bitter Cold, They Steer an Ice-covered Cutter in Wintry Seas

With their windshield completely iced up, the helmsman (right) and lookout of an escort ship need all possible protection from wind and freezing spray. They are garbed in the warmest clothing obtainable.



U. S. Coast Guard, Official

Heavily Armed Coast Guard Men Protect Vital War Supplies Awaiting Shipment

Dock areas of all important American harbors, where vast quantities of explosives, guns, planes, tanks, and food are stored, are patrolled constantly by Coast Guard sentries in jeeps and on foot.



U. S. Coast Guard, Official

They Can Right Their Capsized Boat, Climb in, and Row on, All in a Few Seconds

An overturned boat is no handicap to a Coast Guard lifesaving crew. These men have just upset their boat deliberately in a practice demonstration. Having climbed on top, they will turn the boat upright by pulling on lines like the one in foreground, which are attached to the gunwales. Slots in the boat's side are "freeing ports," through which excess water drains out, making the craft "self-bailing" (page 581).

"In winter we can't have any heat up here in the tower because it makes the windows frost up, and we have to keep them free of snow and ice, of course. One foggy night 150 birds were killed by flying against the tower, and a wild duck broke right through the window."

On a beautiful hillside sloping down to the Thames River at New London, Connecticut, is the U. S. Coast Guard Academy. Here are trained the officers who carry on the traditions established when President George Washington granted the first commission to any American seagoing officer, to command a "cutter in the service of the United States of America."

Today the Academy is doing double duty. It is turning out hundreds of Reserve ensigns, who go direct from a stiff four-months course to active war service. There also is an enlarged quota of regular cadets, who will be

the permanent Coast Guard officers of tomorrow (page 588).

An atmosphere much like that of the Naval Academy at Annapolis prevails in the fine barracks of the regulars. "Swabs," members of the lowest class, sit stiff and straight on the edges of their mess-hall chairs and move always at a trot through the corridors.

Calculating Fractions of a "Scrump"

Part of their "initiation" is to be always ready to calculate, when asked by an upper-classman, how many "scrumps" or fractions thereof remain until the next holiday leave.

A "scrump" is 1/10,000 of a second, and a "microscrump" is 1/1,000,000th of a "scrump"!

In lectures they may hear a gray-haired math professor say: "You take an ellipse and rotate it about its major axis and what do you have, gentlemen . . . a watermelon."



U. S. Coast Guard, Official

He Rides Safely Ashore on the Breeches Buoy, Far above the Pounding Surf

A member of the crew of a Navy patrol boat, aground near San Francisco in a fog, is brought ashore by the Coast Guard with the familiar apparatus which has saved thousands of shipwrecked mariners. The heavy hawser on which the breeches buoy rides is hauled out to the ship by a lighter line which is shot out over the wreck. "Whip lines" attached to the breeches buoy are used to haul it back and forth. Rescued people usually ride with their legs down through the "pants."

or a navigation instructor explain: "The ship moves, and the compass card stands still. . . ."

They learn about ships' boilers, radio, airplane motors, Diesel and gasoline engines, pumps, navigation, gunnery, sailing, buoys, searchlights, mathematics, maritime law, and many other things that not even Navy officers have to know.

Officers Must Be Versatile

A Coast Guard officer must be a combination of navigator, marine engineer, mechanic, police officer, lifesaver, sea fighter, diplomat, and international lawyer.

But in the crowded, tense classrooms of the reserve cadets there is no time for hazing, no time to count "scrumps" until next leave, no time for anything but hardening their bodies and crowding into their minds the

essentials of what they need to go out and fight—right now.

There isn't even time to be sick. A man who loses a few days gets hopelessly behind. You get up at 6:30 a.m., go out and run a half mile straight from bed, eat breakfast, go to classes, drill, practice rowing, and perform strenuous calisthenics wearily. And then you cram your brain with all the facts it will hold until you fall into a welcome bed at 10:30.

Regular cadets study navigation for two years. Reserves study it for two months, then often take command of small cutters soon after they graduate. Few have had previous experience at sea. Much of the last month of the Reserve course is served on Coast Guard ships, however.

Four Reserve cadets I talked with had been respectively, before the war, a Sears-Roebuck buyer, an oil company chemist, a movie pho-



J. Basilio Roberts

Towering Masts Give a Seagoing Air to the Coast Guard Academy at New London

Alongside the far end of the wharf, at left, is the square-rigged ship *Danmark*, used as a training vessel for cadets. Formerly a training ship for the Danish merchant marine, she was in Atlantic waters when Germany invaded Denmark, and was taken over by the United States. Four 83-foot cutters are tied up in the middle foreground, and at right are sailboats used for training in small craft.

tographer, and a credit manager. Two were married.

Why did they choose the Coast Guard for war duty? Most of them liked the water, preferred small boats, and thought an ensign would have better chance for real responsibility in that service. One said, "I just hate subs, that's all."

Without these keen young college graduates to serve as officers, the expanded Coast Guard could not function. Old-time chief petty officers, long in the service, keep a watchful and sometimes doubtful eye on them, however.

Once, when a new young ensign's boat needed repairs, he took it direct to the repair base without first filling out the customary

requisition papers. An old chief said to him in disgust:

"Listen, you got to obey the rules and regulations in this outfit. Just because you're intelligent, that don't make no difference to us!"

But youngsters and old-timers soon acquire a mutual respect.

There's a legend about the Coast Guard that illustrates its spirit. A bystander was watching a Coast Guard lifesaving crew preparing to launch a boat in a frightful storm.

"How do you dare go out?" he asked the coxswain. "In this storm you may never get back."

"The regulations book says we have to go out," was the reply. "It doesn't say we have to come back."

Land of a Million Smiles

BY FREDERICK SIMPICH

With Illustrations by B. Anthony Stewart and Lieut. J. Baylor Roberts, U.S.N.

OZARK people call their mountains "Land of a Million Smiles." They say God lifted these hills so near to heaven that children may reach up and tickle the angels' feet!

Lying midway between the Appalachians and the Rockies, rising high in south Missouri and north Arkansas, and impinging slightly on adjacent Kansas, Oklahoma, and Illinois, these Ozarks are the only mountainous geological uplift in the whole Mississippi Valley (map, page 593).

Freed by motor roads from decades of isolation, these Ozarks normally swarm each season with more than two million campers and sightseers. Their hillbilly songs and old-time square dances have swept the Nation. And what millions, from Maine to California, now know the Ozarks from such plays, pictures, and fiction as *The Shepherd of the Hills*, *Jesse James*, and *The Voice of Bugle Ann!*

Cannon Roar Where Cowbells Tinkled

Today, riding through this once easygoing, leisure-loving land, I sense a grim new spirit—an all-out effort to win this war.

Here more than a quarter million men now are training as soldiers in newly built camps, or working day and night in mushroom factories to make powder, nitrates, TNT, uniforms, ammunition—and to dig the zinc and lead Uncle Sam must have for shells and bullets.

Reversing the old song, today's mountaineers have "hung up the fiddle and the bow, and taken down the shovel and the hoe."

Look at brand-new Fort Leonard Wood, near Rolla, Missouri. Its miles of paved streets and buildings, post exchange, stores, and huge hospital form a complete city on what, only a few months ago, was a vast, woody wilderness, broken here and there only by mountain homes and hamlets which have now been evacuated or even completely wrecked and removed.

Cannon roar now where cowbells tinkled. Hillbilly boys, only a few months in uniform, race through muddy creek beds with their fat-wheeled anti-tank guns, whirling them into action to send fiery red tracer shells whizzing smack into moving dummy tanks 150 to 600 yards away.

One rookie crew hit that hard target, loping along like a mechanical rabbit at a dog race, 13 times out of 15 shots!

"Let's see what one man, all alone, could do," I urged the colonel.

He smiled, indulgently, and ordered: "Now, men, all of you pretend you're casualties, except one. Let him do it all. The rest of you play you're all knocked out—see?"

They did, grinning. Then a lone gunner, not over 21, loaded, aimed, and fired with amazing rapidity, and at 600 yards he put two tracer shells out of three square through the bobbing target!

"Some hill boys are just born shooters," said another officer.

I walked over to the hot, smoking cannon to congratulate the sharpshooter.

"Yesterday," he chuckled, "just as we shot, a rabbit jumped by the target, and we saw his white tail fly 20 feet straight up in the air. We'll do just that to the Japs!"

Infantry, engineers, Signal Corps men, and other branches of Uncle Sam's ever-growing Army are in training at yet more new camps in and around the Ozarks.

Long strings of troop trains and freights, heavy with mysterious cargo, whistle and groan around Ozark grades and curves, claiming right-of-way over all regular trains. Trucks piled high with ties, timber, iron pipe, cement, food, fuel, and ores dispute the highways with crowded buses.

Hill men who used to work for maybe \$1 a day now get \$1.25 an hour driving graders, scrapers, trucks, and bulldozers. Hundreds of these big yellow-painted road-making machines bore deep, straight trenches through the virgin hills, building yet more and more access roads to Army camps and new factory sites.

"I can't even find farm hands enough to stand by the gate and call my hogs," complained one farmer.

Cold Lead for Our Enemies

Mix copper and zinc, and you have brass. From brass Uncle Sam makes his cartridge shells. Here in and about the Ozarks lies his most productive zinc deposits. Lead is found here, too, along with the zinc—lead for bullets. You see it shipped out in 1,000-pound "pigs."

Quest for lead to make bullets first brought the French to settle Sainte Genevieve, on the Mississippi opposite their Illinois post of Kaskaskia, some two hundred years ago.

Today, beneath the Ozark uplift, enough



In Daydreams She Visions the Handsome Men Who Will Smoke Her Corneob Pipes

Pioneer farmers whittled their own pipes from cobs. Then Henry Tibbe, Dutch wood carver, tried turning cob pipes on a lathe. Now "Missouri meerschaums," seasoned two to five years, enjoy nationwide popularity. These pipes are being shellacked at Washington, Missouri.

men to form a whole army division are digging day and night to get out needed lead and zinc.

This, the "Tri-State Lead and Zinc Mining Region," covers 2,000 square miles and stretches into Kansas and Oklahoma. In Arkansas Ozarks are yet more mines, including those that yield manganese ore, which makes steel hard.

Ride from Joplin southwest on "66" and scores of man-made mountains of "chat" rise about you. "Chat" is the word for waste tailings from lead and zinc mines (page 594).

"Every one of those older huge white Sahara-like dunes was built by men with a shovel, a bucket, and windlass," a geologist told me.

"Yes, it does look as if gargantuan prairie dogs had done it! We estimate that the chat in those piles would fill 500,000,000 one-ton trucks. Think of men moving all those big mountains with nothing but shovels!

"But come down in Blue Goose Mine No. 2

now, and we'll show you the latest way of getting lead and zinc out quickly for war needs."

Exploring an Underground World

Until a tiny cage, hung on a cable, let me far down a dark, wet shaft, I had no idea what a strange underground world a modern lead and zinc mine is.

No men with shovels and buckets in *this* mine! Instead, powerful mechanical drag scrapers scooping up ore as fast as it was blasted loose, then loading it on waiting trucks which rushed it to elevators that hoisted it out.

Each big truck and scraper had to be lowered down here, one piece at a time. To burn gasoline in the mine is dangerous, so all vehicles run on batteries.

How odd to see 8-ton trucks growling along these subterranean highways, their drivers ducking to keep from bumping heads on low tunnel roofs!



Thomas G. Kelley

An Old-fashioned Revival in the Ozarks

While the preacher prays over the mourners' bench, babies sleep peacefully in crib (left) and in vacant seats. The meeting will end in singing (Plate XVI).

Mine shafts miles apart are connected by roads, dark and mysterious till headlights flash. They say that even if a man didn't get lost, it might take him months to walk through all the tunnels and drifts in this 2,000 square miles of lead and zinc world.

Some mines use mules.

"How do they act?" I asked.

"Young ones make a little trouble at first," said a boss. "They break loose and run off and hide in the tunnels, but they always stay in the electric light! They never get used to the dark. One we have has been in the mines 25 years; she's slick and fat, and happy.

"Miners learn to love these mules. Once, when water rose high in the mines, two miners risked their lives to save mules caught in the flood.

"Lots of rats live down here, too; they steal the mules' grain."

Oaks and other trees cut for lumber earned the first cash for early settlers who came to people these Ozark ridges.

Today lumbering is revived; trucks hauling logs line the roads. Here and there you see portable mills, with piles of fragrant boards and stacks of fresh-cut ties or sleepers for use on the heavy-laden railroads. New Army camps consume mountains of planks, beams, and rafters.

Stockmen Building Up Herds for Wartime Food Needs

Hungry soldiers demand more and more meat, so farsighted stockmen seek now to build up their herds of cattle and hogs. Farms that had not changed hands for years are now being transferred, and prices rise.

Not all this activity, by any means, is due to war; but war stimulates it enormously.

On the Fullerton Sunbeam Farms, near Miami in the Oklahoma Ozarks, flourishes one of the world's finest herds of Aberdeen Angus cattle. From this farm 18-month-old bull calves have sold at prices from \$600 up to \$5,200. Judges at stock shows for years have



The Author, in Overalls, Revisits Scenes of His Boyhood

awarded ribbons to animals from the Fullerton Farms.

Here now in all his bovine glory one amazing 1,800-pound bull paws the sod, bellows, and waves his aristocratic tail in pride. He is the famous "Black Prince of Sunbeam," International Grand Champion.

Family Album of Ozark People

It's the hill people themselves, however, along with their pioneer traditions and ways of life, as well as the beauty of their wooded hills and rippling streams, that distinguish the Ozarks from all other Midwest regions.

Marooned among lonely Ozark ridges are groups of families who generations ago migrated here from Tennessee and Kentucky hills.

"These so-called 'hillbillies,'" said the late

Walter Williams when President of the University of Missouri, "represent some of the oldest and certainly the purest English stock in America."

People are named Walker, Dobson, Kent, Metcalfe, Witherspoon, Street, Burns, Edwards; less than one per cent are foreign born.

Old plush-bound family albums show tintypes of girls in pantalettes, women with bangs, and grim, unsmiling men with heavy watch chains swung across their tummies. Some have beards like prophets or the Smith brothers.

Gun-loving hillbilly boys were among the first to enlist. Many are already overseas. Now their families, and other Ozark folk, too, open friendly doors to soldiers from big camps near Little Rock, Rolla, Joplin, Neosho, etc.

One stream of motorists flows straight south from Jefferson City, Missouri, on U S

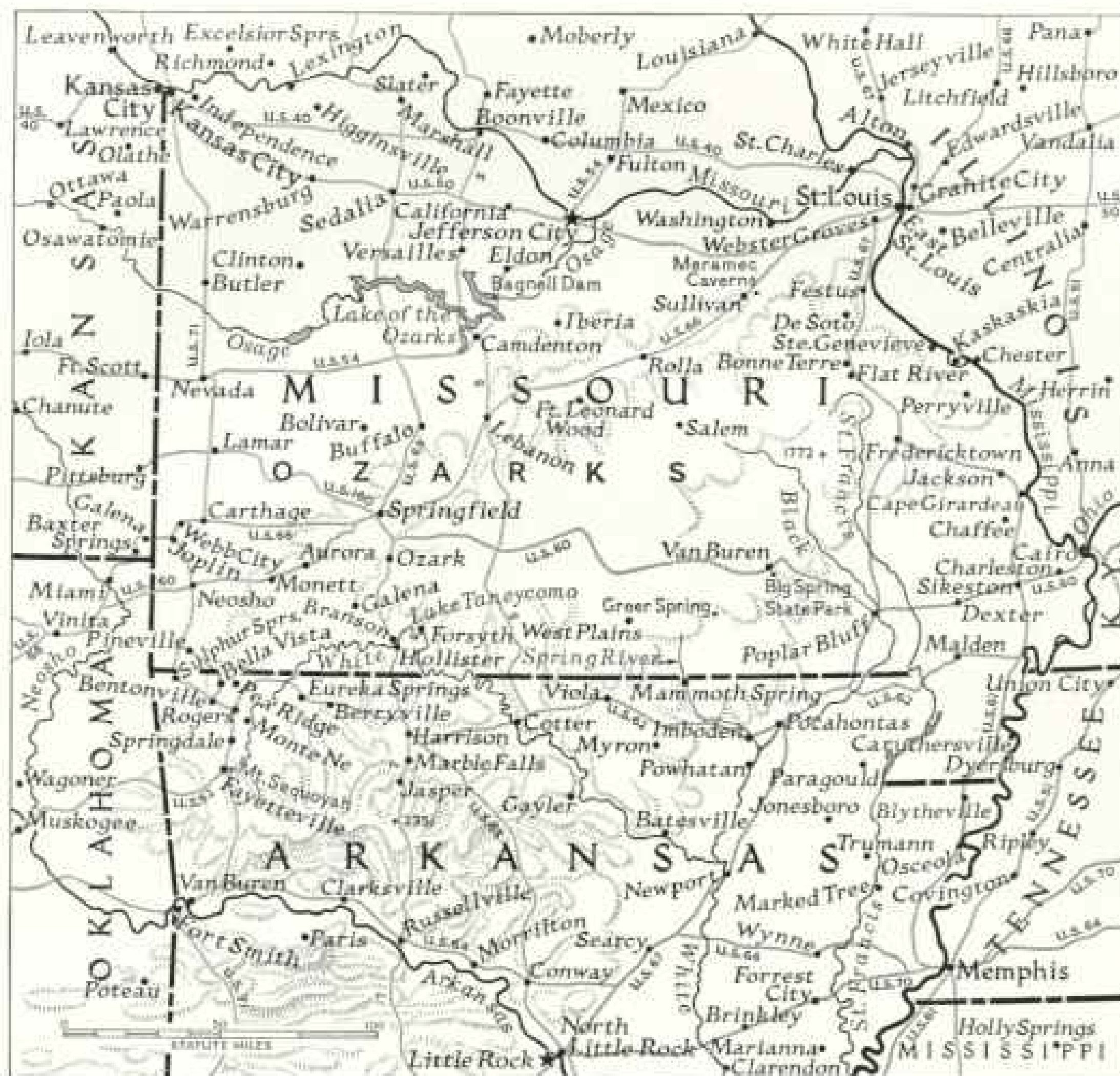
54, to see great Bagnell Dam, in the Osage River. "Lake of the Ozarks," formed by this dam, has 1,300 miles of shore line (Plate XII).

"I was raised on the banks of the Osage," said a garage man. "I never dreamed that some day our old farm would be at the bottom of a lake 100 feet deep! Think of being back down there now, looking up at what used to be blue sky, and seeing big catfish floating around, eyeing the fat worm on somebody's hook!"

From Arrowhead Lodge you look out over the lake to distant wooded shores and imagine yourself in the Adirondacks.

"One winter," said our host, "the lake froze so hard we crossed in automobiles. One man hit a soft spot and lost his Chevrolet."

Lobby gossip swung on.



Five States Share the Ozarks, Worn-down Remnants of a Mountain System

Southern Missouri and northern Arkansas contain the bulk of the Ozark plateau. Its extremities lap into Illinois, Oklahoma, and Kansas. Nowhere does it rise much more than 2,300 feet above sea level. Springfield (61,238) is its most populous city. Joplin is the center of the lead and zinc belt. *The Shepherd of the Hills* country around lake Taneycomo is the scenic magnet.

"Some people around here raise gamecocks. In one fight the gaff flew off a rooster's spur, hit a boy in the heart and killed him."

"That St. Louis man that raises wild turkeys shipped my neighbor a setting of eggs."

"How can wild turkeys stay 'wild' if they're raised tame?"

"They don't. My neighbor hatched his and put 'em away off in the woods."

"Then when he got back to the house, there were his wild turkeys! They beat him home and were crowding on his back porch, yelling to be fed!"

In peacetime most people go to and from

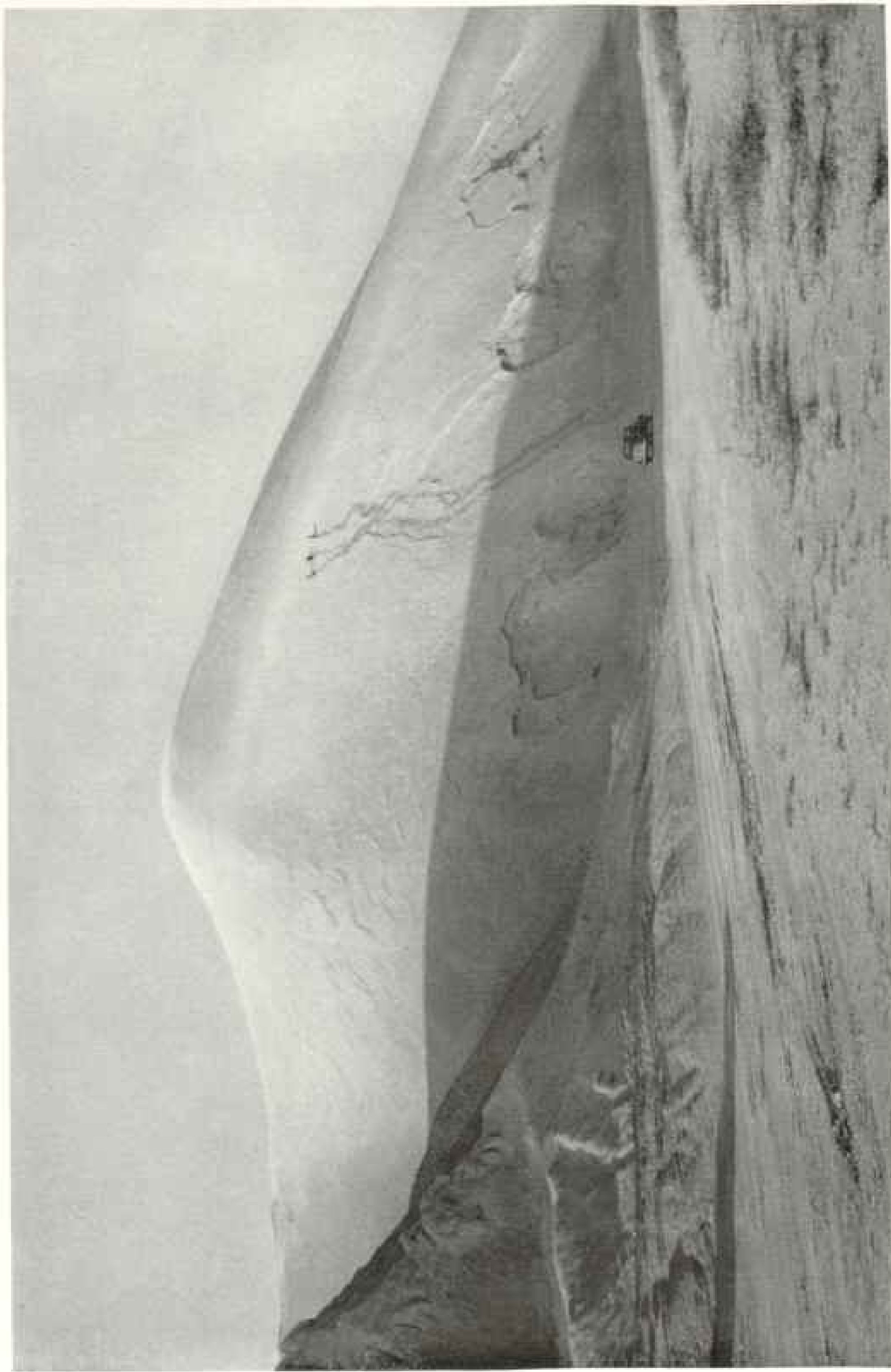
the Ozarks over U S 66. It's a "Main Street of America."

At Lebanon, where busy roads cross, there's an eating place that reminds you of Vicki Baum's *Grand Hotel*.

What different characters! Soldiers from the camps—now and then one in his own flashy sport car.

People from cross-continent buses halted for lunch. Farm agents, mystery women, salesmen, sightseers, bands of noisy school-girls all dressed alike and herded by watchful teachers.

"I was shanghaied from the St. Charles Hotel in New Orleans in 1882," said an old



Three "Mountain Climbers" Struggling Like Ants up the Shifting Side Indicate the Colossal Size of This Man-made "Chat" Dune
Chat is the word for waste discarded from lead and zinc mills. The built in this heap in southeast Missouri would lay a road, estimated at 30 feet wide and one
foot deep, from coast to coast. Chat is used for Missouri roads and for railroad ballast (page 590).



Tommy Coyne

Whistles, Handclaps, and a Hurricane of Laughter Reward the Performer Who Pleases the Army—Usually It's a Girl

You have heard such applause often over the radio; here are the smiling faces to prove it's real. Laugh lines in *Personal Appearance* tickle an entire company in an Ozark camp. Mountain boys were among the first to volunteer. Like Sergeant York of the last war, many are "just born shooters" (page 589).

colored man from "Jeff City." "Finally I got to the Congo. About 1888, I worked with the Stanley Expedition. We went up to the cataracts and to where Livingstone died.

"As body servant to George Francis Train, I also went over the Holy Land, carrying Train's cameras when he made pictures of Galilee and Jerusalem."

A Cashier Turns Philosopher

"Are you an Ozarker?" I asked a friendly girl cashier.

"Me? I'm a New Jersey schoolteacher, or was. One summer, for a lark, I got a job as a Harvey House waitress in Arizona. Since then I've worked clear across America. This life is more fascinating than coddling Mrs. Jones's little darlings!

"All the big shots seem to want to talk when you give them good fried chicken. I hear more smart talk here in one day than I'd have heard in a lifetime teaching those kids. Every crowd we get talks about a different subject.

"They've all read about Ozark hillbillies, coon dogs, old-time fiddlers, and square dances, and want to see some. Others are looking for a spot to build a summer home. Many come to see the big Ozark springs and caves, or to visit their soldier sons in camps. I heard one couple from Illinois say they were just tired of the flat prairies and wanted to see some 'rough country.'

"Two million used to come in summer to fish and hunt, or to cool off. But also a lot of writers, cameramen, teachers, etc., come here to see the hill people. They want to stalk us 'ridge runners' to see us scald a hog, or weave a rag carpet, or get baptized.

"What they finally see is often just a lot of beautiful modern farm homes that line the White River Valley, some fine fat cattle, and nice people behaving like nice people anywhere."

Monkeying with topography, using dynamite and steam shovels to make dams, man can change a whole community's ancient ways of life. Forsyth, Missouri, for example, is an old, old town; it saw the stagecoaches running from St. Louis to California. Forsyth also knew flails, ramrods, candle molds, and powder horns.

Floating down White River

Then came the dam in White River. Came also bizarre new settlements on the lake thus formed. Hollister, with its "English Inn" and Queen Anne cottages; bustling Branson, with a movie theater lined with rustic pioneer things that might excite even Hollywood. Yet an

old boat still delivers mail once a day down scenic Lake Taneycomo!

I took a float trip down White River. That's fun! You just float downstream, and dream and dream—and hope you'll get a bite. Some people have. But you wonder why, when you think of the millions of times men have fooled these blasé fish with silk, wood, rubber, or tin frogs, minnows, flies, crawfish, or crickets.

We figured that an old bass must in his lifetime cruise 10,000 miles or more, counting his annual spawning trips upstream, his quest for food, and his escapes from clumsy bait casters!

With Charlie Barnes, 39 years a White River guide, we cast all day and he *never got a strike*. That broke his heart.

"Charlie," I asked, "what's the strangest thing ever happened on this river?"

"It happened last year," he mused. "One foggy day I was floating some Kansas City doctors. One plugged for jack salmon, just as a flock of teal duck whizzed through thick fog overhead. Miraculously, his plug hit square in that flock; his line wrapped around a teal's neck. And he jerked that fluttering live duck slap-bang down into my lap!"

I made no answer. Minutes passed. Said Barnes hopefully: "Once I had my hook baited with a live minnow. I'd laid down my rod to light my pipe, when my rod suddenly shot out of the skiff, crossed the river, and raced off into the woods."

I still made no answer.

"A mink had my bait," pleaded Barnes. Then we started home.

Hillbilly Music—from Brooklyn

Midwest radio and cafe programs are full of "Ozark Hillbilly" ballad singers. Some learned their "mountain music" in Brooklyn or Chicago.

Genuine hillbilly singers there are, of course, and a few songs that may be peculiar to the Ozarks. But when the Missouri Folk-Lore Society published some 60 examples of old songs collected in the State, the Ozark yield was but little richer than that from other sections.

In Tennessee hills, or West Virginia or Kentucky, they sing many of the same old songs you hear in the Ozarks—"Barbara Allen," "Lord Lovel," "Oh, Dear, What Can the Matter Be?" etc.

May Kennedy McCord has for years written "Hillbilly Heartbeats" in the Springfield Leader. As a born hillbilly, she talks over the radio and has sung Ozark ballads on concert trips and at the National Folk Festival in Washington, D. C.

Work and Play in the Ozarks

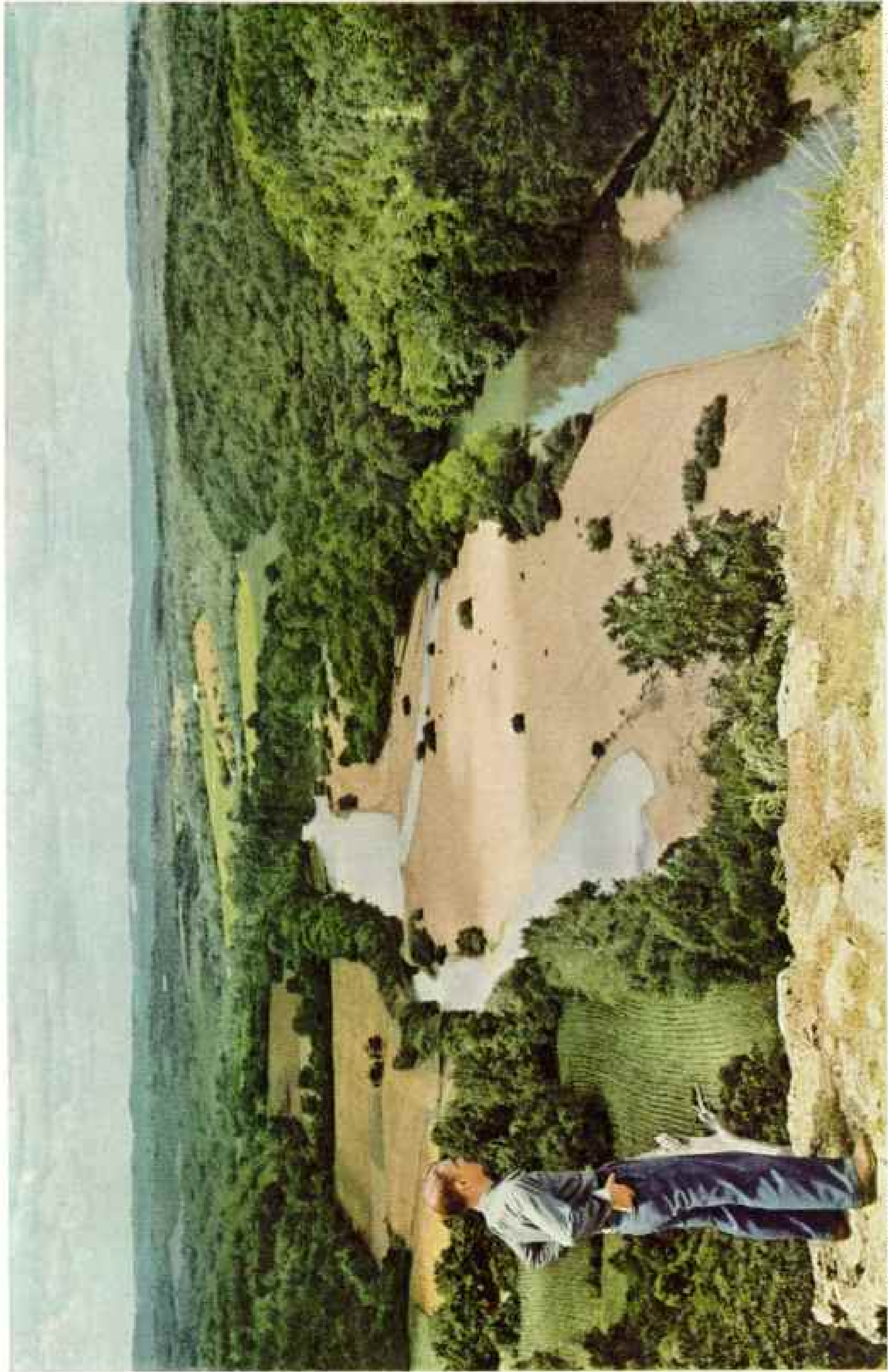


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Photograph by H. Anthony Stewart

She Was Voted "Girl with the Sweetest Smile," in an Ozark Contest

Each year good-looking maidens from all over the Missouri-Arkansas hill country compete for the title, "Ozark Smile Girl." This is Jane Nichols of Bentonville, Arkansas, a one-time winner, snapped while picking roasting ears in a neighbor's garden.



© National Geographic Society

Recreation by W. Anthony Barber

Whiz through Missouri on Fast Trains that Seek Easy Grades and You Miss Such Rugged Scenery

Automobiles opened America's wilder regions to sightseers. Until motor roads came, few but hunters and fishermen explored Missouri's Ozarks. Before the war, some two million summer visitors a year enjoyed their cool, refreshing woods and streams.



© National Geographic Society

"I Earn Two Dollars a Day"

"Pap says we'll knock off Saturday and go fishin'." Brushy, rock-strewn hills, once not worth taxes, now yield cartloads of fragrant, luscious strawberries.



(Ketchikan by H. Astor Hensz)

"Hard, Clean Work Is Good for You"

Thrifty, self-reliant pioneer typist survives. Besides preserving fruit, she shears her own sheep, cards and spins wool, and knits her family's socks and sweaters.

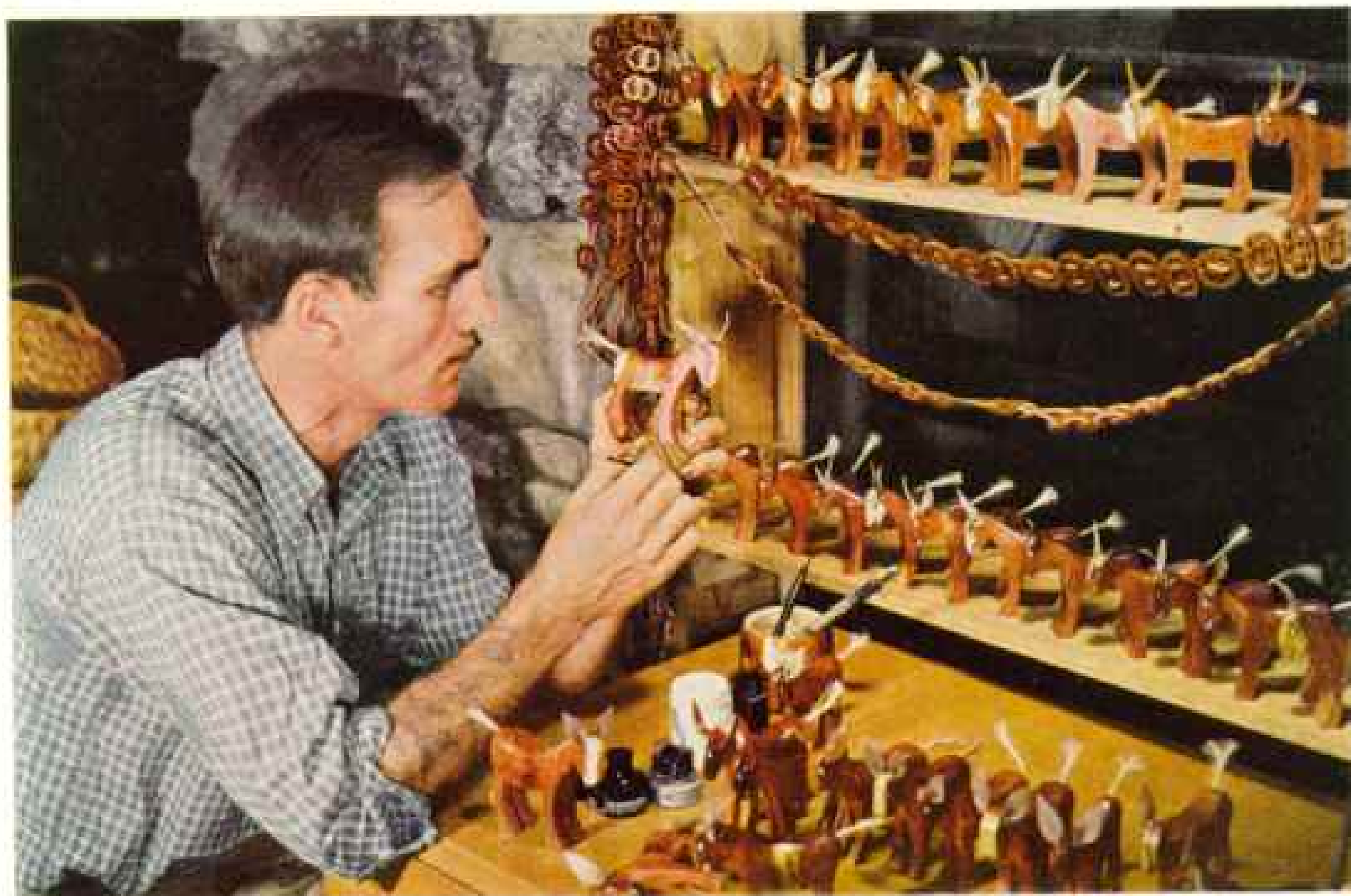


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Kodachrome by J. Baylor Roberts

No, My Son, "All Is Not Gold That Glitters"

Besides zinc and lead, many other Missouri metals are shown in Joplin's Schifferdecker Park Museum.



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Kodachrome by R. Anthony Stewart

"Angle of Ears or Twist of Tail Shows the Mood of a Mule!"

This Missouri carver of wooden mules also makes novelties from sawn cross sections of walnuts.

Work and Play in the Ozarks



© National Geographic Society

Photoliam by H. Arthur Stewart

"Knee-deep in Vitamins" or "Beauty in Beans" Painters Might Call This Scene

Amid 20 tons of beans she shows what a rich region the Missouri-Arkansas Ozark country is for the truck farmer. Much cleared woodland is now devoted to fruit, berry, poultry, and vegetable growing. A large share of all our tomatoes also comes from this region.



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Ozark Schoolboys "Sometimes Sit and Think, and Sometimes Just Sit"

For once, nobody looked at the camera, except the little girls over on the porch. At noon the pig always shows up to get scraps thrown from lunch baskets. School begins in July, when crops are "laid by," and ends before snowfalls block the roads.

Photograph by D. Anthony Bennett



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"Yes, I Love Making Pottery"

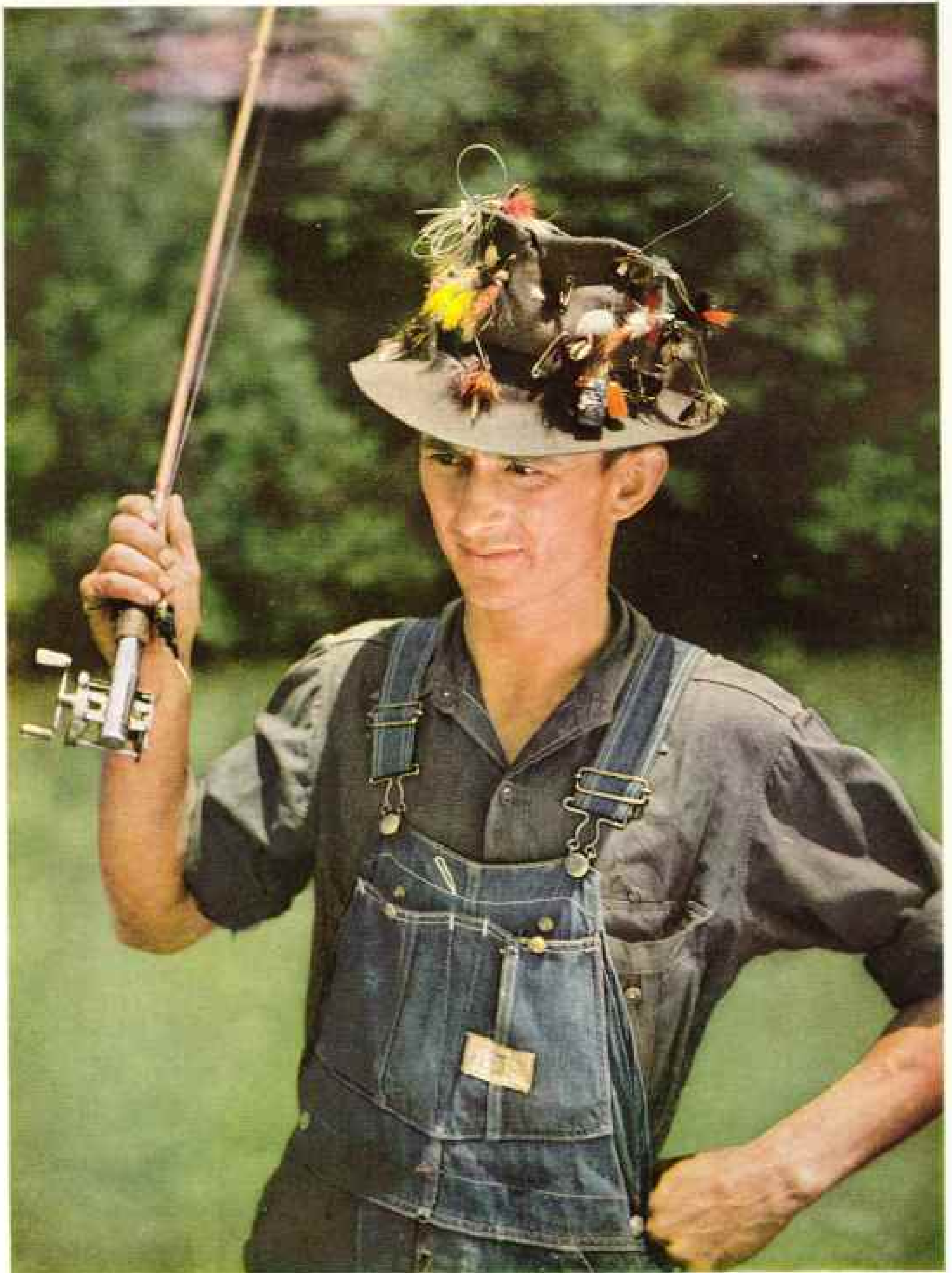
"You're happy, when you love to do what you have to do," said this potter near Hollister, Missouri. He applies colors as the clay revolves.



Recreation by H. Anthony Bennett

"There's Money Even in Rag Dolls"

"But you have to make good ones!" Here are copies of characters in the vicinity of Gayler, Arkansas. Hill people settled here more than 100 years ago.



© National Geographic Society

Kodachrome by D. Arthur Stewart

Copy This Fly-covered Hat and Start a New Style!

Under such a hat, any woman would attract every man who ever cast a fly. How many wood, tin, and rubber frogs, flies, and assorted worms men toss into pools every year to fool the fish! To oblige the cameraman, he struck this pose as he walked across a pasture.

"Best listeners I ever found," she told me, "was when I talked and sang for the English-Speaking Union in New York. They plied me with questions about the Ozarks, 'last seed bed of Shakespearean dialect.'

"English guests there would say, 'Why, we use those very Ozark words still in Cornwall, or in Devonshire.' They referred to words like 'reckon,' used in the King James version; 'poke' for sack, 'holp' for help.

"Our old songs, such as 'Barbara Allen,' were brought straight from England. Even 'Home on the Range' is taken from an old ballad. But some songs are homemade.

"Today college glee clubs use 'Shortnin' Bread' as an encore. You know that Ozark lyric of hog-killing time:

Ever since my hog's been dead,
We been eatin' shortnin' bread, etc. . . .

"That's one of our oldest fiddle tunes.

"Another homemade song is that bushwhacker ballad:

The dirty little coward that shot Mr. Howard
And laid Jesse James in his grave.

"In our Ozark hound dog song there's pathos, devotion, fidelity. Look at the honest feeling in this tribute:

Every time I come to town
The boys keep a kickin' my dog around;
Makes no difference if he is a hound,
They gotta quit kickin' my dog around!

Vagabond Cats and Mama Minks

From Ozark Beach Hotel, near Lake Taneycomo, at early dawn, if ears and imagination are keen and no cowbells tinkle, you may hear wild turkeys gobble in the woods across the lake.

Quail, bold in the closed season, whistle near the houses and scratch up gardens with gallinaceous glee. Live rabbits stream out of Missouri like bats out of caves—100,000 a year—for stocking the game supply in eastern States. Wolves are a problem. They make trouble eating young stock.

One St. Louis sportsman turned a lion loose on a Mississippi island, then invited friends to come on a lion hunt! House cats run wild, prey on quail, rabbits, and song birds. Old yellow tomcats live like Robinson Crusoe, off the country.

Around lonely bends in these mountain creeks, minks dive for mussels and frogs; they stay under a long time. To stalk them and watch them at work or play, you have to be extremely quiet and keep out of sight. If you even move your hand to brush away a gnat, they take alarm.

One day I watched an old mama mink after

a frog, her four young ones waiting on a little sand bank. Suddenly she saw me, turned and started running, letting out warning whistles; whereupon her young ones dashed to meet her, grabbed her by the sides with their teeth, and hung on as she ran away.

"It was this abundant game that first lured west-bound emigrants to settle here," said ex-Representative William L. Nelson of Missouri, long a Missouri sportsman. "Take potluck now at any Ozark home, at the right time of year, and you may get game for supper—especially quail and squirrel. When hunters' guns roar, you know squirrels are falling."

At Montague Trout Hatchery, near Ozark, Missouri, we saw 300,000 young rainbow trout in one pool.

"Cranes rob me," said the manager. "They come at night and roost around my ponds, waiting for daylight. They'll kill and swallow a two-pound trout in a flash."

You've heard the gambler's phrase, "shooting fish in a tub." When we dropped a hook baited with liver into this pool, no fewer than 500 big rainbow trout leaped for it. Seeing so many big fish fighting for your bait is like dreaming of finding silver dollars all over the ground!

"In June Ozark fields smell of strawberries. We ship to Canada by trainloads," farmers said. "Chief enemy among all berry-stealing birds is the quail."

Girl berry pickers started running when Stewart set up his camera. "What are they afraid of?" I asked. "Nothing. They're just going home to doll up so they'll look pretty."

Where Youth Trades Labor for Learning

"WHY COME YE HERE?" These words ride high over the assembly-room stage at the School of the Ozarks, at Point Lookout, near Hollister.

Though barefooted and penniless, here mountain boys and girls may win an education. It's not free; yet little money changes hands (page 607).

An hour of work is the unit of exchange. Students pay for food, clothes, rent, even dental work, with hours of labor, not dollars.

Everybody in the Ozarks likes Dr. R. M. Good, who heads this school. "We teach these boys and girls that not everybody can be a white-collar worker," he said. "We show that life can be just as satisfying if one works at canning fruit, at printing, woodworking, or farming, and loves his work.

"They use quaint words at first. You'll hear them call a summer shower a 'nubbin stretcher,' or remark, if clouds form, that 'it's clabbering up.'



Quilting from Markham

"Molasses Is Sweet, Too, so Sugar Rationing Don't Bother Me"

Small fields of sorghum cane are common in the Ozarks. Sorghum "lasses saves sugar. It's good on corn cakes, in candy, and even in coffee. "Long sweet'nin'," it is called, as distinguished from sugar, which was "short sweet'nin'."

"But native intelligence is a fixed quantity. These people came here generations ago, got lodged in these mountains, and went to seed. It was only lack of chance to learn that kept them illiterate.

From Scissors-grinder's Wagon to University

"We once heard a boy crying in an itinerant scissors-grinder's wagon; we took him in and he went from here to graduate from the University."

Iberia Junior College, in Missouri, is typical of the best in Ozark culture. Established long ago in an isolated small town still many miles from any railroad, it has been the door of opportunity to thousands of young men and women who have made good.

Native handiwork finds expression in the Ozarks. At Camden-ton, which replaces the old town of Linn Creek, now under 60 feet of Lake of the Ozarks water, is a factory started by a local whittler. Today its output, consisting of more than 50 trinkets fashioned from walnuts and bits of cedar, is sold all over the United States.

From Lake Taney-como we took U S 65, crossed the State line, and zigzagged into northern Arkansas.

Pottery workers abound. One family runs a wheel that has been handed from father to son more than a century. Colored figures of cows, dogs, horses, and roosters are grouped for sale about wayside stands.

Frog Farm Fenced in to Keep out Varmints

At Berryville is a frog farm, fenced to keep out hungry varmints. Its ponds are full of moss and water-cress to provide oxygen for the batrachians.

Eureka Springs, health resort, almost

stands on end. No circus has ever shown here because there isn't level ground enough to pitch a tent. Basin Park Hotel has seven stories. You can reach any floor without using stairs or elevator. Because it is built against the mountain side, every floor is a ground floor.

Some of the roughest Ozark country lies just west of Eureka Springs. Here your road skirts canyons 500 to 600 feet deep.

Turn right from the main road and you come to Pea Ridge Battlefield. In 1862 the Blue and the Gray shot it out here, burning rail fences at night to light their way to battle. From Oklahoma General Albert Pike brought a band of Cherokees to help the Confederates.

If you want to skim the high ridgetops and



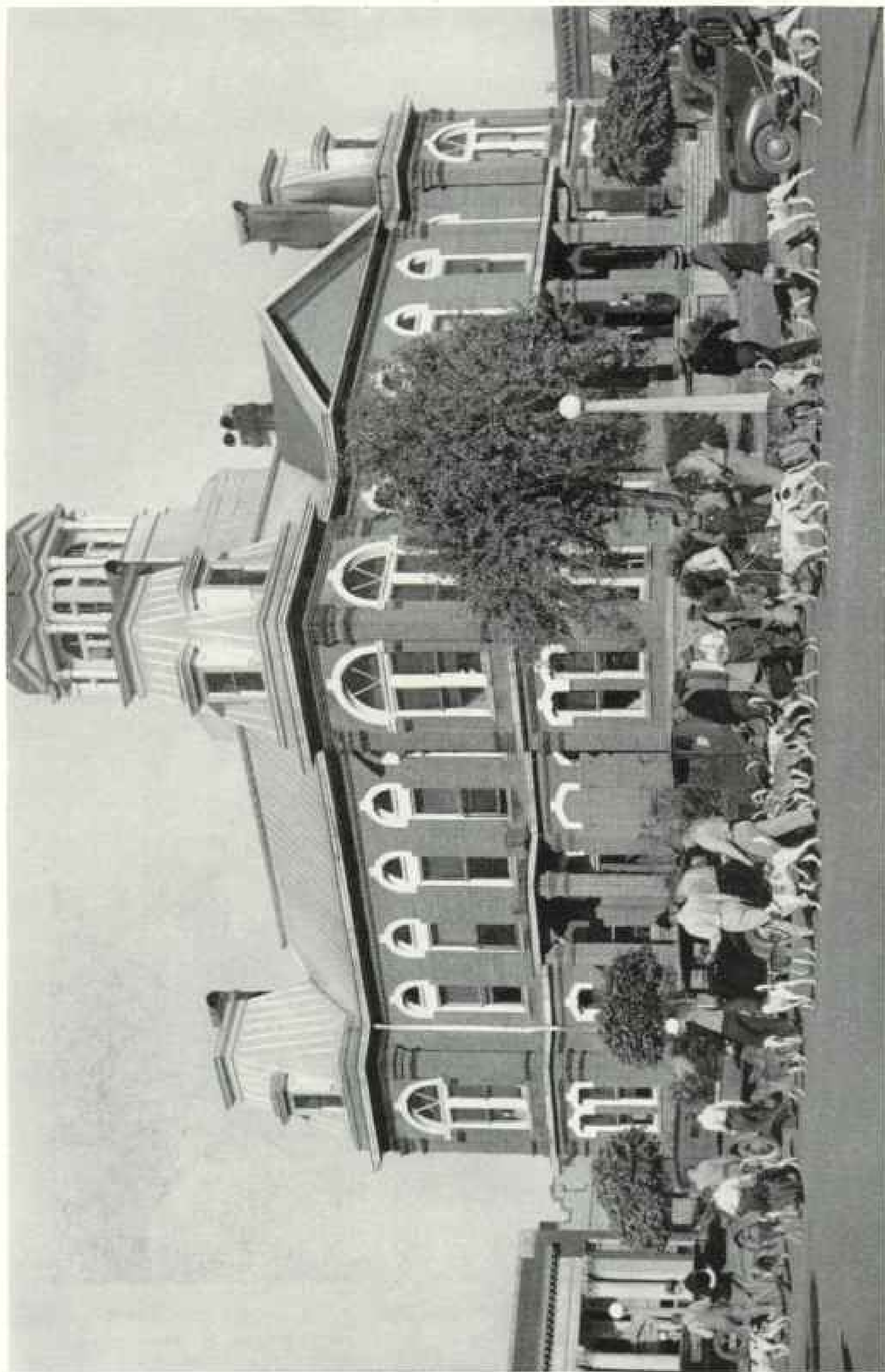
Missouri Farm Youngsters Mix Play with Work

On a holiday afternoon they cut a load of fodder. Atop a sled they ride in from the field.



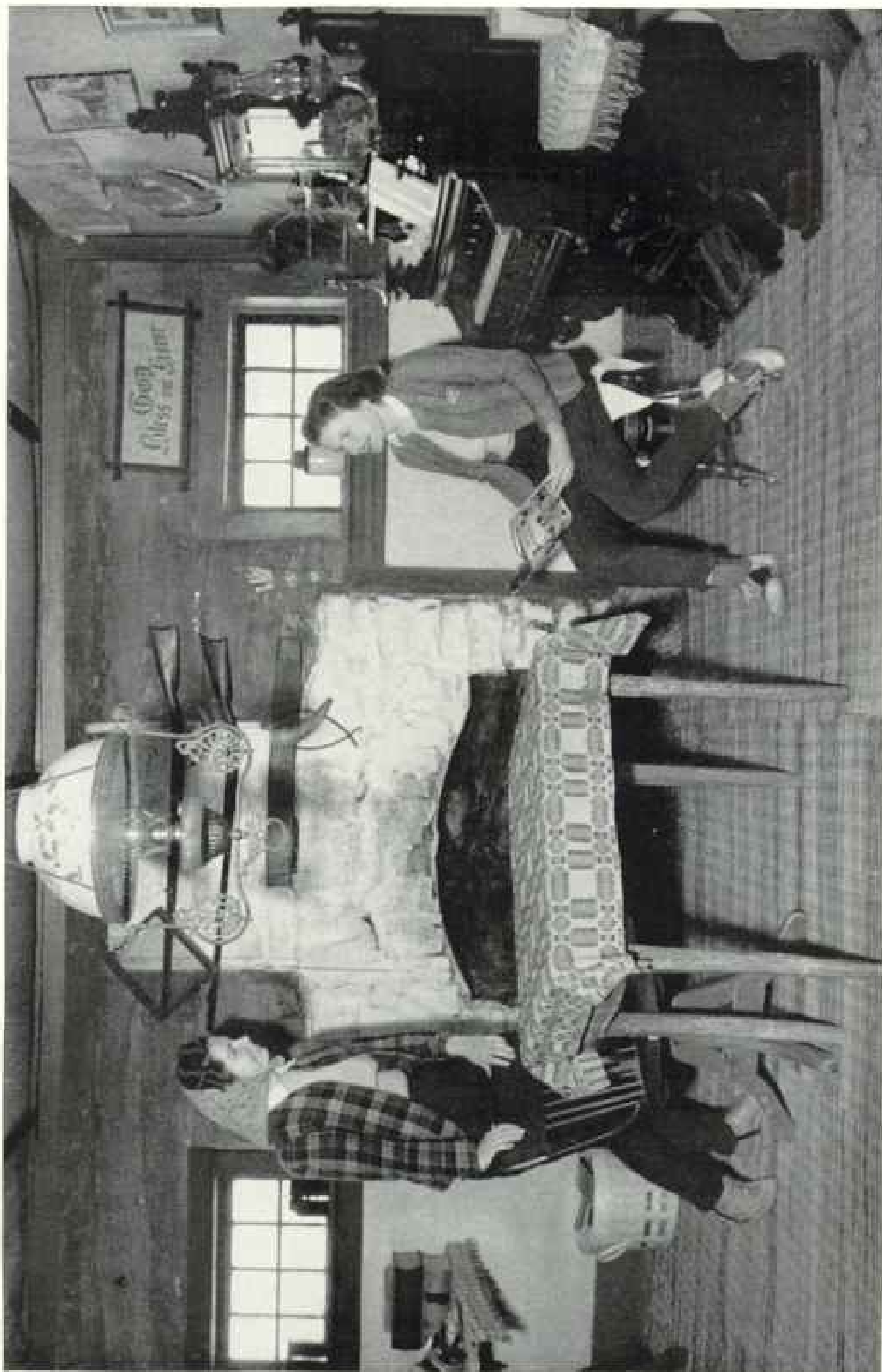
Happy Students Who Work Their Way through School Sing Hymns with Fervor

This quartet is using an old-time "shape-note" book. Sounds are represented by shapes of notes, such as triangle, square, and oval. To pay tuition they work 16 hours a week at School of the Ozarks, near Hollister, Missouri. The balance is paid by sponsors who "adopt" students (page 605).



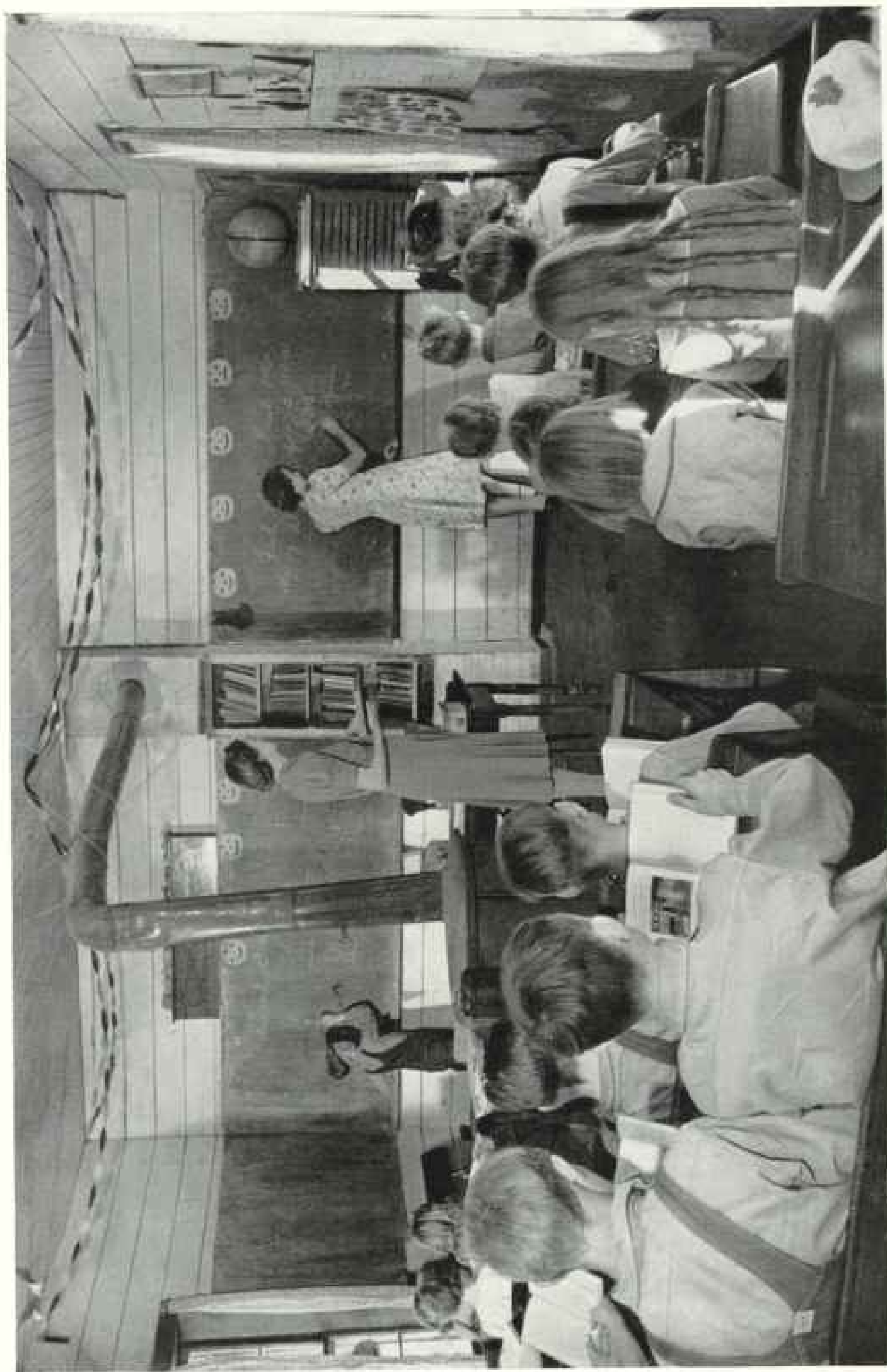
Owners Parade Their Foxhounds past the Courthouse at Versailles, Missouri, on the Way to Field Trials

Here nobody rides to hounds, and no fox is caught. Businessmen and farmers alike sit in the woods by night and try to identify each dog by its "mouth" as it flaps tongue on a trail. Some of the dogs are numbered with figures painted on their sides.



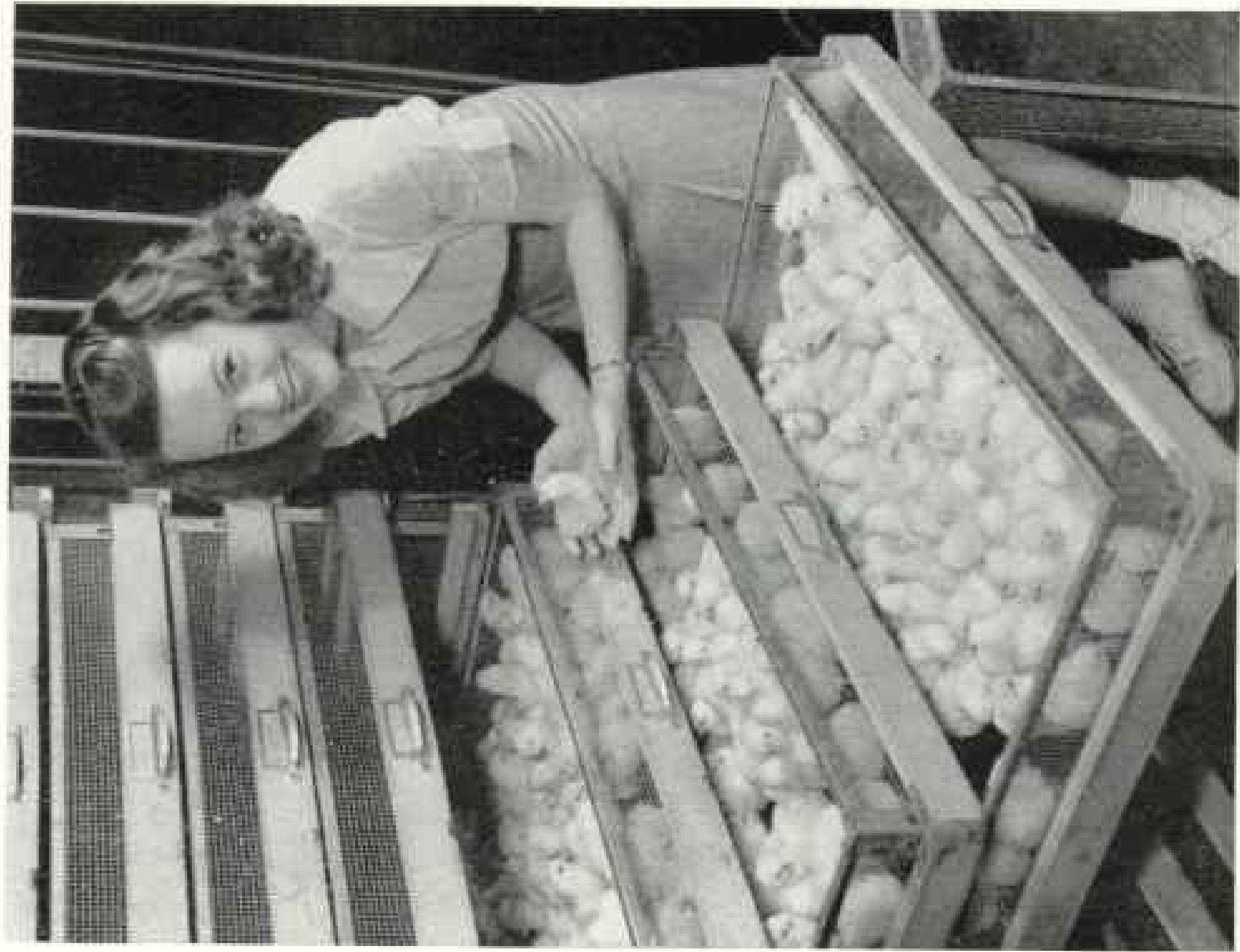
Visitors Flock to Matt's Cabin since Harold Bell Wright Described It in *Shepherd of the Hills*

"Old Matt" and "Aunt Molly," characters in Wright's Ozark novel, lived in this cabin near Branson, Missouri. Built of frame and log, with stone chimney, it is preserved as it was in their day. It overlooks Mutton Hollow and Sammy's Lookout. Above it is Inspirational Point, where the novelist camped.



This One-room Log Schoolhouse near Galena, Missouri, Is Among the Last to Survive

Look at the stovepipe, boys in overalls, and long curls on girl at right. James Whitcomb Riley would have loved this pioneer classroom with its duplex seats and Halloween decorations. Teacher has 27 pupils ranging from the first grade to the eighth (Plate VI).



Motherless Chicks Live in Multiple-floor Apartments

About three weeks ago these day-old chicks were eggs just being placed in the incubator at Springdale, Arkansas. Some electric hatchers in Arkansas incubate 100,000 eggs at a setting (page 612).



When You Buy a Pie Here, You Get the Cook with It

The girl who baked the pastry becomes the purchaser's partner for an evening's festivities at this Missouri church party. Spirited bidding inflates the price of pie baked by the best-looking cook.

get some best-of-all Ozark views, take State Road No. 7 south from Harrison.

Here hills in spring are painted with dogwood, rhododendron, wild plum, and violets. No part of America has greater variety of wild flowers.

In this region of few railroads, trucks normally haul everything they can get—fruit, chickens, coal, livestock, household goods, firewood, or fence posts. "Gipsy trucks," like tramp steamers, bring down corn from Iowa and haul back cedar fence posts.

Transition is swift. Below Harrison you see substantial homes, big barns, good wire fences, and herds of fat Herefords. Climbing higher into the mountains, however, old-time rail fences reappear, houses become dilapidated and weather-beaten, and you sense a poor country.

Yet people have fun. Youth flocks to Marble Falls, with dance hall and roadside zoo. Where they got monkeys and bears I don't know; but all any zoo man has to do hereabouts to get plenty of wildcats, coons, and skunks is to put out bait and leave the zoo doors open!

When you get to Jasper, seat of Newton County, which never had a mile of railroad, you're really in the backwoods. Hills are so steep that only their tops are cultivated. Rail fences climb the slopes; horse and pig troughs are made of hollow logs. Women wear sunbonnets, and some take snuff.

Farmers raise nearly all their own food. They kill and cure their own pork. "Hog scalds" are favored spots along creeks where hogs are killed, scalded, and scraped. Strings of dried peppers and onions hang on walls.

Families here have lived on the same hill-tops for generations. Old ways and old beliefs, long since abandoned elsewhere, tend to persist.

When a man dies, the family clock must be stopped. To keep milk and butter cool, they set their tin buckets in cold streams or log springhouses. Chickens and turkeys often roost in trees, and people say their tame gobbler sometimes meets his wild cousin in the pea patch.

Quaint Ways of Earning a Living

Many Ozarkers earn a living cutting staves for liquor barrels. Harrison, Arkansas, has seen millions of barrel staves piled up to dry. From a marble quarry near here, I was told, a 2,000-pound block was quarried in 1849 and shipped by water via New Orleans, intended for use in the Washington Monument.

Oddest Ozark industry is at Imboden, Arkansas, whence Byron Marshall ships am-

phibia, reptilia, and other biological specimens to some 400 schools and colleges for dissection-room use. One big order was for 10,000 bats. These he netted in a cave, drowned them, then packed them in formaldehyde for shipping.

This biological department store has more than 500,000 specimens, from live moles and worm snakes to newts, vinegar eels, and veil-eyed salamanders.

Ozark salamanders don't snort fire and smoke, as you see salamanders doing in Chinese medical advertisements, but they're most popular with biology classes. And Imboden ships them, dead or alive.

If you wish to raise your own lizards, here you can get a setting of eggs with directions for hatching and feeding.

Because Osage and Cherokee Indians long claimed northwest Arkansas, this region is culturally nearer the Midwest than the South; farm life here is not on the plantation scale, though people fought on the Confederate side.

Apples, chickens, dairying, diversified farming make this Ozark section prosperous.

Mass Production in Poultry

Some electric hatchers in Benton County incubate 100,000 eggs at a time (page 611). Broilers here annually eat 100,000,000 pounds of feed!

All this is on such a gigantic scale that you can't think of it any more as just a poultry farm; it's mass production. From the day they're hatched, these chickens are kept locked up with no exercise; food goes to them on conveyor belts. They get so fat they can hardly stand up!

Known as "Arkansas White Rocks," all markets bid for these fryers. Cafes feature these chickens, served "in the rough." No knives or forks, you have to eat them with your fingers.

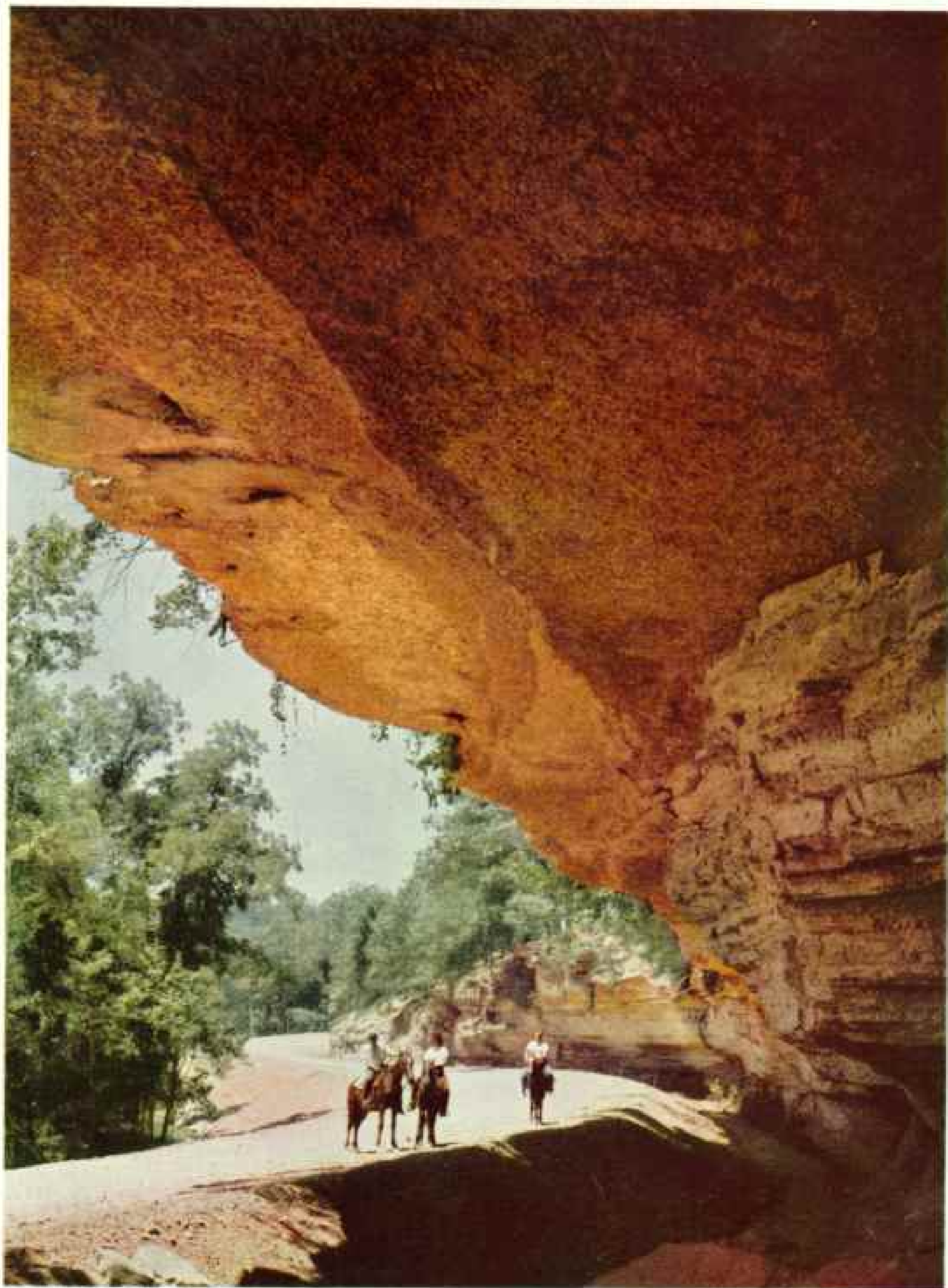
So much apple vinegar is made here that they ship it out in tank cars!

On State Road 100, out of Bentonville, is Bella Vista, a popular lakeside resort.

Students of money remember "Coin" Harvey. In the Bryan silver-mad days of "16-to-1" this man wrote a book, *Coin's Financial School*. Like *Uncle Tom's Cabin*, Harvey's book took hold, selling more than a million copies.

At Monte Ne, near Rogers, Arkansas, Harvey spent the last years of his life on his plan to record America's cultural achievements in a great American pyramid. At his death he had finished only the amphitheater around the base of the proposed pyramid. It is used now for plays and stunts by girl campers.

Work and Play in the Ozarks

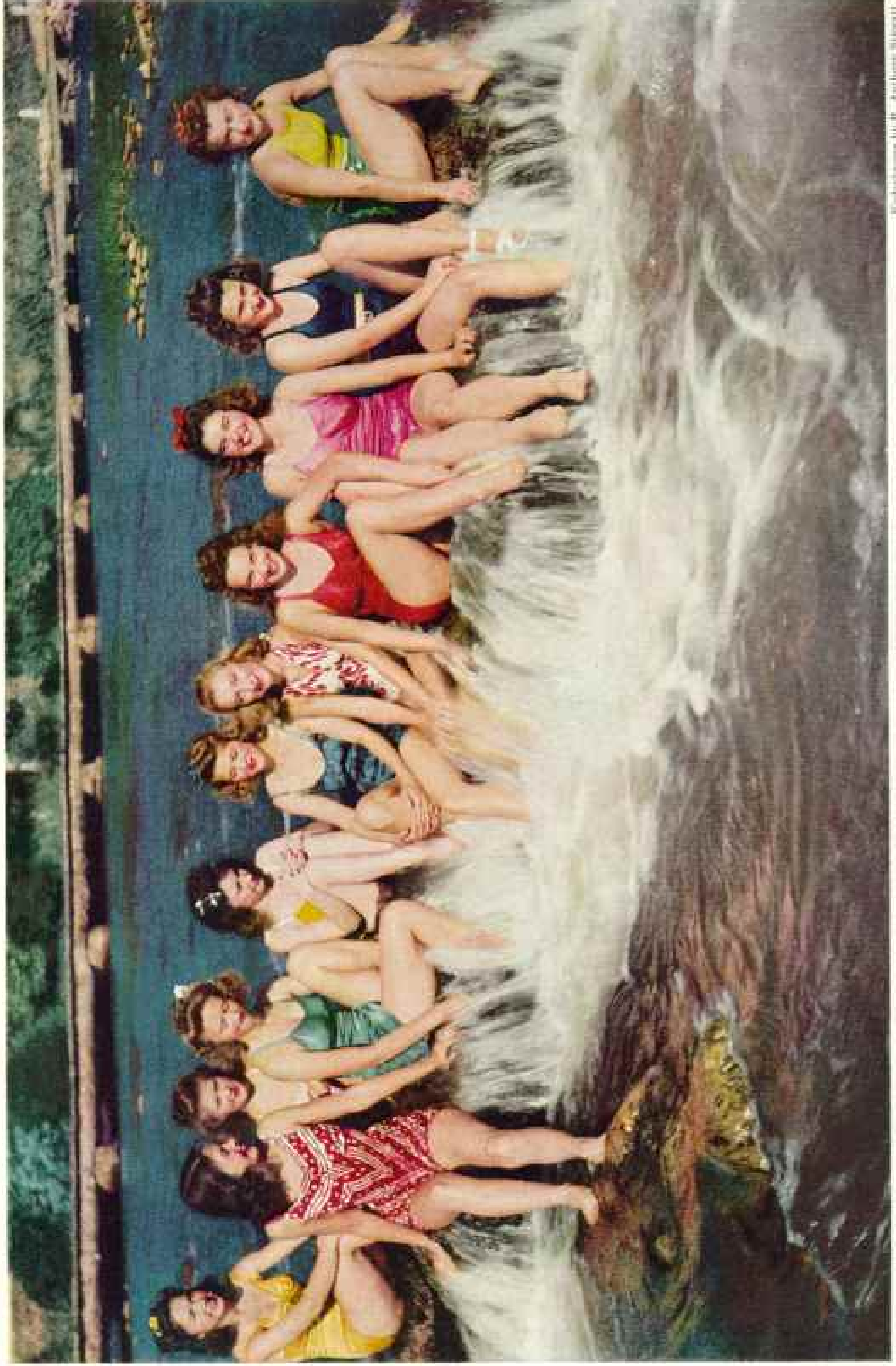


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Introduction by Dr. Arthur H. Stewart

Some Ozark Caves, Cool in Summer and Warm in Winter, Serve as Livestock Shelters

Near Bella Vista, Arkansas, the motor road runs in the shade of overhanging cliffs. Farmers store hay under these natural roofs, and flocks of sheep find shelter here. Owls, bats, and swallows nest in holes in the cliffs; in places shots or yells produce odd, hollow echoes.

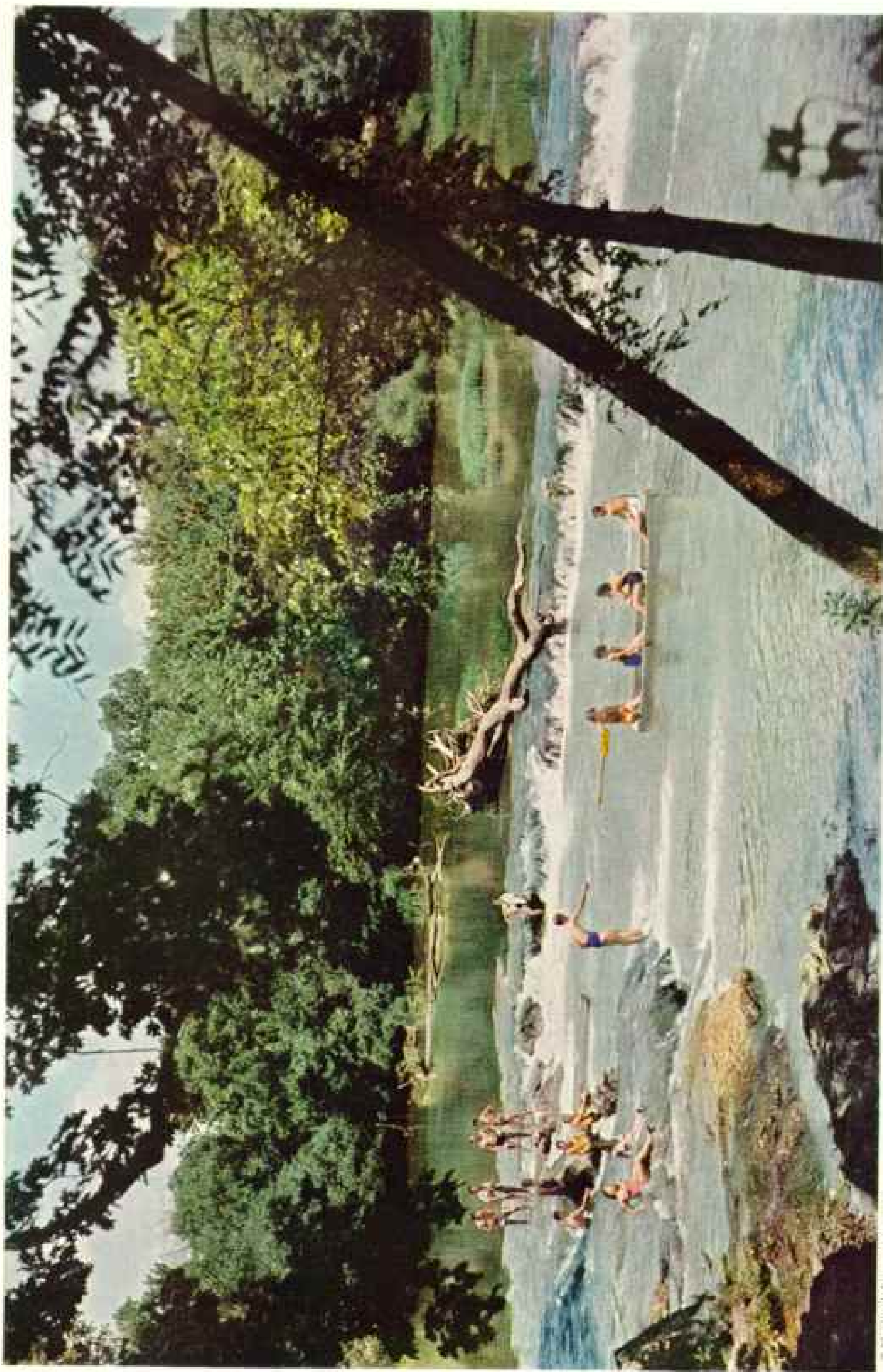


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Reproduction by R. Anthony Rippeart

For the Adoration of Venus, Ozarkers Never Need Bother with Florida or California Beach Parades

Vigorous from outdoor exercise in tonic mountain air, well nourished on the fruits of fertile upland farms and gardens, here is American youth at its physical best. Who says the world isn't getting better-looking! Perched here is a short dozen of shapely mermaids from summer camps on Arkansas's Spring River.

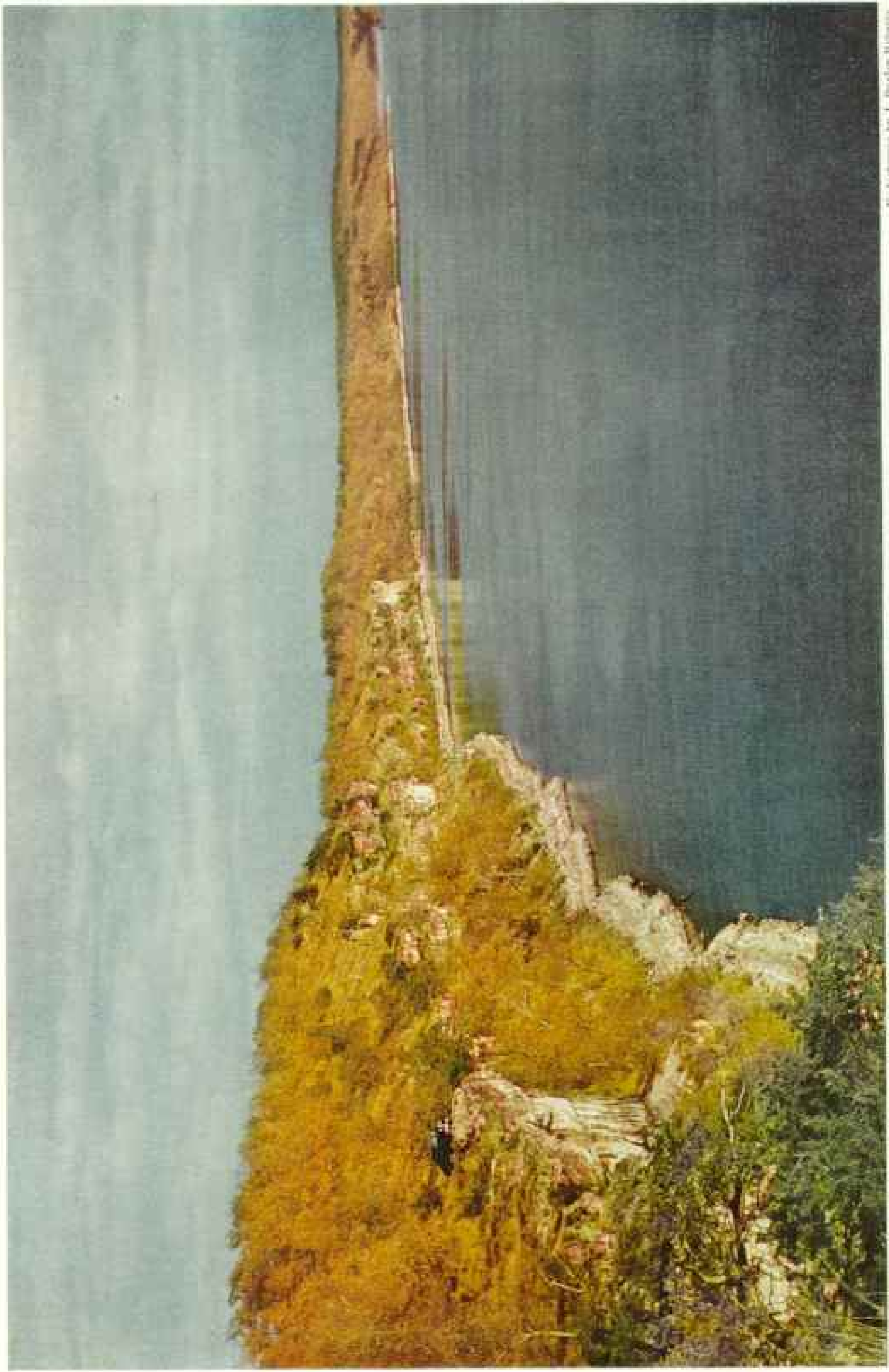


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From Mysterious Mammoth Spring in Arkansas Flows a Full-grown Cold, Clear River

Named Spring River, after its source, this pleasant stream affords a playground popular for leagues about. Summer homes and camps line its shady banks, a godsend to summer visitors from hot lowlands of the middle Mississippi Valley.

Enslavement by H. Anthony Hirscht



© National Geographic Society

Limestone Bluffs Rim Scenic Lake of the Ozarks, Formed by Bagnell Dam in Osage River

Fly over this vast watery expanse with some 1,300 miles of shoreline and you are astonished at how it changes the geography of southern Missouri. Whole communities had to move, roads had to be changed, and new settlements built. Some sportsmen have shipped pleasure craft here from faraway States.

Continued by J. Taylor Bennett



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Reproduction by J. Hector Delorme

Striking Murals by Missouri Artist Thomas Hart Benton Adorn the State Capitol at Jefferson City

Turbulent scenes from early Missouri history and literature are portrayed. Here are slaves, Indian fur traders, Huckleberry Finn, "Frankie and Johnnie" of ballad fame, and one scene showing Jesse James robbing a train. Visitors from all over the world have come to see these murals.



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Rebuckings by R. Anthony Stewart

"Let Him Roll! We Knew He Couldn't Ride that Wild Colt without Saddle or Bridle!"

Veteran buckaroos whoop with delight when a broncobuster gets "piled"—provided, of course, he's not hurt. Every year the best riders among Oklahoma and Arkansas cowboys and cowgirls compete for prizes at Fort Smith, Arkansas. Already the megaphone is counting this victim out. Next!



© National Geographic Society

Lack of Gas and Tires Brings back Old-time Farm Wagons.

"Top buggies," long stored away as chicken roosts, are also being painted up and put to use. Here a farm wagon hauls home two women in sunbonnets with baskets of potatoes they have just dug. Honest toil is beneath nobody's dignity. Some people still walk to country stores over bypaths and carry home their groceries.

Keokuk, Iowa by H. Anthony Stewart



"You Win the Spotted Pony," the Judge Tells Her

At the Fort Smith, Arkansas, rodeo, she took first prize on these points: Skillful riding, condition and appearance of her mount, plus her own good looks. "And now—just a few words into the mike!"



© National Geographic Society

Photographs by B. Anthony Stewart

Revival Converts Being Baptized in the White River, Near Cotter, Arkansas

Coin Harvey's cultural pyramid idea was carried out in another way by the Time Capsule of Westinghouse Electric & Manufacturing Company, buried on the New York World's Fair grounds in 1938 and sealed in 1940.

Fayetteville, seat of the University of Arkansas, is an old, old town, as they go here. It alone, as the center of Arkansas culture, is worth a whole story.

At random through the years I traded notes with that remarkable man, the late Charles J. Finger, who wrote *Tales of Silver Lands, Highwaymen, Bushrangers, Life of David Livingstone*, and a score of other books.

Sailing as a young mate on a London bark bound for Patagonia, Finger's life reads like Conrad's. Helen, his artist daughter, was illustrating one of her father's books when we called.

"I never saw you, nor your picture, but I sensed who you were," insisted Finger, when Stewart and I found him hard at work on a new book. He wrote in a rustic shack away off in the woods, and streams of American writers from Carl Sandburg to Bob Davis had worn a path to his door.

On Mount Sequoyah, east of Fayetteville, is a Methodist Camp, marked in summer by a huge electric cross. In this training school more than 1,500 church workers, young and old, enroll each season for study.

Hunting Wild Bee Trees

Blackbirds chug to waving cattails beside a hayfield and chirped their "click, click," sounding like shears clipping a hedge. Suddenly hayfield workers started running, slapping at their necks. They'd stirred up a bumblebees' nest. Stung on the belly, a horse nearly kicked a sulky rake to pieces.

To get rid of the bumblebees, men set an uncorked jug half full of water near the nest; then everybody got back and let the bees settle. One after another, they buzzed around, found the hole in the jug, mistook it for the dark door to their old nest, crawled in and drowned.

To find a honeybee tree, these hill folk reveal their skill in woodcraft.

Said Clifford Clear of Myron, Arkansas: "To locate a bee tree, I put out bait like sweet water or anise; or I may locate bees already at work on clover or sumac. In any case I stand and watch to see which way they start. They always fly back to their tree in a straight line.

"When they've got a sugar load they don't fly fast, so it's easy to track them; all you have to do is look up now and then to be sure

you're still under the line of flight. I cut one tree last June and got over a hundred pounds of honey."

Most hillmen would rather hunt and fish than eat; certainly they would rather follow a hound than a plow. Said one Nimrod: "I can call crows with my nose and tonsils. Between crow squawks I put in the hoot of a worried owl. That makes crows think their pals near by are fighting an owl, so they rush over to where I am hiding with my gun.

"Crows are smart, but they can't count. If they see me go into my blind alone they keep out of range; but if I take another man with me and he then turns around and comes out, that fools them. They don't seem to know that two men went in and only one came out.

"So after I'm in there alone and call them, they come right up to the blind. Sometimes I take an old black hat and hold it up and shake it over the blind while I'm calling; they see that and think it's a crow fight and rush right into it. We have to fight crows all the time. They ruin gardens and kill young chickens."

Legends of the Razorbacks

Durocs and other fine meat-bearing swine are frequent on the better Ozarks farms. Also, as along White River, you see long-legged, half-wild hogs rooting for mussels; you can hear them crunch the shells.

"I've got about 80 head," said a mountain hog man, "that run wild, yet get fat on acorns and chinquapins. I never see them all at once."

Passing open hill country, I saw where such hogs had rooted for grubs, turning over 50-pound rocks and making an area of many acres look as if it had been plowed.

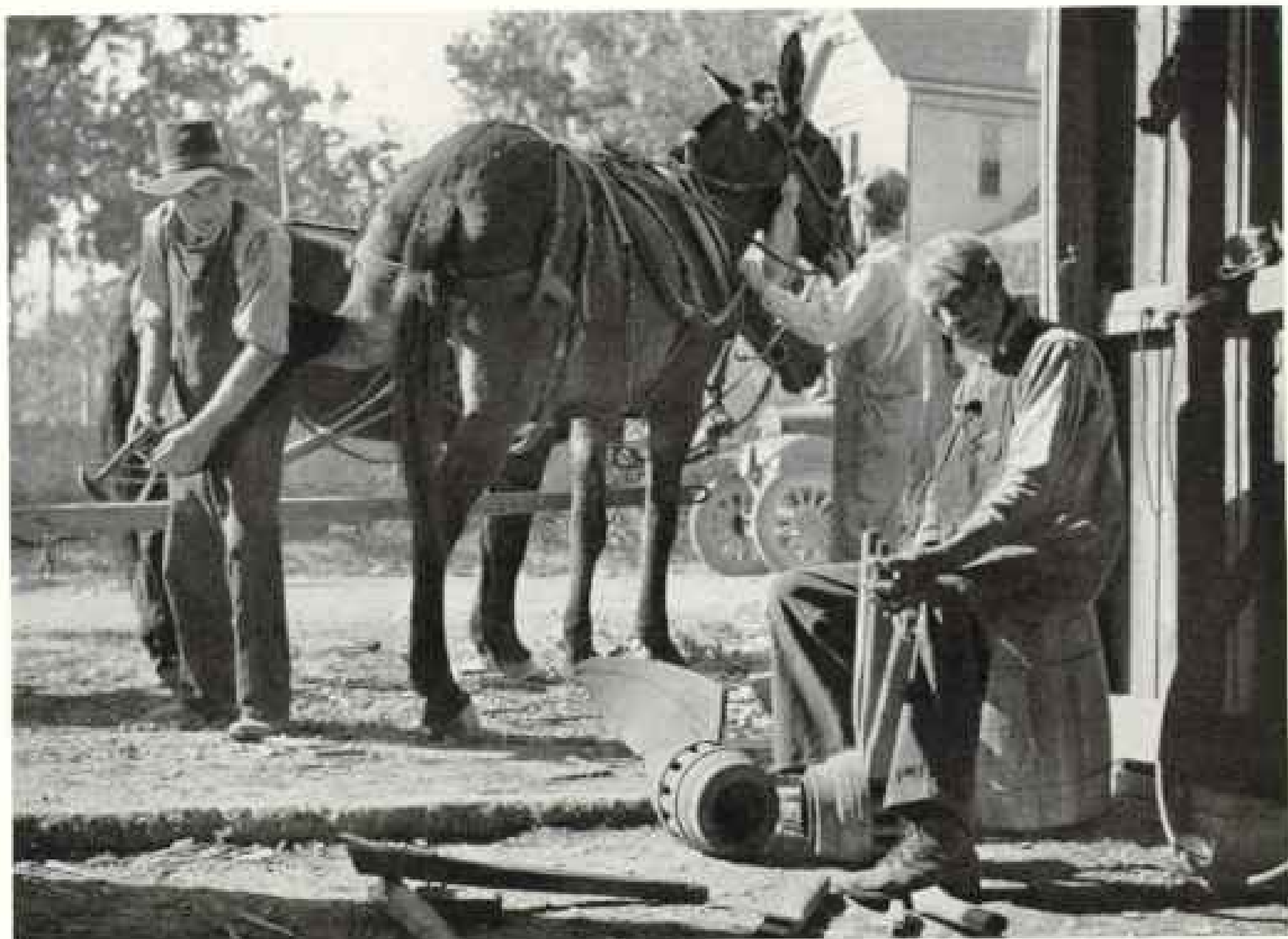
Few animals in America have been the butt of as many tall tales as this half-traditional razorback. Folklore gives it a coyote's face, tiger teeth, a snout so long that it can drink out of a jug, and backbone bristles that stand up like a sailfish's dorsal fin!

To catch these acorn-eating razorbacks, they use a "ketch" dog, my guide explained.

"He runs alongside, grabs an ear, and swings the sow around and around.

"In this waltz, the dog is trained not to reverse. Soon the sow gets dizzy and falls down; then we rush in with a rope and tie her.

"By late spring these acorn-eaters get pretty thin. If chased then, they may leap high, flip over on one side, and glide like a flying squirrel. I've seen one, extra thin, soar clear over a hollow and land running on top the next ridge!"



"Hold That Mule's Foot Tight, or He'll Kick You Clear through the Shop!"

Greenhorns class mule shoeing among "hazardous occupations." In this old-time blacksmith shop, at Pineville, Missouri, you see a wheelwright repairing hub and spokes. Automobiles, such as the jalopy in background, almost drove his tribe out of business.

Good example, that, of the Ozark yarn spinners' art. They don't expect you to believe. But they do like you to laugh and appreciate their story-telling powers.

One night somebody told this: Hired men lay on the grass, under a front-yard shade tree. Coming out on a side porch, a girl rang the dinner bell. As they went in, one man kicked a hound, which howled long and mournfully when he heard the bell.

"Shut up, dog! You don't have to eat here," grumbled the farm hand.

In Arkansas's tiny Viola town, population 280, for years each April has seen a Singing Festival. Here come 3,000 to 4,000 singers, to sing church hymns. Often music publishing houses send a quartet or a featured soloist, but the crowd prefers to sing itself, rather than to listen.

Lawrence County, like some others down here, has two county seats, a survival from days of bad roads. One such is Powhatan, old town on the Black River. In its tiny courthouse are records written with goose quills when Lawrence County included most of northern Arkansas and part of Missouri.

Bills of sale for slaves are recorded here, and the many French names show how French trappers used to frequent the Ozarks.

Time was when an Arkansas mussel was only fish bait. Then somebody found a good pearl in one. Excitement spread; for a time all classes—from county lawyers and bankers to farmers and tie hackers, their wives and children—swarmed up and down the Black, White, and other Ozark streams, raking for mussels.

Collection of shells for making buttons is still a good business, and even now people sometimes find pearls.

Ozarks Honeycombed with Caves

Some Ozark caves are so big that they have rivers and waterfalls in them.

Caves enough to shelter all the Ozark people, with all their oxen, asses, hound dogs, wild turkeys, and fighting cocks perforate these hillsides. In fact, Arkansas's Diamond Cave, near Jasper, explored for 21 miles but no end found, might alone hold them all.

Meramec Caverns in Missouri are so convenient that visiting automobiles drive right

in, hundreds at a time. Marvel Cave, near Missouri's Lake Taneycomo, draws thousands of sightseers in peacetime years. For its size, many insist, it has some of Nature's most spectacular underground architecture.

"The World's Only Underground Night Club!" So claims Bella Vista, Arkansas. In its vast Wonderland Cavern, swing bands play and guests sing, dance, eat, and drink at 65° Fahrenheit when up on earth in open air it may be hot as the middle kettle of Hades. Lodges, clubs, even the Arkansas Legislature have held sessions here!

"What made all these underground chambers?"

To that question Dr. Gerard Schultz, of Missouri's Iberia Junior College (page 606), made answer:

"All this Ozark highland is a limestone region, with heavy subterranean drainage. When rain water seeps through dead leaves or any other decaying vegetable matter, it becomes charged with carbon dioxide; this dissolves the limestone and forms caves, sinkholes, and natural bridges" (Plate IX).

From some caves pioneers took saltpeter to make gunpowder; they mined lead for bullets, and old families still have their bullet molds.

One old-timer in Buffalo, Missouri, "largest town in America that has no railroad," proudly showed me his muzzle-loading rifle.

"My great-grandfather brought it across the Atlantic," he said. "It used to be a flintlock. After Mexican War times we changed it to cap-and-ball. I still hunt with it. In fact, she's so true they've ruled me out of all the turkey shoots, because with her I always got the gobbler."

Underground Rivers and Mysterious Springs

"Double back to Van Buren, Missouri," folks insisted, "and see one of the world's biggest springs." We did.

Big Spring rises full-grown from the rocks, and flows an average of 301,000,000 gallons of water a day. That's two and a half times as much as is used daily by St. Louis!

And Big Spring is only one of many in the Ozarks. What are they? Subterranean streams from snows that melted long ago in the Rockies? Dr. H. A. Buehler, State geologist at Rolla, Missouri, says that straw or pieces of wood, if dumped in a stream 25 miles away, later show up in Big Spring after a mysterious subterranean journey.

Mammoth Spring, across the line in Arkansas, is equally amazing; here a dam and powerhouse furnish electric current for adjacent communities. Near by is a vast Federal

hatchery that distributes young game fish to Ozark streams.

Fat, short-winded folk never see Greer Spring, wildest and most spectacular of all. To reach it, you must climb down a steep mountain side in Oregon County, Missouri. Beaver frisk in its foamy waters and wild turkeys gobble from adjacent slopes.

Around Greer Spring the country is still much as it must have been when the bear-hunting, buckskin-clad pioneers came 120 years ago.

Swiftly now, however, the Ozarks of song and story are changing. Isolation yields before radio, new roads, and the impact of near-by soldier camps.

One night we watched a square dance. When soldier boys swung their country girls clear off the floor in an old-time square dance, they called it "making the calico crack." Likely as not, however, the next dance would be a rumba, for radio's inviting rhythm irresistibly demands the learning of new steps.

From all over the Nation fresh recruits constantly arrive at the camps, which are like big union stations, always crowded, yet with crowds forever changing. As fast as one outfit is trained, it goes to war, and a green group takes its place. So America discovers the Ozarks, and the Ozarks see a new America.

New roads and the influx of motor parties, more than any other influence, have, of course, brought closer touch with the outside world. In Taney County, Missouri, one woman guide alone has handled thousands.

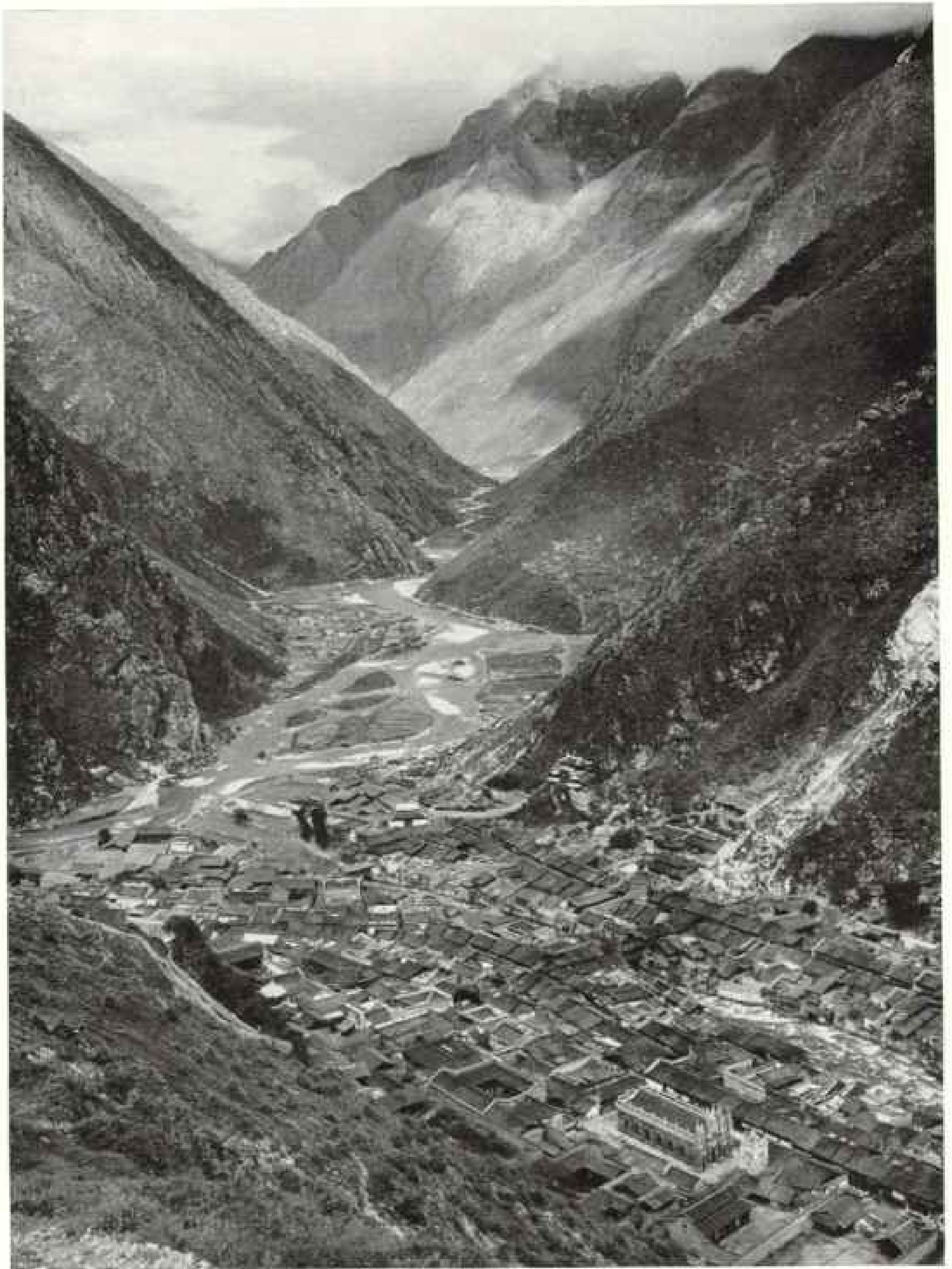
"I've worn out a fleet of cars in the last 20 years," she said. "I specialize in taking parties out from Branson to see the *Shepherd of the Hills* country. On that one trip I've piled up over 700,000 miles (page 609).

Ozark elders thus sum it all up: Young people tend to quit the hills. Besides all boys now in the armed forces, many men, young and middle-aged, leave for factory work and for civilian jobs in the big Army camps.

Girls would rather find city jobs, where they can dress up, see the soldiers, and go to the movies, than stay on the small farms and work in overalls. Any girl who can "write short" (the hill expression for shorthand) is sure now of a town job at good wages.

Some town girls come here to work as waitresses in resort hotels, so it's hard to tell now just who is a hillbilly and who is not.

Finally, as one thoughtful hill philosopher said, "We're more interested now in winning the war—and finding help to pick our berries—than we are in whether a horsehair soaked in water will turn into a snake, or whether a dog's tail draws lightning."



Joseph F. Beck

Tatsienlu Is a "Wild West" Town on the Border of China and Tibet

In this city of 30,000, halfway up the mountains rimming the Tibetan Plateau, green tea, coolie-carried from West China lowlands, is exchanged for hides, furs, wool, and gold from the west. After an 8-day trip from Yachow, the expedition paid off its Chinese coolies here and engaged Tibetan yaks, horses, and attendants (p. 627).

Climbing Mighty Minya Konka

Americans First Scaled Mountain That Now Is Landmark of
China's New Skyway

BY RICHARD L. BURDSALL AND TERRIS MOORE

With Illustrations from Photographs by the Sikang Expedition

WHEN the Japs overran the Burma Road, a new lifeline for China came into being. Reaching from India to Chungking by air, American planes began making the tortuous flight among the massive ranges rimming the eastern edge of the Tibetan Plateau.

This is the most difficult air route on the globe to maintain. Our American pilots must cross tremendous ranges continually wrapped in cloud and storm, at elevations thousands of feet higher than the air routes across the Rockies and the Sierras. The planes skirt mighty Minya Konka, then descend precipitously through narrow, rain-deluged gorges to Chungking, where the sun is hidden most of the year by fog.

The summit of this mountain, 24,900 feet above sea level, is the highest peak of all the great border ranges of the southeastern Tibetan Highland (map, page 628).

Some years before the war we set out from Shanghai to explore and climb it.

At that time the prospect that airplanes and even automobiles would soon look to this peak as a landmark seemed remote (page 632). Though great changes have since taken place, the unique geography of the region remains unchanged.

Nowhere else in the world is there such a formation as that in this region just to the west of Minya Konka, where three great rivers drive through neighboring mountain gorges only fifty miles apart and then fan out, each to become the life-giving river system of its own country. They are: the Yangtze of China, the Mekong of French Indo-China, and the Salween of Burma.*

Paralleling these three, and only 200 miles away, a fourth great river, the Brahmaputra, through another deep gorge, also escapes from the Tibetan Highland and then, swinging west at right angles, falls away to the plains of India.

The southeastern portion of the Tibetan Highland, where these remarkable formations occur, is under Chinese administration and is

known by them as the Province of Sikang. The few inhabitants, however, are almost exclusively Tibetans, living much as Tibetans elsewhere on the high plateau.

In peacetime Sikang could be reached by three routes: from Bhamo at the head of navigation on the Irrawaddy River in Burma, from the railhead at Kunming (Yunnanfu) in southwestern China, or by traveling up the Yangtze from Shanghai.

All routes involved long, tedious journeys, but the last provided the shortest overland way of reaching our chosen mountain.

Our Sikang Expedition numbered four: Richard L. Burdsall, engineer; Arthur B. Emmons 3d; Terris Moore; and Jack T. Young, an American-born Chinese. Emmons and Moore were students at Harvard University.

We set out to do three things: measure the altitude of Minya Konka; make its first ascent if possible; and obtain small collections of the plant and animal life of the region, especially birds and big game.

And ours was truly a National Geographic-inspired expedition, for our first knowledge of the very existence of this mysterious mountain came through the NATIONAL GEOGRAPHIC MAGAZINE of October, 1930, with its stimulating article, "The Glories of the Minya Konka," by Joseph F. Rock.

Since our plans for an expedition to other regions were changed in part by fighting at Shanghai and in North China, we turned eagerly to this new and more fascinating objective.

Until those prewar years little had been known about Minya Konka itself. The mountain was away from the main routes of travel then, and what trails there were lay for the most part in deep valleys. A traveler could then get a glimpse of it only when crossing passes, provided the weather was good, with no clouds intervening.

The Széchenyi Expedition in 1879 observed Minya Konka, called it Bo Kunka, and, taking a 35-mile sight from Dsongo (Yingkwanchai), computed its altitude at 24,934 feet. Many maps of the early 1900's have omitted it altogether or shown it in a wrong position with no altitude mentioned.

* See "Through the Great River Trenches of Asia," by Joseph F. Rock, NATIONAL GEOGRAPHIC MAGAZINE, August, 1926.



Simple Folk Offer Prayers to the God of the Mountain

Before the ascent the two snow-line porters engaged in religious devotions at a makeshift altar. Rice and juniper boughs burned as incense perfumed the air in the base camp meadow. The native Tibetan faith is a form of Buddhism. It recognizes a multitude of minor gods and goddesses. Their grotesque and fantastic images are painted on temple or lamasery hangings.

Even as recently as 1929 there was much speculation about its altitude. On the sketch map used to illustrate their book, *Trailing the Giant Panda*, Theodore and Kermit Roosevelt gave the stimulating figure of 30,000 feet, followed by a question mark. The NATIONAL GEOGRAPHIC MAGAZINE article appearing the following year was more conservative, citing a figure of 25,600 feet.

Our surveying party, consisting of Emmons and Burdsall, started from Shanghai in the middle of June, leaving Moore and Young to complete some final arrangements and secure additional items of climbing equipment.

Story of the Advance Trip

Here is Burdsall's story of the advance trip as he later related it:

We traveled on a comfortable little motor vessel for 1,500 miles up the Yangtze—Great River, the Chinese call it—to Chungking, where we arrived in nine days, a record for the trip. Passing beyond Ichang on the way, we threaded through the famous gorges, whose cliffs rise sheer for hundreds of feet above the dark, swift river.

In spring and summer the tremendous quantity of water poured into the Yangtze by its

upper tributaries must pass through these narrow gorges. Unable to spread out in a flood here, it piles up to great depths. We saw one scale marker painted on a cliff at the head of the Wushan Gorge, which indicated a depth of 105 feet above the normal winter level. The river is reported to rise at times more than 200 feet between high and low water.

Our two engines had all they could do to push us up the rapids, but we did not have to put a cable ashore, as is sometimes necessary.

Changing Steamers at Chungking

At Chungking we changed to a smaller steamer which fought its way for four days up the Yangtze to Ipin and for three more days northward up the Min River to Loshan.

Carved in a cliff on the east bank of the river just below this city is a gigantic seated figure of the Buddha, 196 feet high, of about 700 A. D.

From Loshan we took an extremely rough bus ride to Chengtu, the capital of the big Province of Szechwan, one of the richest and most densely populated in China. A few days later we continued by bus and ricksha to Yachow (Yaan), where we found our baggage. It had been brought safely by porters

under military escort over the direct road from Loshan.

After repacking our 1,400 pounds of equipment, weighing off the loads on a suspended beam scale, we left with a caravan of 18 porters for the 8-day trip to Tatsienlu (Kangting). The mayor of Yachow sent a guard of half a dozen soldiers for the first stage, and we had varying numbers after that.

While there are two shorter roads to Tatsienlu, we took the well-traveled "big road" because of its easier going for our men (page 630).

Road Too Rough for Wheeled Vehicles

Even this road was then too rough for any wheeled vehicle unless the vehicle was taken apart and packed on an animal. In that manner we saw several field guns being transported. One mule carried the barrel, followed by another with a wheel strapped on each side, and a third with the mounting.

In some places the road is built of rough stone steps as it climbs over two 9,000-foot passes. Our contract called for half a catty (one catty: $1\frac{1}{2}$ lbs.) of pork as an extra payment to each of our porters for negotiating these passes, and well they earned it. One poor fellow gave out on the second pass and our headman had to carry his load over.

From Tahsiangling, the first pass, there is an excellent view of Minya Konka which we enjoyed on the return journey, but now the whole pass was enveloped in mist.

We passed a small temple called Buddha's Ear, which marked the halfway point on the road from Peiping to Lhasa. In the days when China had official residents in Lhasa, a fast courier service was maintained between the two "forbidden cities" and from this point a dispatch could reach either of them in 19 days.

It has been estimated that 480 men and 660 animals were employed on the Tibetan section of this service. Urgent documents traveled day and night and could cover the 1,200 miles of rough going from Tatsienlu to Lhasa in 15 days.

Goods Carried by Human Porters

We saw a few pack trains of mules and small horses, but nearly all goods on this road were carried by human porters. The chief article of commerce was tea bound for Tibet. It was packed in woven reed bales, and the porters carried loads of tea weighing considerably more than themselves.

Each man had a T-headed stick on which he could rest his load at frequent intervals. It took 24 days to reach Tatsienlu where the tea was repacked in hides and loaded onto the

"ships of the high plateau," the yak caravans which operated into inner Tibet (pages 631, 648).

The importance of Tatsienlu was due in no small measure to this tea traffic (page 624). Its location may be partially accounted for by the natural approach formed by the Tatsienlu River which has cut a gorge eastward toward China through the mountains down to Waszekow on the Tung River, falling over 5,000 feet in 15 miles.

The scenery had increased in grandeur as we journeyed toward Tatsienlu. The climax came with the trip up through this wild gorge beside the torrent, which comes roaring down among boulders as big as houses in a grand series of rapids and cascades. The gorge was spanned by a number of bridges consisting of a single rope woven of split bamboo. Over each rope slid a wooden sleeve about eight inches long, pulled back and forth by a smaller rope supported by little hoops.

Off for the Mountain

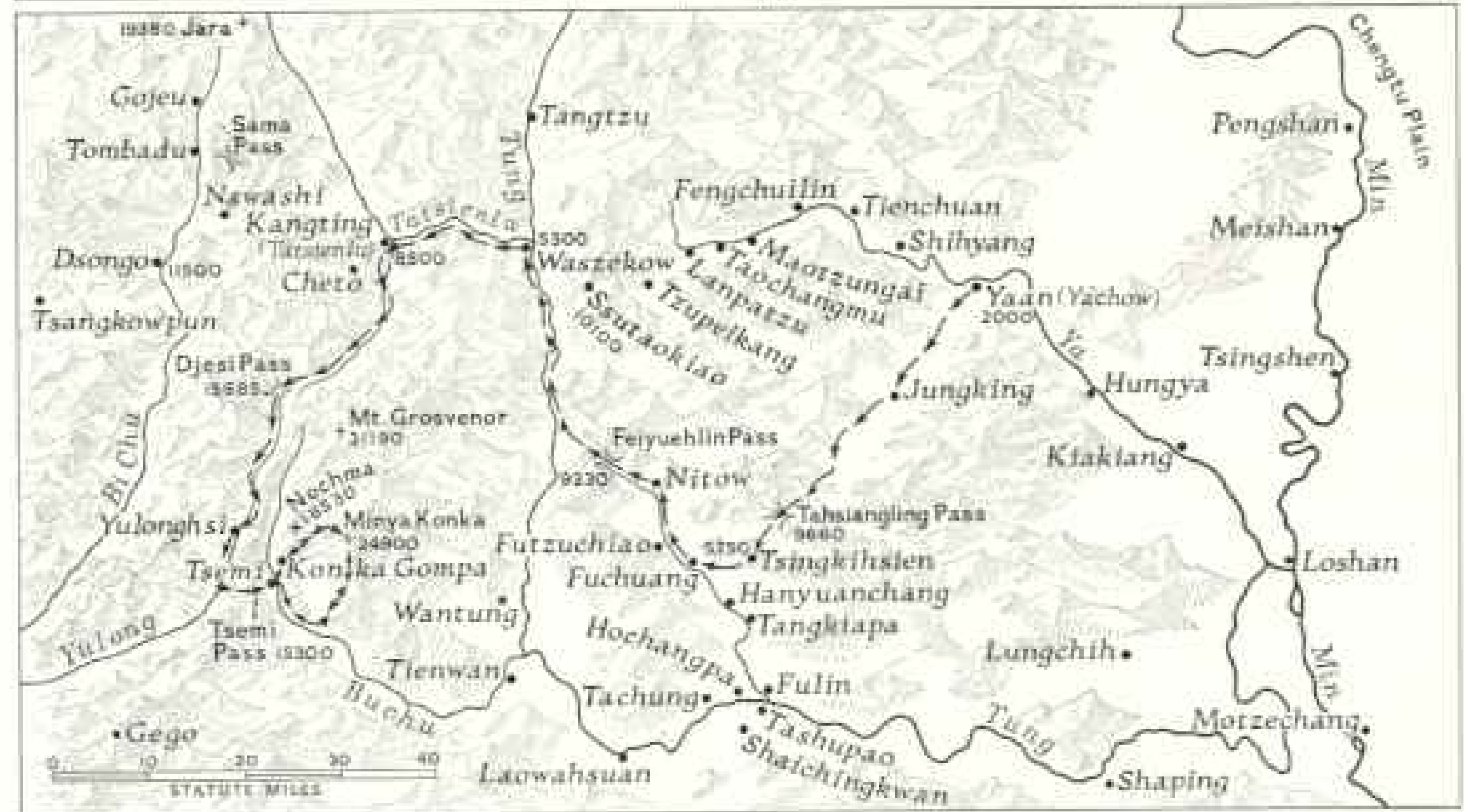
After four days spent in arranging for animals and repacking our loads in Tatsienlu, we started for the mountain. Our papers from Nanking enabled us to use the ancient *ullah* system, whereby some Tibetans furnish government officials with transport at half the regular price instead of paying taxes. We had a caravan of 16 horses and yaks with six Tibetan drivers. Our route lay southward up a narrow valley.

As we ascended from Tatsienlu, which has an elevation of 8,500 feet, we found the evergreens and hardwoods giving way to lower growth and finally to grass and bushes. There were wild flowers in great profusion—asters, buttercups, dandelions, lady's-tresses, paintbrush, yarrow, rock pink, forget-me-nots, and countless others, conspicuous more because of their variety than for individual showiness.

It has been estimated that there are many more kinds of plants in western China than are found in the whole of Europe.

On the third morning we climbed the Djesi Pass, whose summit, like that of all Tibetan passes, is marked by a cairn of rocks, supporting sticks with prayer flags fastened to them. Our barometer showed its elevation to be 15,685 feet. Mist and hail prevented a view of the mountains, so, after Emmons had climbed a near-by hill and erected a cairn for surveying purposes, we descended the southwest side of the pass.

We now found ourselves in the Tibetan grasslands, a country with a beauty all its own. The broad valley was carpeted with short grass and there were low bushes on the hillsides but



Hitherto Remote, Minya Konka Is Now an Air Beacon in the China-India War Route

Life-line planes, carrying more munitions than passed over the Burma Road before that artery was cut, roar within sight of the mighty peak. Minya Konka's summit soars above all the huge border ranges of the southeastern Tibetan Highland. On the detailed map (lower) is shown the course the authors followed in going from Yachow through the border country to the mountain.

no trees. It is too high for crops, but in summer the Tibetans pasture their yaks here. We passed several herds, some with four or five hundred animals.

The yak in this region was about the size of our domestic ox, black, with long horns and a bushy tail. The old bulls were magnificent animals, with long hair reaching nearly to the ground. In spite of their formidable appearance, they seemed to be gentle (page 631).

When we camped for the night, two bulls started snorting a low "huh-huh-huh" and walking toward each other. Our Tibetans seemed pleased at the prospect of a fight, but, by alternately advancing and retreating, the animals managed to maintain a certain dignity without coming to close quarters.

Yak meat is excellent and tastes like beef. The milk is not used as such, but is made into butter, which we bought in cakes four inches square, wrapped in leaves. It is also made into big lumps of hard, sour cheese. The hides have many uses, and the hair is woven into cloth and rope.

As beasts of burden, yaks plod slowly along, the Tibetans urging them on by whistling or gently guiding them back into the trail by hurling rocks at them. Yaks are independent, and like to make a new trail wherever possible. Steep hillsides seem no obstacle whatever. For this reason the roads in Tibet usually consist of many parallel paths.

We camped near a tent inhabited by a man and his wife, an old woman, and two children, who permitted our cook to use their fire. A big Tibetan mastiff tied outside barked ferociously until quieted by the boy.



Gaomo Wears His *Pulu* over One Shoulder in Summer

In winter he pulls it up on both sides. A pocketbook containing a little sewing kit is carried in a turquoise- and coral-studded pouch on his belt. A similar pouch with steel edge contains flints and tinder, with which a Tibetan can "strike a light." Gaomo was the Expedition's cook.

The black tent was surrounded by many tall stakes. Ropes passing over these held the walls out so that few poles were required on the inside. This left more room for the smoke, which was very thick. When I had become slightly accustomed to it, I discovered two little yaks lying near one side of the tent.

Prayer Flags Look Like Radio Antenna

At Yulonghsi we found three widely separated houses, substantially built of stone with roofs of long shingles held down by stones. Above each roof were two masts supporting a string of prayer flags. Seen from a distance, the arrangement looked like a radio receiving antenna.



Chinese Porters Plodding from Yuchow to Tatsienlu Carry Parasols for Protection from the Sun

Over this route passed the ancient trade between Peiping and Lhaza (page 677). The trail is narrow and traffic light, for villages are few and far between. Here the Expedition's men are moving along a stretch of new road where there is danger of sudden slides. Older parts are much safer.



A Yak Caravan Comes in from the Plateau, Unloads Wool, and Takes on Green Tea at Tatsienlu

Though moving more slowly than a walking horse, the yak is a useful beast of burden, living almost entirely by grazing. He is sometimes bred to handle. He supplies Tibetans with hair for their tents, hides for equipment, and meat, milk, butter, and cheese for food. A boy or woman continually walks around the rear and flanks of the procession stinging the laggards or stragglers with small stones from a braided hair sling. To the right is a ferocious black Tibetan mastiff (page 677).



George F. Black

American Warplanes, Winging from India to China, Fly within Sight of Lofty, Snow-capped Mimya Konka

Towering to the height of 24,000 feet, this sheer pyramidal peak is the crowning pinnacle of the range which rises 30 miles south of Tatsienlu, in eastern Szechwan Province, China. Several other peaks in the vicinity are more than 20,000 feet high. In 1952 the author climbed this snowy monarch for the first time.



Like a Swiss Chalet, the Konka Gumpa Lamasery Nestles Almost in the Shadow of Minya Konka

A lama, most pile of prayer stones, and high, narrow prayer flags reflect the atmosphere of worship. Fearing Dordjelutru, god of the mountain, the lamas here wished to prevent climbing attempts, but consented when the visitors said they had made a year-long pilgrimage to offer homage to Minya Konka (page 638).



First Camp Perched on the Snow at 18,000 Feet, Like a Peep Sight Trained on Noehma Peak

A series of four snow-glacier resting places above the meadow base were necessary to put the climbers within striking distance of the summit. A man can climb about four times faster at sea level than he can at 18,000 feet (page 644).



Minya Konka Made a Backdrop for the Expedition's Survey Camp on the Edge of the Plateau



Curious Natives Often Dropped in on the Expedition for a Friendly Call

Common language is not necessary for a good joke! Tibetan is entirely unlike Chinese. Conversation was sometimes in limited Chinese, more often in sign language or through an interpreter. The old man behind Emmons's hat continually fingers the string of prayer beads around his neck.

In addition to this, a Tibetan house usually has a *mani* pile in front of it, consisting of hundreds of stones on each of which is carved the sacred formula: *Om Mani Padme Hum*—which means, literally, "O the jewel in the lotus, amen."

Each syllable stands for one of the six classes of beings which inhabit the living and spirit worlds: Gods, Titans, Men, Beasts, Yidah, or hungry ghosts, and the Inmates of Hell. The prayer is to enable them to escape from the wheel of life and enter into Nirvana. We saw many of these *mani* piles along the trails, and always passed to the left of them.

A few miles northeast of Yulonghsi, just over the top of a high ridge, we found a good campsite beside a tiny lake at an elevation of 14,900 feet. Our Tibetan cook, Gaomo, who could speak some Chinese, objected to camping near the water because of spirits, so we told him he might place his tent beyond a little knoll (page 629).

When he saw that we were bold enough to camp by the lake, he evidently decided that our protection would be sufficient and quietly pitched his tent close by.

Rainy weather was due soon, so we lost no time. By the next afternoon, August 1, we

had selected two summits on the ridge and erected 7-foot stone beacons upon them. From these points we planned to measure the angles to Minya Konka, though as yet we had not seen it.

First Glimpse of a Mountain Giant

At camp late that afternoon, however, the clouds broke away and gave us a fleeting glimpse, brief but sufficient to satisfy us that here was one of the great mountain giants of our planet.

Next morning the whole range stood out sharp and gray in the early light, part of it reflected by our little lake. An imposing spectacle confronted us: a glorious one as the sun rose, changing the gray to dazzling white save where the rocks were too steep to hold the snow.

The mountains stood seven miles away to the east, across the deep Buchu Valley, while beyond a second little valley rose Minya Konka. We had been told that "it sticks right up," and indeed it did, towering far above its huge neighbors in stern and matchless supremacy.

The next three weeks were busy ones, and by August 18 we had measured the angles



Young and Burdsall Display Heads of Himalayan Blue Sheep

These animals are common on high grassy benches near the snowline in the Minya Konka range. They provided the expedition with much-needed fresh meat. Jack Young is wearing metal goggles with transverse slits. They do not provide full vision, but are a good emergency substitute for snow glasses.

with a transit to Minya Konka and 25 other mountains. Also, we measured a base line in the Yulonghsi Valley, extended it by triangulation to our two high stations, connected our camp with the high stations, and took time and azimuth observations to determine the true directions of our lines of sight.

We were none too soon, for the rains now began in earnest and three inches of snow fell on the night of August 22. We remained in camp making computations and taking additional readings with our delicate mercurial barometer.

This instrument was the "baby" of our expedition. Emmons and I had taken turns walking with it, not daring to ride, and during the rough bus trips it had to be held so it would not be jarred severely or strike the floor or roof.

A New American Climbing Record

Our care was now rewarded, for it was the first mercurial barometer to reach this region without breaking, and we knew that now for the first time a figure for the height of the mountain would be nearly accurate.

The average of a series of 70 observations on the barometer and the altitude of the sum-

mit above our survey camp found by triangulation ultimately indicated 24,900 feet as the height of Minya Konka above sea level. Although we could not determine final figures in the field, we realized that a successful ascent would set a new American altitude record.*

Could Minya Konka be climbed?

From our position the northwest ridge looked excessively steep; the north and west faces were impossible cliffs. But what about that southern shoulder? If it could be attained, the route from there to the summit offered some hope. The southern shoulder was inaccessible from our survey camp position. The only chance was that it might be gained from the other side. To reach a point from which this might be determined was our next aim.

We assembled a caravan of yaks, dismantled our survey camp, and as the side of the Buchu Valley was here too steep for animals, descended again into the Yulonghsi Valley.

*Higher altitudes have since been reached by Americans (Mr. Burdsall, coauthor of this article, accompanied one expedition) in an unsuccessful attempt on Mount K2 (Mount Godwin Austen, in India), but Minya Konka still remains the highest mountain successfully scaled by Americans.



Back and Knee Do the Work in a
"Chimney" of Compressed Snow

Glaciers on Minya Konka are in slow but almost constant motion. This crack in an otherwise vertical and virtually impassable wall increased to almost eight feet during one week.

This descent was steep enough by a zigzag trail, but one of our yaks took a notion to run straight down with a trunk banging on each side. The fact that breakable articles in one of them survived is a tribute to the skill of Emmons in packing them.

We traveled down the Yulonghsi Valley and crossed Tsemi Pass (page 646) to the hamlet of Tsemi, which consists of two houses. Here a small stream serves both body and soul; it accomplishes the former by driving a grain mill and the latter by turning a prayer wheel, capable of producing a multitude of prayers at each revolution.

As we had to wait at Tsemi for a change of animals, we determined to make an overnight visit to the Konka Gompa lamasery described by Dr. Rock (page 633).

This lamasery is perched on the side of a little valley which farther up runs toward the west face of Minya Konka. Down its middle runs a big glacier which terminates just short of the lamasery. We heard that the head lama was away on a visit to Lhasa, but we were well received by the one in charge.

Entering the main building, which surrounds a courtyard, we were ushered into a small room which was so dark and smoky that at first we could see nothing. Gradually we perceived that the center was occupied by the standard Tibetan hearth, about four feet square, paved with earth, and surrounded by a small wooden ledge.

On an iron frame was the usual shallow iron pot, 18 inches wide, with wooden cover. Smoke from the fire under it filled the upper part of the room and escaped through two small openings.

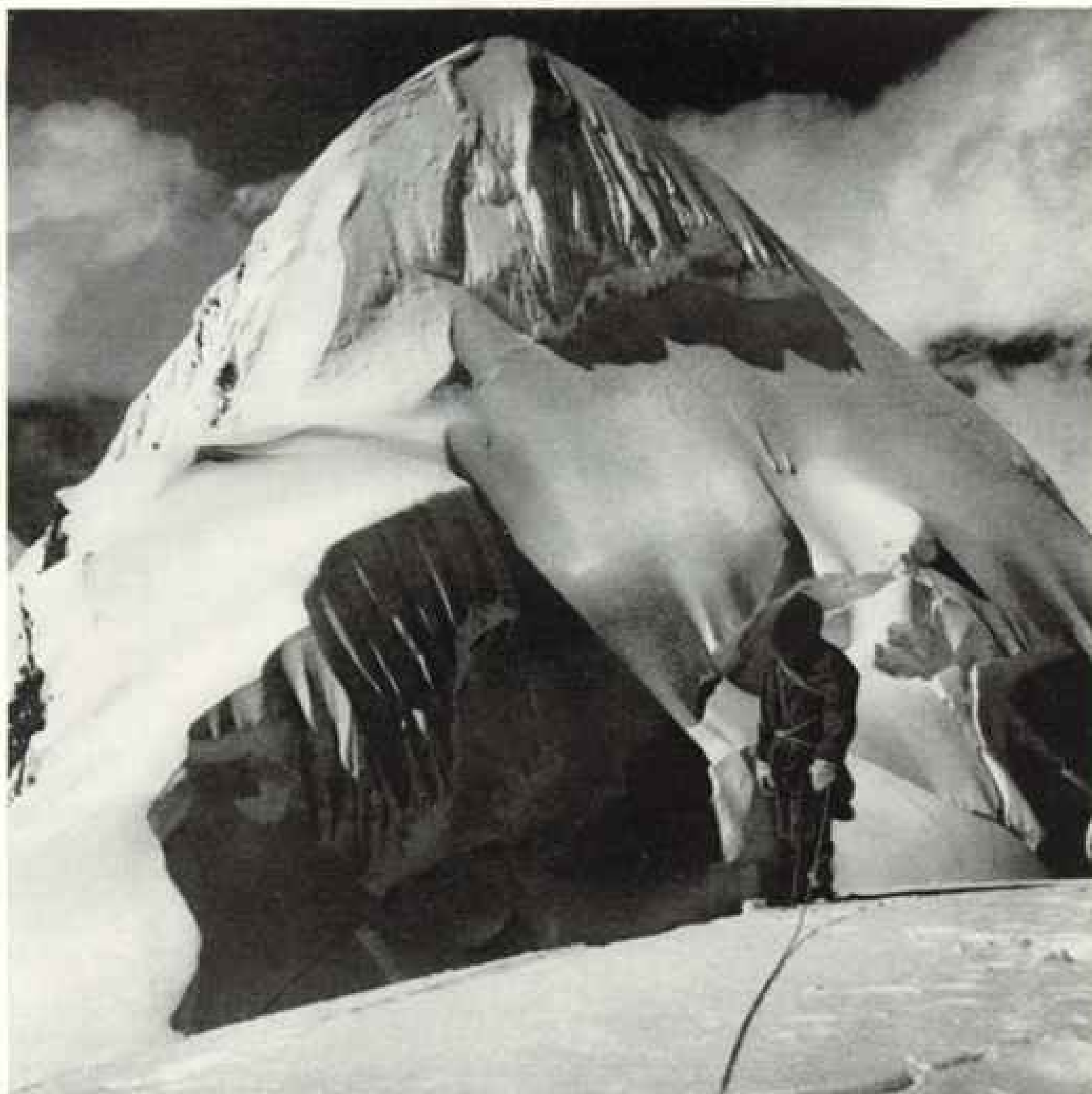
Two old women were there, and they had us sit on some low stools before the fire. Gaomo, our servant, sat on the floor (page 629).

Tea Mixed with Butter and Salt

They refilled the big pot with water and, as it came to a boil, threw in a handful of coarse tea. A few minutes later they took some out in a big dipper and poured it into a wooden churn, a foot in diameter and three feet high.

Working the dasher up and down, they thoroughly mixed it with butter and salt. Gaomo had his own wooden bowl, which every Tibetan carries, but they gave us china ones, first carefully wiping them out with a dirty rag. Politeness demanded that we drink, and it was not really as bad as it sounds, though the mixture tasted more like soup than tea.

Then they passed a wooden box of *tsamba*, which is barley parched and ground into a fine white flour. We mixed some of this into



The "20,000-foot Hump" Is a Real Problem at Close Quarters

Emmons and Moore stop to look back at the icefalls and crevasses by which they passed around the dome. Returning, they chose instead to traverse higher up and to the right across the broad, smooth slope above the leader's head. A section of the ice cornice at the very top of the "hump" broke under Moore's feet, nearly causing a tragedy.

our tea, kneading it into a dry paste and eating it with our fingers.

Though rather tasteless, it is good food and is the staple diet of the people throughout Tibet. With a leather bag of tsamba, some tea, and a little butter and salt a man is equipped to go on a long journey.

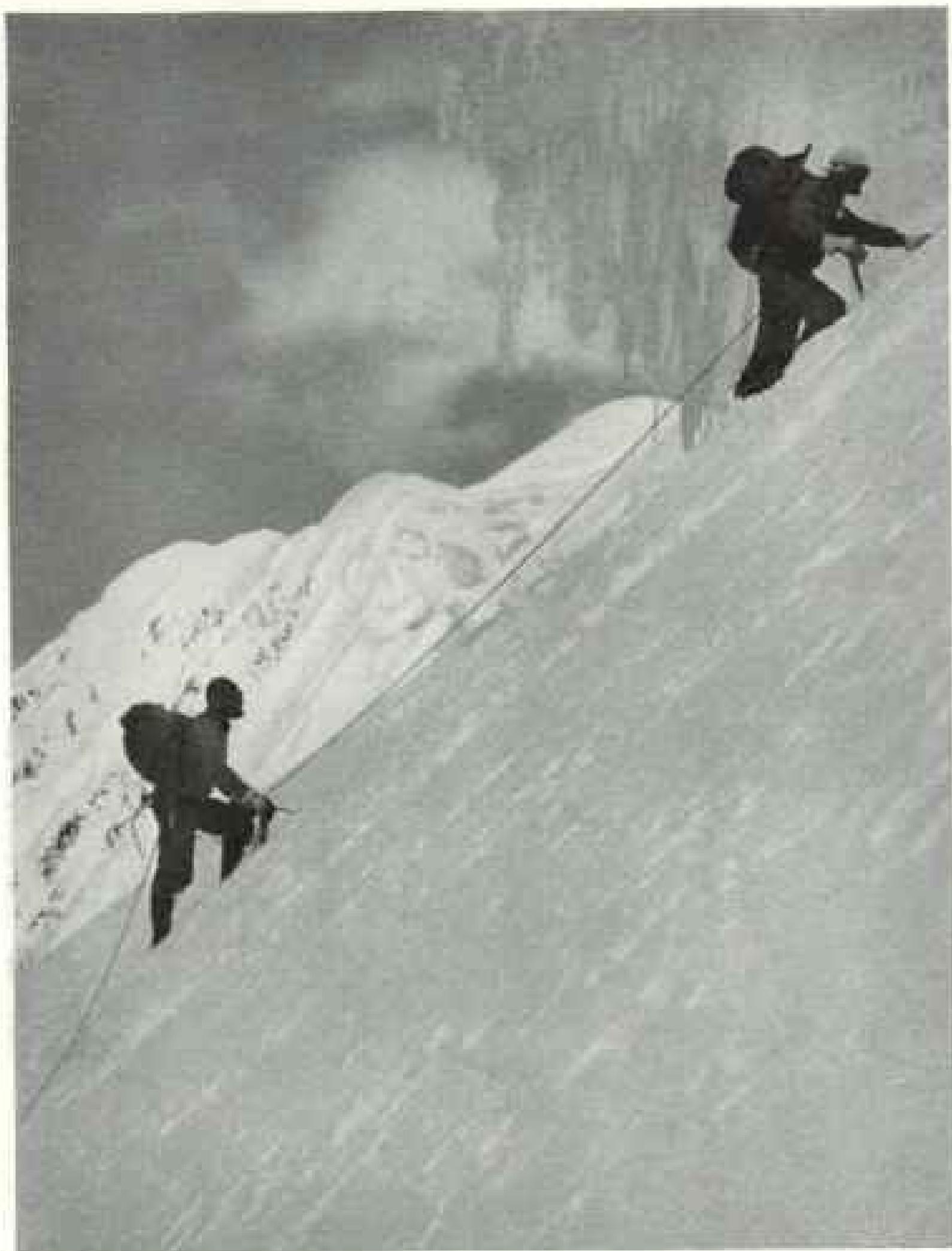
We made considerable use of it ourselves, generally cooked as cereal for breakfast, but were glad that we were close enough to Tatsienlu to send for other delicacies.

Another woman had come in while we were eating, together with a very old man twirling a prayer wheel. The scene reminded us of

the witches' scene in *Macbeth*, and if, instead of "Om Mani Padme Hum," the old lama had muttered, "Double, double toil and trouble," he would have been as prophetic as the witches in the play.

A lama showed us to a large room for the night, but before turning in we staged a performance of our own, by setting up the barometer and taking the temperature by whirling a small sling psychrometer, which they may have supposed to be a potent foreign prayer wheel.

At dawn the next morning we were awakened by the mournful crowing of a lone white



Expedition Members Climbed, Carrying Their Own Equipment

Many useful lessons were learned which now are of value in the equipping of mountain troops of the U. S. Army (pages 644, 650). Moore (above) and Burdsall approach the crest of the northwest ridge, about 19,500 feet up. Behind the leader icicles hang from a sérac, or giant ice block, protruding from the sloping glacier (page 648).

rooster and soon afterward heard the voices of some boys reciting their lessons. At least one boy from each family in Tibet is sent to a monastery and becomes a lama.

It was amusing to watch one of these little neophytes reading aloud from his Tibetan book in a most emphatic manner, jerking his head with each syllable.

Moore and Young joined us about this time and from here on the entire party moved together. We were glad to see our friends. The former had traveled all the way to Manila where Governor General Theodore Roosevelt, Jr., had given him impressive letters of introduction to a certain high Tibetan lama.

Completing the reconnaissance of the great south shoulder of Minya Konka which Emmons and Burdsall had started, Moore and Emmons, by climbing to 19,000 feet, discovered several hopeless gaps in this route.

Here was a blow. The only remaining chance of climbing the mountain now lay along the tremendous northwest ridge. Several weeks had been used up in futile reconnaissance and the season was getting late, since we were coming into October; so we turned every effort to the northwest ridge (pages 641, 643).

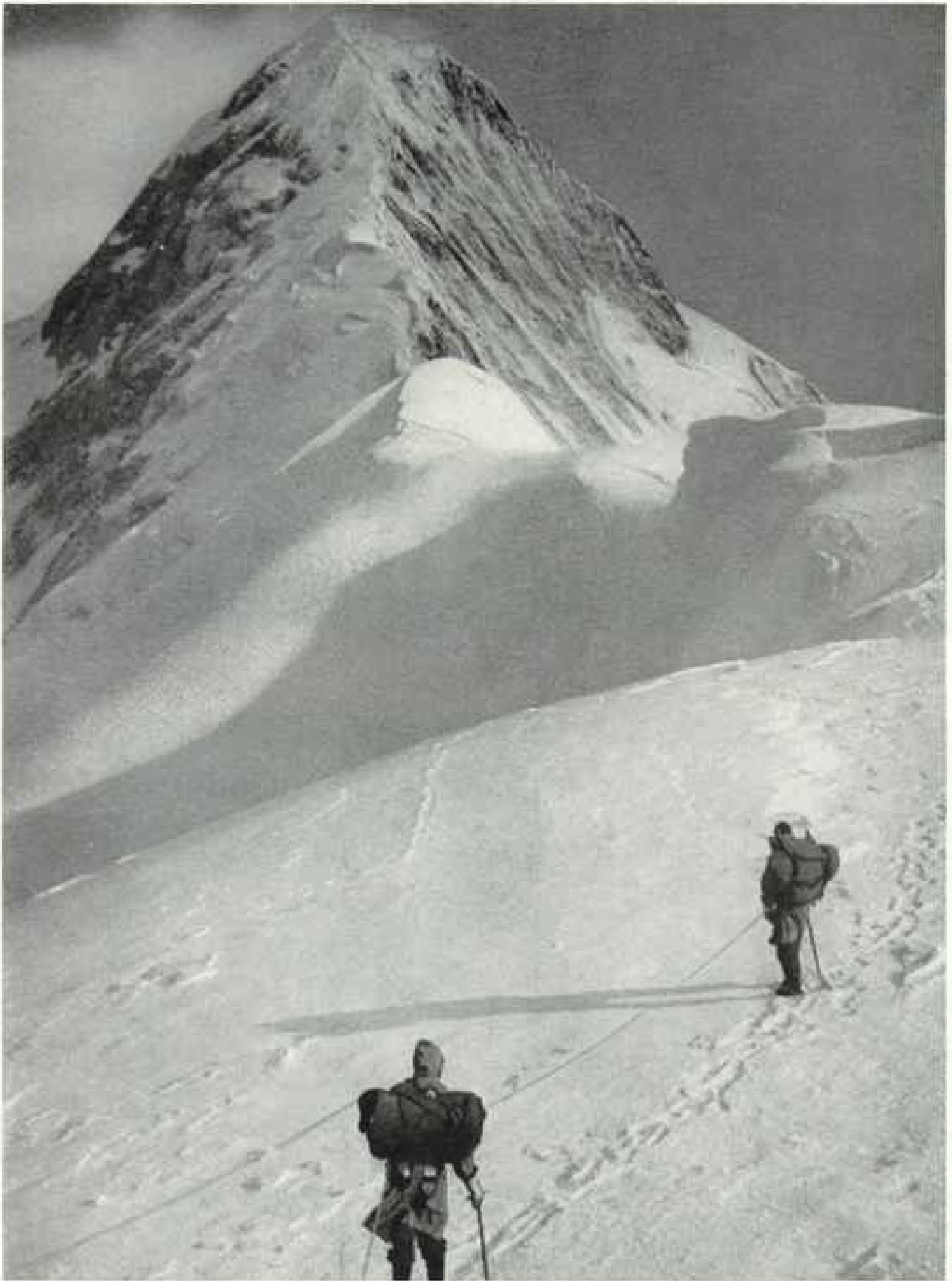
Breaking our reconnaissance camp, we returned to the lamasery, which offered a convenient starting point. The lama in charge received us hospitably and placed a room at our disposal.

But several days later, when he learned what we proposed to do, he objected.

Minya Konka, it was explained to us, is the abode of Dordjehutru, the mountain god, who should not be dis-

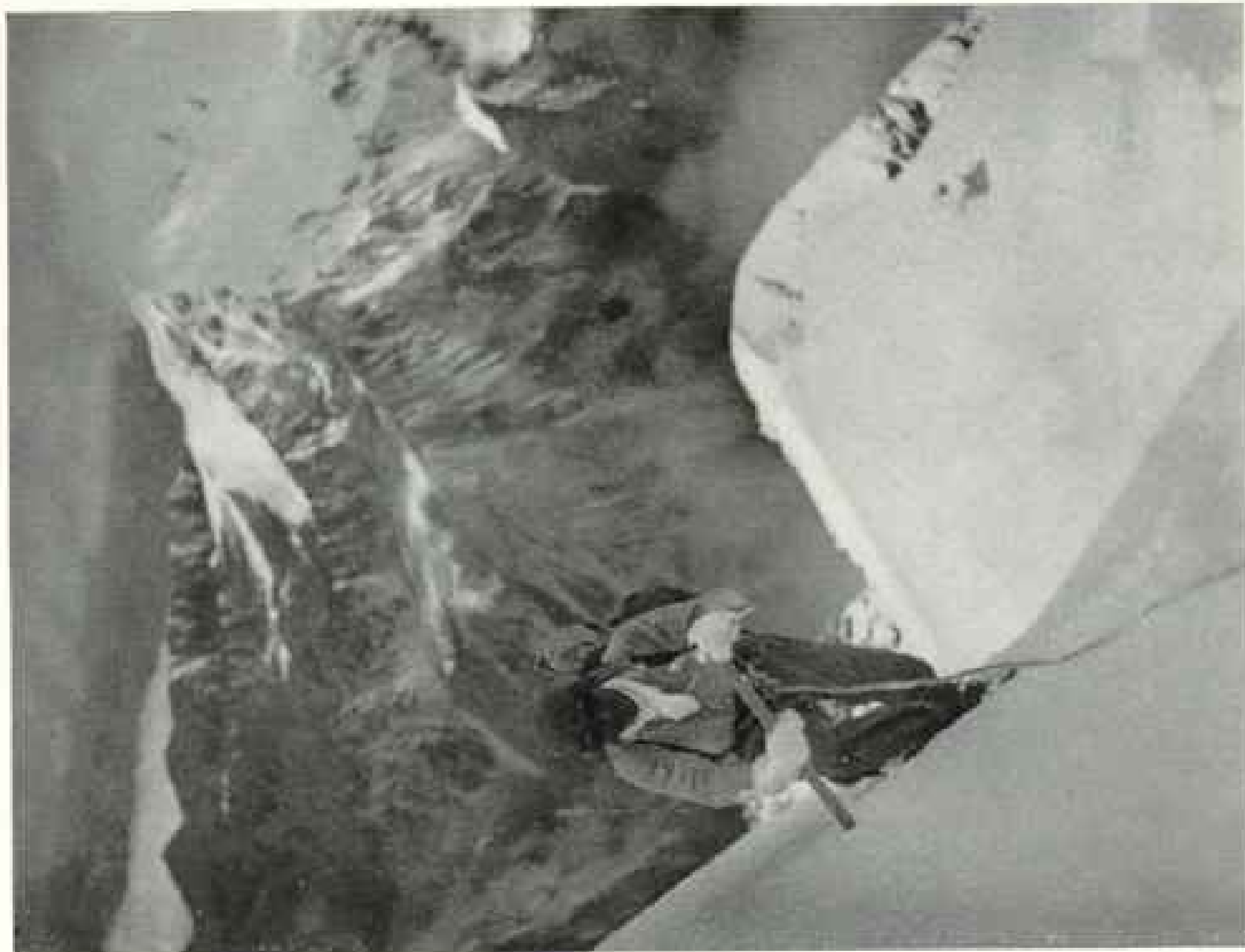
turbed. We were told that when Dr. Arnold Heim, Swiss geologist, had visited the mountain, there had followed severe hailstorms which caused much damage to the crops.

Jack Young's diplomacy now stood us in good stead. He told them we were worshippers of mountains; that we had crossed the great water and made a pilgrimage of a whole year to visit this object of our veneration. With this plea and small contributions for prayers and the burning of incense, he finally reconciled them to our going (page 626). Gao-mo would not accompany us, so we sent him to Tatsienlu to fetch some much-needed supplies, including kerosene and rupees.



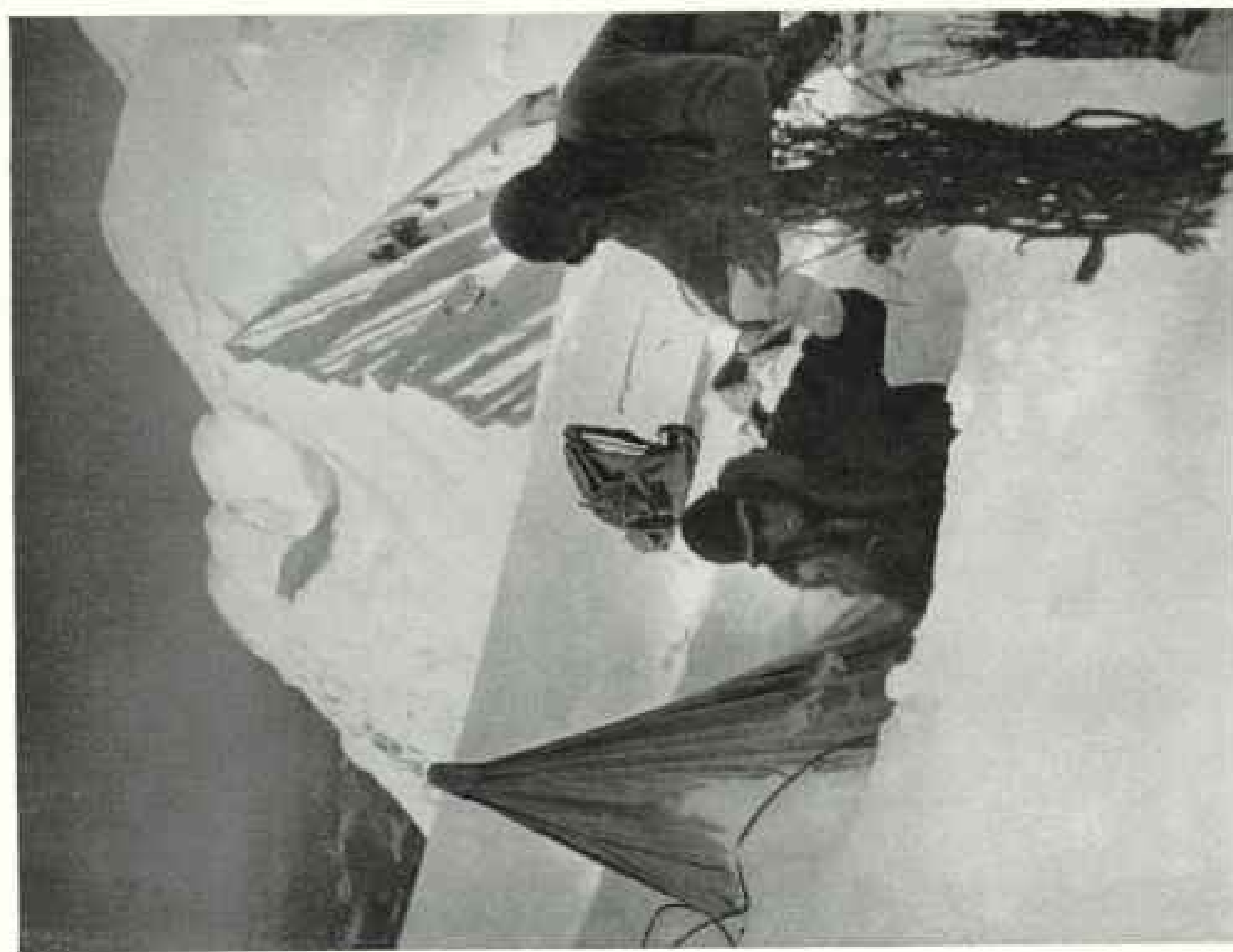
From Minya Konka's Great Northwest Ridge, the Summit Beckons in the Distance

On the summit there is less than two-fifths as much substance to the atmosphere as at sea level. Although aviators must normally take oxygen before reaching this altitude, climbers are able to do without it. The body adjusts itself to rarefied air when an ascent is made over a period of several weeks (page 644).



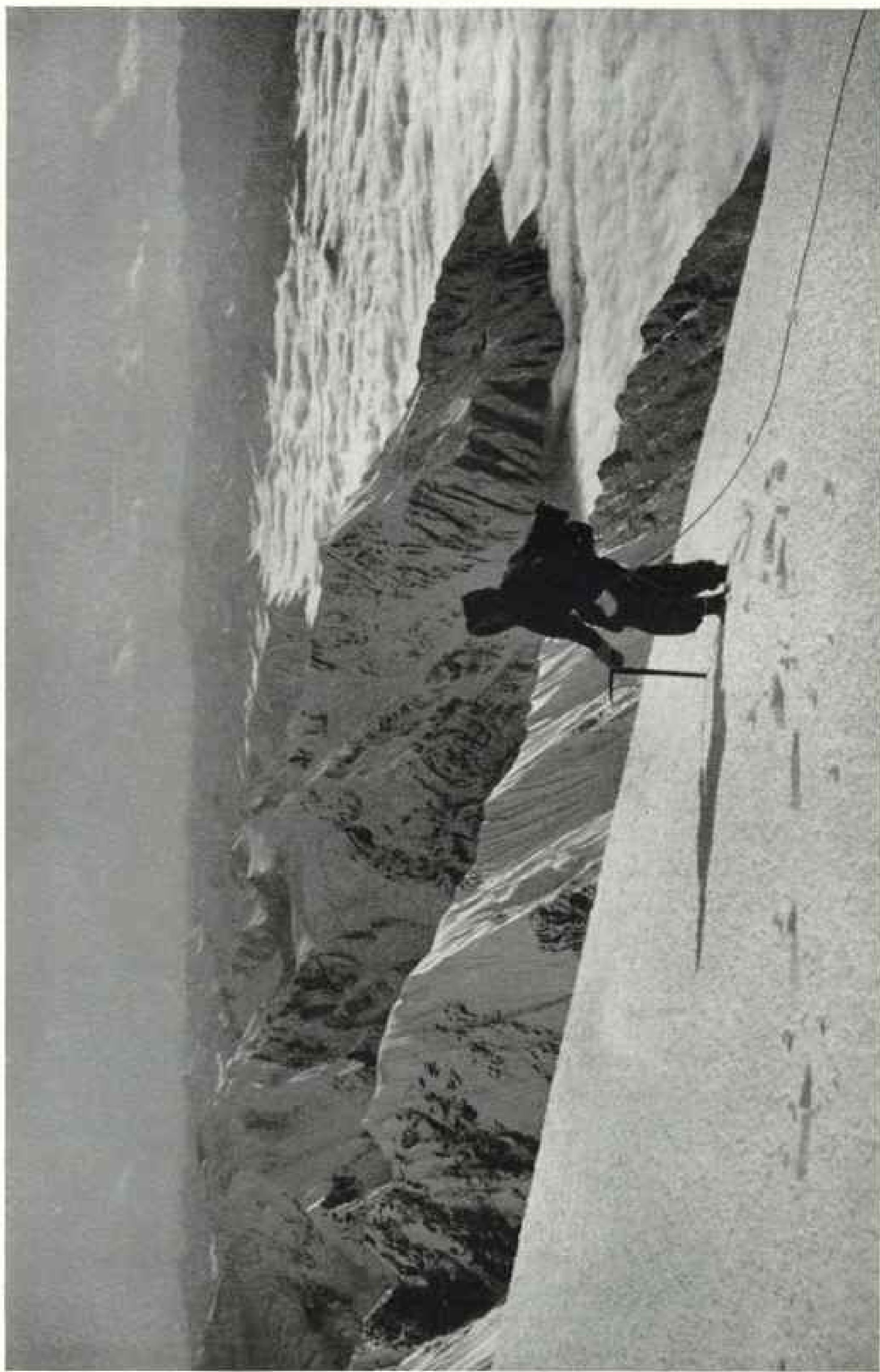
Jack Young, American-born Chinese, Proves a Good Climber

A ticklish passage about 15,000 feet up is negotiated with mountaineering rope and ice ax. The leader cuts the steps. Goggles must be worn on glaciers. After the ascent of Minya Konka, Young left the expedition temporarily to make a complete circuit of the range and to collect wild life.



A Shifting Drift Half Buried the 20,000-foot Camp

While the climbers were absent one day, a change in the prevailing west wind heaped snow around the tent. Fortunately, they had not collapsed it; otherwise it would have been lost. Bunbles in the right foreground are willow-wand trail markers.



High in a Dream World, Climbers Look South along the Edge of the Tibetan Plateau

From the crest of the northwest ridge, at 21,000 feet, they survey a vast sea of clouds nearly two miles below (page 640). Once at this great height a flock of small birds passed near. The basic principle of clothing at these altitudes is a light parka forming a windproof outer shell, with several layers of wool worn under it.

Next morning, October 2, we started with six porters, one of them a woman. After fording with some difficulty the swift, icy stream below the monastery, we followed the northern tributary of Minya Konka's large west glacier. This huge river of ice no longer fills its former bed and the contraction has left a V-shaped valley on each side.

We ascended the one on the west for about five miles to a point where it opens out into a small grassy meadow at the foot of the northwest ridge extension. A clear stream flowed along one side of the grassy meadow, and on the hillsides above we found some firewood. The elevation was 14,415 feet.

Snow often fell at this level in the night but melted off during the morning, leaving the pretty little blue gentians which dotted the meadow none the worse for their white blanket.

Here then, on the little isolated meadow, surrounded by high mountain walls, we established our base camp. A few hundred yards north of our tents rose the foot of a huge moraine over a thousand feet high.

Above, this merged into an extension of the northwest ridge leading to the mountain itself, whose summit now towered more than 10,000 feet directly above us.

Young had persuaded two porters to continue to help us from our new base camp up to the permanent snow line, which in one place rose as high as 17,000 feet. But it would be impossible to have their assistance higher than this—the very place it would be most useful—because we had no snow glasses, boots, crampons, ice axes, and high-altitude wind clothing for porters.

Still, there was some consolation in this, for if we succeeded in climbing Minya Konka, it would be by far the highest mountain ever climbed without the help of porters.

Climbing Knowledge Useful to U. S. Troops

All previous Himalayan expeditions (and all since) have depended very largely upon native porters for the establishment of their high camps. But in Alaska, where there are no native porters, American climbers and explorers have developed a technique of cutting down to bare essentials, using only the lightest-weight equipment, then carrying these minimum needs on their own backs.

Even before coming to Tibet we had planned to try out this peculiarly American technique. Now, because of the vicissitudes in the Japanese-Chinese war zone at Shanghai, through which we had come and lost much of our equipment, it became a necessity.

Little did we realize then that our rather peculiar knowledge would later become useful

to the United States Government in choosing equipment for its mountain troops.

Using what might be called the Peary polar method, whereby the establishment of one camp is primarily for use as a springboard for the next, we erected four camps during the course of the ensuing weeks, each higher and higher on the snows and glaciers of Minya Konka.

The first was situated at about 18,000 feet, halfway along a sort of "flying buttress" leading up to the northwest ridge (page 634).

The next was right on the horizontal crest of the great ridge itself, at about 19,800 feet.

The third was well along the ridge just below the start of the final pyramid, at about 20,700 feet. The highest camp we finally succeeded in erecting at 22,000 feet, halfway up the final pyramid of the mountain. This left some 3,000 feet to climb on the day of final dash for the summit from the night camp.

Judging by our progress as we neared this highest camp, 3,000 feet was just about as far short of the summit as we dared place the highest camp and still have a chance of making the round trip in one day.

At these altitudes men move with incredible slowness. At about 18,000 feet you have left half the earth's atmosphere below you. At this altitude, or even lower, aviators commonly begin to take oxygen, to avoid losing consciousness.

On the summit of Minya Konka less than two-fifths of the earth's normal atmospheric density is left to the climber. Acclimatization and the amazing adaptability of the human body, if given several weeks to make the adjustment gradually, enable a man to climb with a load on his back to altitudes at which he might possibly die if carried up suddenly from sea level by airplane.

Among these physiological adjustments is a large increase in the number of red corpuscles in the blood (page 641).

After several weeks of working these camps forward, returning for rest to the base camp, and then going back to the final push, the two of us and Emmons found ourselves one night in the highest camp discussing plans for the next day.

Our position was now fully extended. We were established here in Camp IV with food enough for a few days. There were some additional supplies, but no tent, at Camp III and a good reserve at Camp I. With satisfaction we prepared our supper that evening.

We had a number of Chinese biscuits, frozen as hard as rocks, which we would thaw out, split, and then toast over the Primus stove. In doing this, Emmons's knife slipped and cut



Moore Places Old Glory Atop Minya Konka, 24,900 Feet, Highest Mountaintop Ever Reached by Americans

To prove the ascent, a complete 360° overlapping photographic panorama was recorded. The Chinese flag was also flown at this point in honor of the Government whose official permission sanctioned the expedition.

a gash in his left hand clear to the bone.

The cut, though satisfactorily dressed with our tiny first-aid outfit, was such that he could not handle rope and ice ax well enough for the climb ahead. It was a great disappointment to all three of us that we could not make the attempt together. Emmons, however, cheerfully volunteered to hold down the camp and offer some support in case of need, while the two of us tried for the summit.

A High-altitude Chess Game

To be as fit as possible for this attempt we took a day of rest and played several games of chess with a little pocket set. After several hours of marching and countermarching, Burdsall proved the winner. It would be interesting to know whether the art of chess has ever literally reached a higher level!

At 3:40 a. m. on October 28 Camp IV was illuminated by a tiny candle lantern, which cast its feeble rays over the folds of our three sleeping bags. While the two of us pulled on our boots and windproof parkas, Emmons started the Primus stove and warmed up some oatmeal, cooked the evening before.

At this altitude the simplest tasks require great effort. Snow must be melted for drinking water, but opening the tent door to get some of the lumps piled within reach was quite a chore.

Breakfast over, we crawled out into the darkness. The stars were brilliant and the gusts of wind, which had threatened to wreck the tent during the night, had temporarily ceased. We put on our crampons and the climbing rope, and each took a bundle of the willow wands brought as markers to help us find the way back in case of storm (p. 642).

With a "Good luck" from Emmons, we started at about 5 o'clock. Moore led with a flashlight while Burdsall followed, feeling for the steps with his hands.

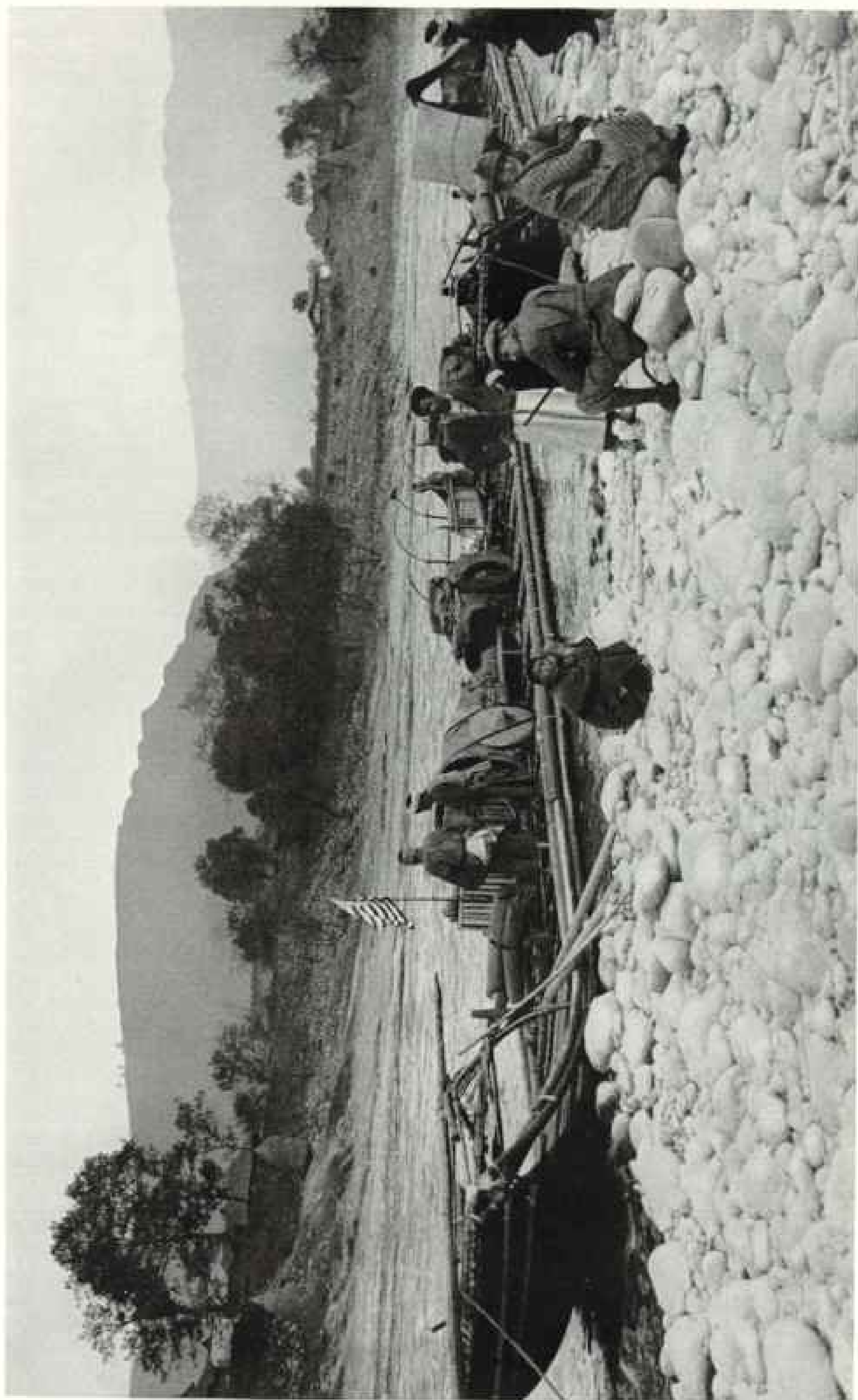
The planet Jupiter shone brightly up to the left of the summit. After half an hour of complete darkness it began to grow light, and a little later, though we were hidden from the sun, we could see its rays striking the peaks behind us with brilliant light.

Now stretching far to the west appeared the purple shadow of our mountain, which presently grew shorter and disappeared as the sun



A Sea of Clouds Fills the Valley between the Edge of the Tibetan Plateau and Minya Konka Range

An almost continual westerly gale sweeping across the plateau usually confines these monsoon clouds to the valleys. The summit is barely visible at the right center. Here in Tachin Pass, altitude about 15,300 feet, Terris Moore is moving toward Tatsunbu with the injured Emmons (page 653).



Homeward Bound! Expedition Equipment Is Loaded on Bamboo Rafts at Yachow to Float Down the Yu River

A Tibetan eared pheasant captured near the foot of Mt.yn Konka was brought out alive in the cage (at left, on raft). This and other birds were presented to the Academia Sinica at Nanking and placed on display. There they remained until the Japanese sacked China's former capital.



Tea Porters Carry Far More Than Their Own Weight

Packages in these standard shapes sometimes tip the scales at 24 pounds. Paid according to weight, these men try to take as much in one load as possible. Human labor is so cheap it even undersells animal transport here. The men stagger along for a hundred yards, then rest their loads on T-shaped staffs. Only a few miles are covered in a day.

climbed higher. He was our rival with the silent admonition, "Make haste; in a few short hours I start my descent."

We Tackle Steeper Climbing

The snow was hard and windblown, with frost flowers on it in many places. At one spot we were bombarded with these, which were blown off from above and came driving down the ridge with great force. We followed the route which Moore and Emmons had made ten days before, and in some places these earlier tracks were still visible.

At 8:30 a. m. we reached the highest previous point and soon afterward came to the

outcropping of rocks.

Up to this point we had marked the trail, but as the day promised to remain clear we now discarded our sticks and were freer to tackle the steeper climbing. We moved carefully one at a time, belaying each other, and our hopes rose as we found that the climbing was not as bad as we had feared.

Finally we could leave the rocks and turned left up a smooth snow slope on the north face of the mountain. During his high reconnaissance two weeks before with Emmons, Moore had made a careful study of the ridge through field glasses and he remembered it so well that only once did we have to retrace our steps for a few feet.

Suddenly we came to a place where we could see the ridge leading onto the summit, only a quarter of a mile distant, but before us stood a group of séracs covered with lumps of crystals like snow cauliflowers. These proved the greatest obstacles encountered during our climb, but steps had

to be cut in only a few places (page 640).

Above these our way lay up a crooked narrow ridge, but the going was easier. We still climbed at fair speed, considering the altitude, but had to stop frequently for spells of hard breathing.

At 2:40 p. m. we reached the top, climbing onto an oval platform about 20 feet long running east and west. Fifty feet beyond was another oval of similar size running north and south, the snow between being a few feet lower.

We walked over to this second oval, which was the highest spot, keeping well away from the eastern edge where we feared there might

be a cornice caused by the prevailing westerly wind.

At Last, on the Summit!

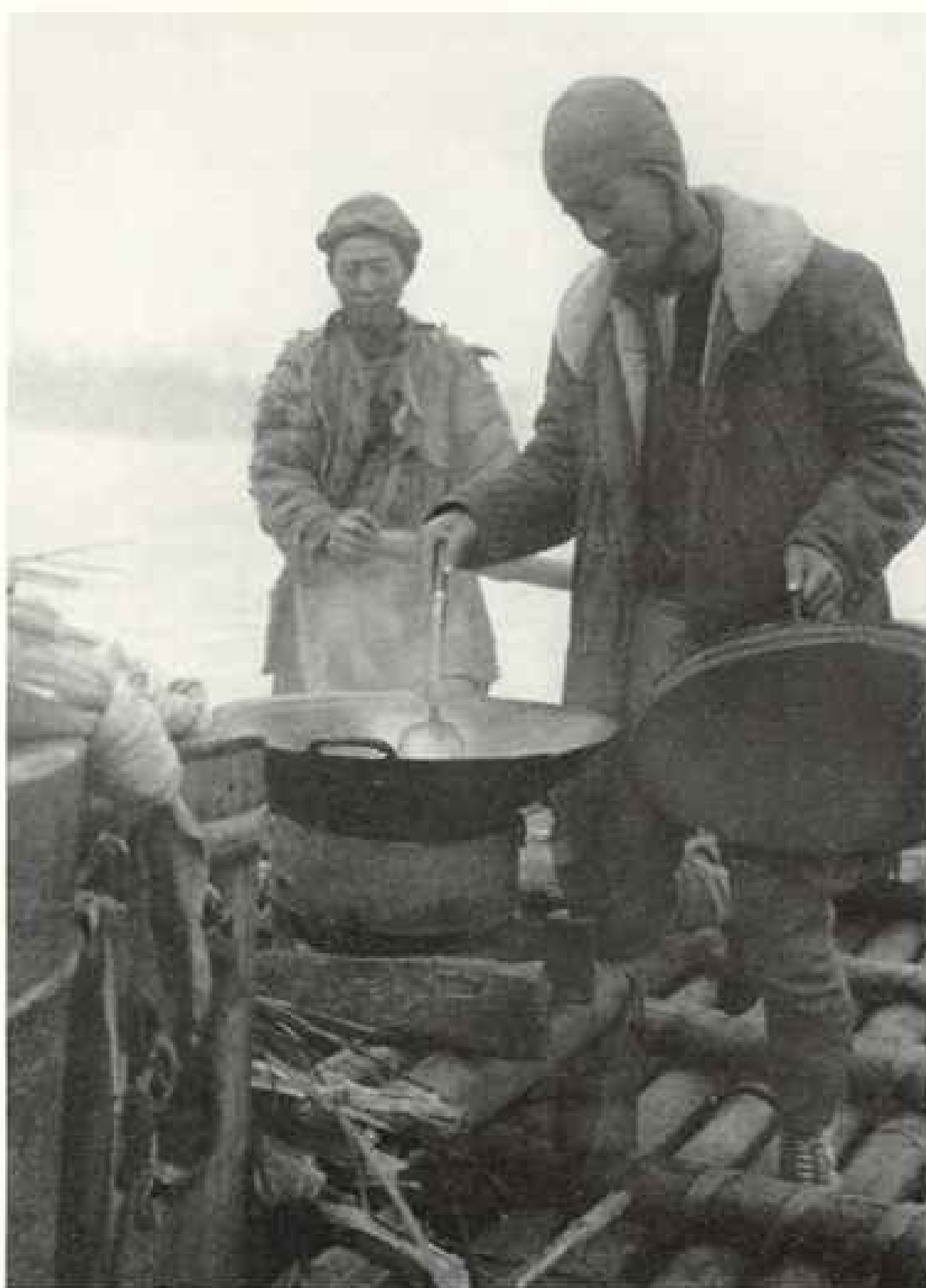
It was difficult to realize that we now actually stood upon the spot so high in the sky toward which Emmons and Burdsall had sighted their transit in August and toward which we had all labored so hard for the past month.

From our great height the view was vast and superb. To the north were the magnificent snow and rock peaks of the Minya Konka and neighboring ranges, whose summits had long since yielded and sunk below our horizon. Beyond them, 55 miles away, rose the solitary Jara.

Eastward as far as the eye could reach stretched a sea of clouds covering the Chengtu Plain, but pierced by a few nearby rocky islands. To the south were some fine snowy peaks. Beyond them and westward toward Tibet was a vast rough ocean of blue mountains, with here and there a white crest. Three high peaks appeared on the southwestern horizon and another directly to the west.*

Now we recorded about 30 photographs, including a 360-degree photographic horizon panorama, and pictures of the American and Chinese flags at the highest altitude they had ever reached (page 645). Finding this had consumed over an hour of our brief time, we at once started the descent from the summit.

The wind had been increasing, and on the narrow edge of the ridge it now became terrific. At times we crouched down the better to brace ourselves against it. The same velocity at sea level would probably have been irresistible,



Jack Young Cooks Wild Duck on the Bamboo Raft

Probably because of the scarcity of shotguns among the local population, waterfowl are plentiful on the Ya River. For several days the expedition, heading homeward, floated down the river to the Yangtze.

but here the air, being only two-fifths as dense, did not have so much force.

As we descended farther, and the sun fell behind the horizon, the wind moderated. We proceeded carefully now, belaying each other over the difficult places. Just before dark we reached our high camp, where Emmons received us with warm congratulations and hot soup.

In spite of an overwhelming desire to get down off the snow, we rested late the next morning and by the time we had made up our

* The three have been identified as the Konkaling Peaks, described by Joseph Rock in the *NATIONAL GEOGRAPHIC MAGAZINE* of July, 1931.

packs it was almost noon. Between Camps II and III Emmons began to suffer excruciating pains in his right foot and discovered that both of them had been frozen. It must have happened when we were establishing Camp IV.

Although he had spent two days and three nights at this camp, nearly all of the time in his sleeping bag, his feet had not become warm enough to reveal their condition.

Our progress down the steep slope below Camp II was slow, for Burdsall was not feeling well and could not descend at normal speed.

Emmons, who had discarded his pack, now detached himself from the rope and hurried on in an attempt to get down before his other foot thawed out.

We descended slowly with our packs, to which we had added a few articles from his, following his tracks to make sure he had not gotten into trouble.

When we reached Camp I, as darkness was descending, we found "O. K. Art" scratched upon the snow. We could see his tracks continuing down to the snow line and assumed that he would reach the base camp.

In this, however, we were mistaken, for down on the moraine his left foot thawed out. This made it impossible for him to walk, so during the night he crawled to some water and passed the remaining dark hours there.

Next day he was taken down by our two porters who previously had been instructed to make daily trips up onto the moraine to look for us.

Porters Carry Emmons to Lamasery

The following day they carried him to the lamasery where Young had secured porters and animals, and Moore made a quick trip with him to Tatsienlu, where he arrived after four days and nights of terrible suffering. Burdsall followed a few days later with all of the equipment (page 646).

Dr. R. L. Crook of the American Baptist Mission in Yachow was reached by telegraph and came in fast time to Tatsienlu. Emmons's sleeping bag was placed upon a stretcher, and we accompanied him on the 8-day journey back to Dr. Crook's hospital at Yachow.

Although suffering intense pain, he continually displayed an indomitable cheerfulness that was an inspiration to everyone. Amputation of all the toes eventually proved necessary.

But Emmons has been physically so un-

affected by this misfortune that two years later he capped a climbing season in the Alps with participation in another Himalayan expedition, personally reaching twenty thousand!

He says he is a better fancy rock climber now, because with no toes in the way and with special short boots he can get his feet and body closer to the rock walls!

Young Goes Hunting

Jack Young joined us ten days later. After arranging for our transportation from the lamasery to Tatsienlu, he set out on a hunting expedition which took him into the Lolo country to the southeast.

Returning to Tatsienlu by an eastern route, he completed a circuit of the Minya Konka range.

With the assistance of native hunters and porters he had obtained a good collection of animals, including a group of blue sheep, or bharal (page 637), goral, wild boar, musk deer, a monkey, a black bear, and the little-known brown or grizzly bear, called *drema* by the Tibetans. The status of this bear is still debatable, some scientists considering it a distinct species. Young also captured a live Tibetan eared pheasant, a large white and black bird, called "horse chicken" by the Chinese.

Finally the time came when we loaded all of our baggage and specimens onto a long bamboo raft, with the pheasant in a wooden cage near the bow, and started on the first stage of our journey back to Shanghai (page 647).

We said farewell to Emmons, leaving him under the care of Dr. Crook in Yachow, where he was confined to the hospital for several months. His misfortune was the one casualty on our expedition, which had successfully accomplished its three objectives.

Passage of time and the war have brought great changes to the widely scattered members of the Sikkang Expedition. Jack Young is with the Chinese war government in Chungking. Burdsall is an engineer working at Port Chester, New York. Emmons is a secretary in the American Embassy at Montevideo.

Moore's war work goes right back to the rough country around Minya Konka: he is expert consultant to the Quartermaster General in the matter of light-weight practical equipment for mountain and ski troops.

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To carry out the purposes for which it was founded, fifty-five years ago, the National Geographic Society publishes this Magazine monthly. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

Articles and photographs are desired. For material The Magazine uses, generous remuneration is made.

In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region, The Society's researchers solved secrets that had puzzled historians for three hundred years.

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On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to the world altitude record of 72,395 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

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The Society cooperated with Dr. William Beebe in deep-sea explorations off Bermuda, during which a world record depth of 3,028 feet was attained.

The Society granted \$25,000, and in addition \$75,000 was given by individual members, to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California were thereby saved for the American people.

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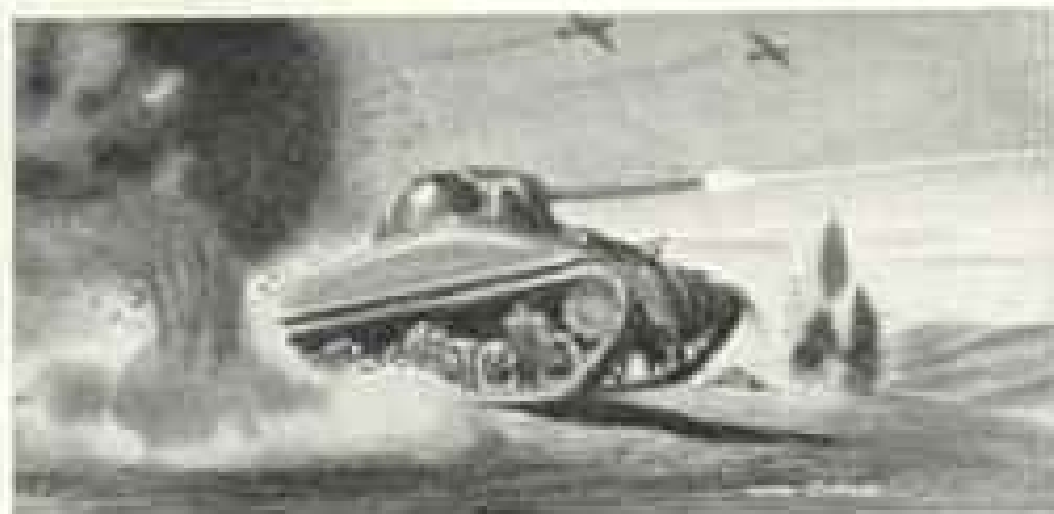
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1. In North Africa, American tanks—equipped with a special Westinghouse gun device—are giving American forces new striking power. These tanks, unlike enemy tanks, are able to fire with incredible accuracy at full speed over rough grounds.



2. In Russia, American planes—supporting the ground forces—are helping to win battle after battle. Westinghouse builds parts for these planes, provides vital equipment for producing the aluminum and magnesium from which they are made.



3. On the Seven Seas, helping to keep our supply lines open, are scores of Westinghouse products. Among them are turbines, gears, electric drives, motors, anti-aircraft gun mounts, instruments and controls.



4. In the Pacific, Westinghouse-built "walkie-talkies" and other types of communications equipment, X-rays, bomb-fuses, anti-tank shells, and other weapons are doing their share to lick the Japs.



5. In the Bombing of Germany, delicate, precision-made aircraft instruments and radios direct our planes to their targets. Much of this blind-flying and navigating equipment is made by Westinghouse.



6. On the Production Front, Westinghouse products—from generators to motors, switches, transformers, automatic controls—are on the job in hundreds of war plants . . . helping win the battle of production.

Tune in the Westinghouse Program starring John Charles Thomas—N B C Network, Sunday, 2:30 P. M., Eastern War Time.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

FOUND:

THOUSANDS OF TONS OF BRASS!

In one of Buick's busy plants, large calibre shell cases are now being built of *steel* instead of hard-to-get *brass*.

Coming from the line by the thousands, these cases mean an important saving in a highly critical material.

But, you may ask, doesn't this simply mean that our already-burdened steel-producing facilities have to turn out just that much more steel?

The answer is—not at all! Through careful redesign and development of new methods on other of our war jobs, Buick has effected important savings in steel too.


These are more than enough to offset a load on the steel

mills that might have been involved in this switch from one material to another.

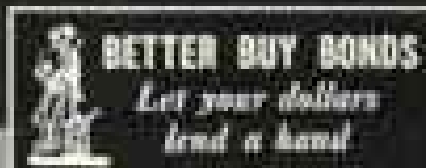
It is very much like finding several million pounds of brass every year—not by accident, but in reward for a patient, careful process that goes on constantly in Buick plants.

We're *always* looking for ways to save materials of any kind. Even a fraction of a pound per piece produced is not too little to get our prompt attention.

Such care pays, as this instance proves. It makes all materials stretch—and there is no better way of making sure our fighting men get plenty of what they need to win.



war bonds
**WHEN BETTER AUTOMOBILES ARE BUILT
BUICK WILL BUILD THEM**



BUICK DIVISION OF **GENERAL MOTORS**



Eugene Ormandy Another painting by Boris Chaliapin in the Magnavox series of great contemporary musicians

Music was in his blood . . .

AT the age of three he learned to play the violin . . . at seven, he was admitted to a class in counterpoint . . . at seventeen he became a professor of music.

Today, the dynamic baton of Eugene Ormandy guides one of the most celebrated groups of musicians ever assembled. Although still a comparatively young man, he is the Conductor and Music Director of the world-renowned Philadelphia Orchestra.

The audiences of this famous orchestra are not limited to the few who can purchase tickets. Superb Ormandy recordings have brought to millions the rare delight of great music greatly interpreted.

To appreciate the true quality of these Ormandy records, you should hear them reproduced with life-like fidelity by a Magnavox radio-phonograph.

Because of its superb tonal qualities and unmatched clarity, this unique instrument has been chosen by discerning music lovers and many of the world's greatest makers of music.

Music Cheers Fighting Men

Our boys in the Army and Navy *need* music. It can give them endless hours of relaxation and pleasure—can help them forget hardships and dangers. See your Magnavox dealer for a wide selection of records to send to *your* soldier or sailor.

BUY WAR BONDS FOR VICTORY TODAY—SECURITY TOMORROW



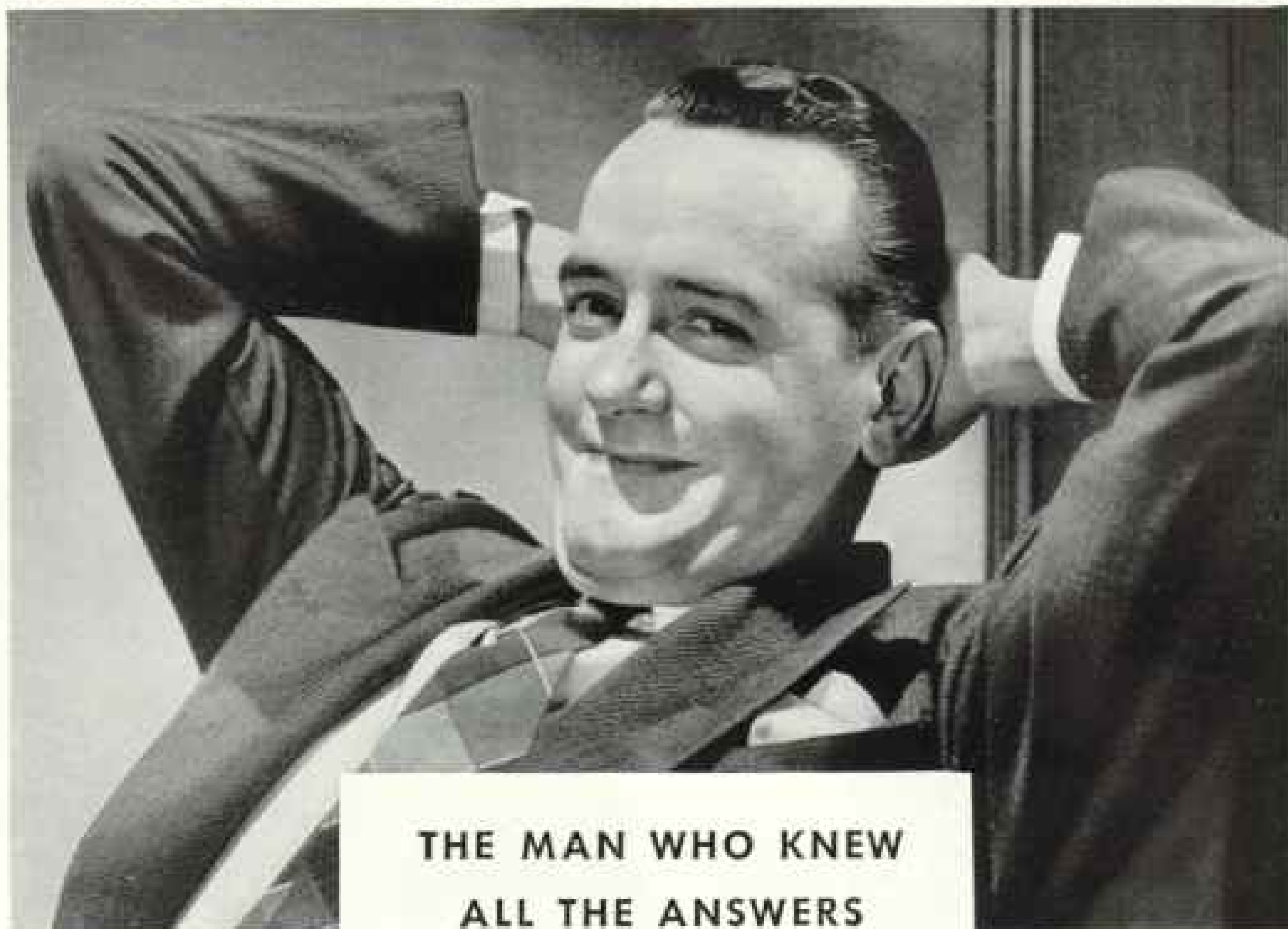
The fine craftsmanship which won for Magnavox the first Navy "E" award (and White Star Renewal Citation) among instrument manufacturers has made these radio-phonographs the first choice of discriminating buyers.

The Magnavox Co., Fort Wayne, Ind.

Magnavox

THE OLDEST NAME IN RADIO

>>> THE FUTURE BELONGS TO THOSE WHO PREPARE FOR IT <<<



**THE MAN WHO KNEW
ALL THE ANSWERS
BUT ONE**

INSURANCE agents found Doug Lounds easy to see, but not so easy to convince. "Putting them through their paces," Doug called it.

Somewhere in the back of his mind, Doug really intended to buy life insurance—some day. Yes, his Prudential man's arguments did make awfully good sense. But Doug kept putting it off.

Then one night Doug's wife threw a surprise party for his birthday. And suddenly, in the friendly joshing about his age, Doug saw the years piling up on him. Of course he felt fine—but... maybe now would be a good time to do something about life insurance.

So next time Doug's Prudential man brought up the life insurance plan they had talked over, fully expecting a kidding, he got a client instead. Doug said okay, signed the application, and took his physical examination right away.

At that point, the unexpectedness of life showed up. Doug Lounds said "yes"—but the doctor said "no". . . and the application was turned down.

So Doug Lounds now has to build his family's future the hard way. He knows from experience that the Prudential phrase, "The future belongs to those who prepare for it," should have an important word added at the end—"today."

***The Best Time to Begin Planning
for Tomorrow Is Today***

Since 1875 it has been The Prudential's privilege to help make people's future more secure.

Through Prudential life insurance, more than eight million families are making sure that part of the world of tomorrow will belong to them.

Wouldn't it be a good idea to invite The Prudential to do the same for you . . . today?



PRUDENTIAL
INSURANCE COMPANY OF AMERICA
Home Office: Newark, New Jersey

AS A SERVICE to the government and to you, Prudential representatives sell War Stamps. Buy some today!



Reprinted by request

Many requests have been received for copies of this dramatic Flying Fortress picture. Reprints, 24 x 22 inches, free from advertising, are now available on a special heavy stock suitable for framing. If you wish one, address Studebaker, South Bend, Indiana, enclosing 10c to cover mailing cost.

When the above Flying Fortress picture was first published in Studebaker advertisements last Fall, America's air might was just beginning to be felt in the Pacific and European war theaters. Today the Flying Fortress is spearheading one successful offensive operation after another. And every Studebaker man, who is privileged to help build Wright Cyclone engines for this invincible dreadnaught of the skies, follows



the news of Flying Fortress victories with justifiable personal gratification in a job well done. Besides producing large quantities of Wright Cyclone engines for this devastating Boeing bomber, Studebaker is also turning out much other war matériel, including tens of thousands of big, multiple-drive military trucks. Studebaker is honored by its assignments in the arming of our Nation and its Allies.

Studebaker BUILDS WRIGHT CYCLONE ENGINES FOR THE BOEING *Flying Fortress*



The greatest enemy our Air Force has to meet!

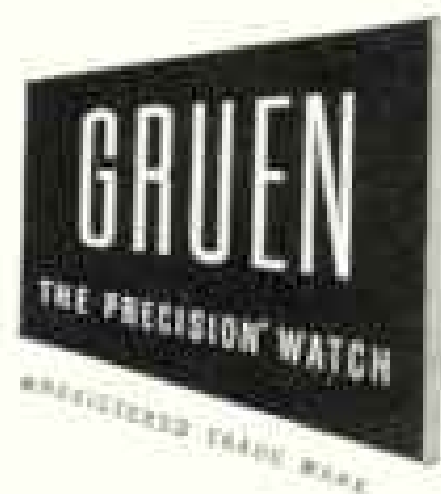
- It's ice . . . ice that can coat a plane at the rate of $3\frac{1}{2}$ inches a minute!

Fortunately, most of our planes are equipped with automatic de-icers . . . rubber edges on wing and tail that are automatically inflated with compressed air when ice reaches a certain thickness. This breaks the ice covering . . . then the rushing air catches it . . . whips it away!

The instrument that measures the ice thickness is an electrical indicating instrument . . . one of more than 200 that guard the lives and increase the efficiency of our flying men.

Because these instruments must be made with all the precision of a fine watch . . . we at Gruen have been asked to turn our 69 years' experience in this field to making instruments of this type for all services.

That is why you may be unable to obtain the particular Gruen watch you want. But we know when you think of the reason . . . you'll understand. The Gruen Watch Company, Time Hill, Cincinnati, Ohio, U.S.A. In Canada: Toronto, Ontario.



BUY A GRUEN
WATCH. BUT
BUY A WAR
BOND FIRST

AMERICA'S CHOICE SINCE 1874

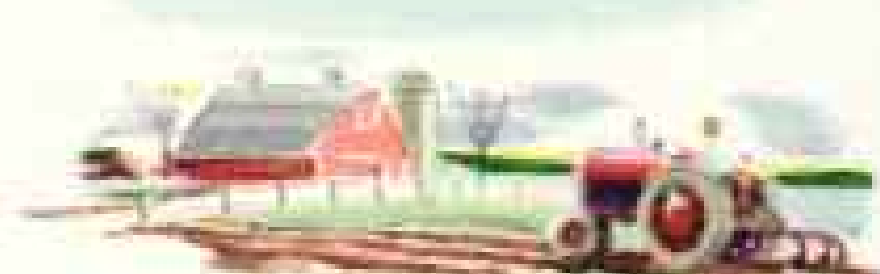
ANOTHER GREAT CHAPTER IN RAILROAD HISTORY



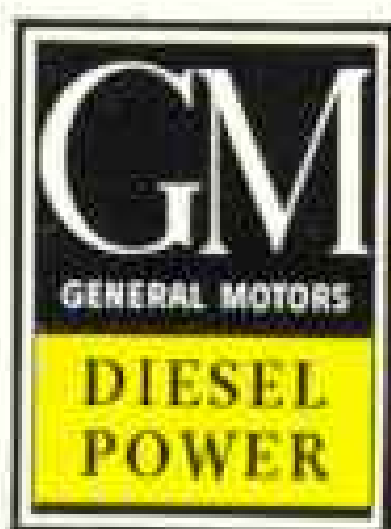
Here Carrier and Ives, the famous portrayers of American life in the past century, picture their idea of the ultimate in convenient travel—a train of the 70's rolling through the cut outside Jersey City.

Today GM Diesel Locomotives speed passengers from Chicago to Los Angeles, 2227 miles, in 41½ hours, a business-day faster than in the middle nineteen thirties. In recent war emergencies GM freight locomotives on the Santa Fe have been an important factor in the rapid movement of precious war material between Chicago and the Pacific Coast.

THE history of America is a history of progress in transportation. ★ This history is not completed. ★ General Motors locomotives have turned a new page in this record of progress. ★ The flowering of this new era when peace again returns is foretold in the tremendous strides already taken in meeting the challenges of war today.



Pages will be turned too in farm and industrial history. For GM Diesels will be ready to serve wherever America needs power.



LOCOMOTIVES ELECTRO-MOTIVE DIVISION, La Grange, Ill.

ENGINES: . . . 300 to 3000 H.P. . . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

ENGINES: . . . 15 to 250 H.P. . . . DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.



BUY
MORE
WAR
BONDS

Uncle Sam takes stock of his Milwaukee Road States of America

What a wealth of commodities and products!

Winning the "war of movement" is just as important to all of us as winning the war of the production lines and fighting lines.

Our transportation facilities must not fail us . . . and America's railroads already have given convincing proof that they'll do their job adequately.

In the twelve states served by the Milwaukee Road, Uncle Sam has a vast store of resources needed to help sustain both the fighting front and the home front for the duration. Look at the map above and you'll get some idea what this territory means to the war effort.

The Milwaukee Road today is efficiently handling more traffic than ever before in its history. And 35,000 loyal and patriotic employees are determined that the wartime transportation records they've established will be maintained.





Tough? These new SYNTHETIC RUBBER soles wear twice as long as leather!

EVERY general knows that a soldier is no tougher than his feet. That is why, back before the war, both the Army and Marine Corps made rubber soles and heels "regulation" on field shoes—because tests proved good rubber long outwore any other material on the march. And it is easier on the feet than old-style hobnails.

But when Uncle Sam began calling millions of men to the colors, Goodyear foresaw that our troops might eventually be deprived of these longer-wearing, foot-cushioning soles as the nation's rubber reserve dwindled. So many months ago we set our Research Department the task of developing comparable soles and heels from Chemigum, Goodyear's own synthetic rubber.

Now after many trials Goodyear is ready with Chemigum soles and heels that not only wear as long as natural rubber—*more than twice as*

long as the best leather—but possess a plus advantage not found in either rubber or leather. This is Chemigum's impermeability to acids, oils and greases that cause both leather and rubber to soften and swell. As a result, Chemigum soles and heels are definitely superior for wear in engine rooms, auto repair shops, gasoline stations, oil fields, barnyards and in many industries.

Thus once again Goodyear has anticipated an emergency and is ready with the answer. Should the rubber shortage force the Army to give up its present shoe construction, Chemigum

soles and heels can be produced as rapidly as adequate quantities of this synthetic rubber can be made available. And with the expanding output of

new synthetic plants, built as part of the government's rubber program, these better shoe products will ultimately be available to all.



GOOD YEAR
 THE GREATEST NAME IN RUBBER

Chemigum—T. M. The Goodyear Tire & Rubber Company



Sailor...
 if we were passing
 out the medals, we'd
 pin a handful
 on you!



There's no fun and no glory in getting your tanker through to North Africa . . . taking your cargo through Submarine Alley to Archangel . . . or pushing through the lonely stretches of the Pacific with supplies for the boys in New Guinea.

Sailor, you don't even have a uniform to show that you're in the service of your country . . . no stripes or bars for the times you've been dumped into the cold Atlantic by torpedoes . . . but, with or without them, we know you couldn't do more for your country.

We can't send the medals, but we're glad and a little proud, to be sending Scotts to your tankers and your cargo ships as fast as we can build them for you . . . to give you hours of *safe* radio listening, to ease the strain of tense days and nights of watching, watching and wondering. Listen to news broadcasts or favorite programs from home, at all hours, safe from detection by enemy direction finders—the Scott Marine Model Receiver never rebroadcasts a signal or betrays a friend.

Our tribute to you, Sailor, and the men of the merchant marine is personal and sincere. We know what hardships you must endure, and we want you to know that with us, as with every real American, your service rates with *any* of the armed forces for courage, toughness and high devotion to your country's cause.



SCOTT
Marine Model
 LOW-RADIATION
RECEIVER

* The Scott Marine Model is for shipboard use exclusively. Due to present restrictions, we regret that it cannot be offered to individual purchasers.

E. H. SCOTT RADIO LABORATORIES, INC.
 4450 Ravenswood Avenue, Chicago





Wedding without bells

The scene above is a familiar one at the Boeing plant in Seattle.

It shows the front and rear halves of a Boeing Flying Fortress* fuselage being joined in mechanical wedlock on the final-assembly floor . . . each section so precisely and perfectly manufactured that joining them together, and "hooking up" pre-installed wiring, controls and cables, is a matter of minutes.

In manufacturing so complicated a product as the huge Boeing B-17 under war conditions, the best production system is the one which is *most compact* (for it is essential to make every unit of

plant space a production asset), *most flexible* (for new combat experience may dictate that design be modified "overnight" without holding up production), and *fastest* (for the scene above can never be familiar *enough*, until the war is won).

The Boeing system of short-flow, multiple-line production fulfills all three of those conditions, and results in the *highest output in the aircraft industry per man, machine, and unit of plant space*. Essentially, it is a system based on "breaking up" the airplane into sections, completing each section on a short assembly line, and

finally wedding the major sections into a completed airplane which could, if necessary, be flown away from the final-inspection station.

It is this manufacturing skill and efficiency — combined with Boeing know-how in design, research and engineering — which have made Boeing-designed and Boeing-built Flying Fortresses, Stratoliners* and Pan American Clippers so outstanding in the aviation world.

It is these things, too, which will some day make the phrase "Built by Boeing" stand for better peacetime products in a free world.

DESIGNERS OF THE FLYING FORTRESS • THE STRATOLINER • PAN AMERICAN CLIPPERS

BOEING

*THE TERMS "FLYING FORTRESS" AND "STRATOLINER" ARE REGISTERED BOEING TRADE-MARKS



So proudly they sail

All across the seven seas they sweep, these ships of our Merchant Marine, their wakes weaving the pattern for the fabric of a free world.

And deep in the heart of every ship... standing watch with every lonely look-out... keeping the vigil on every bridge... pervading every fo'castle... is a spirit born on the day "Old Glory" was run up the hal-yards of an American ship for the first time—and waved its challenge of a new freedom to all the world.

Men chained to the highways of the earth cannot entirely appreciate the traditions of American seamanship that were so nobly

begun on that day... and are being so gloriously enhanced today. But they can pause and give thanks, humbly, that the men and ships now sailing under the American flag are possessed of the strength and will to perform their herculean task. Without them, there could be no hope for Victory.

★ ★ ★

AGWI is proud to be a part of this Merchant Marine, now sailing with Uncle Sam at the helm, which is building the road to victory. It will be proud, too, after it has returned to its normal peace-time routes, to help convert the high hopes for world-wide cooperation from a wartime goal to one of the thrilling realities of the post-war world.

ATLANTIC GULF and WEST INDIES STEAMSHIP LINES

Foot of Wall St., New York

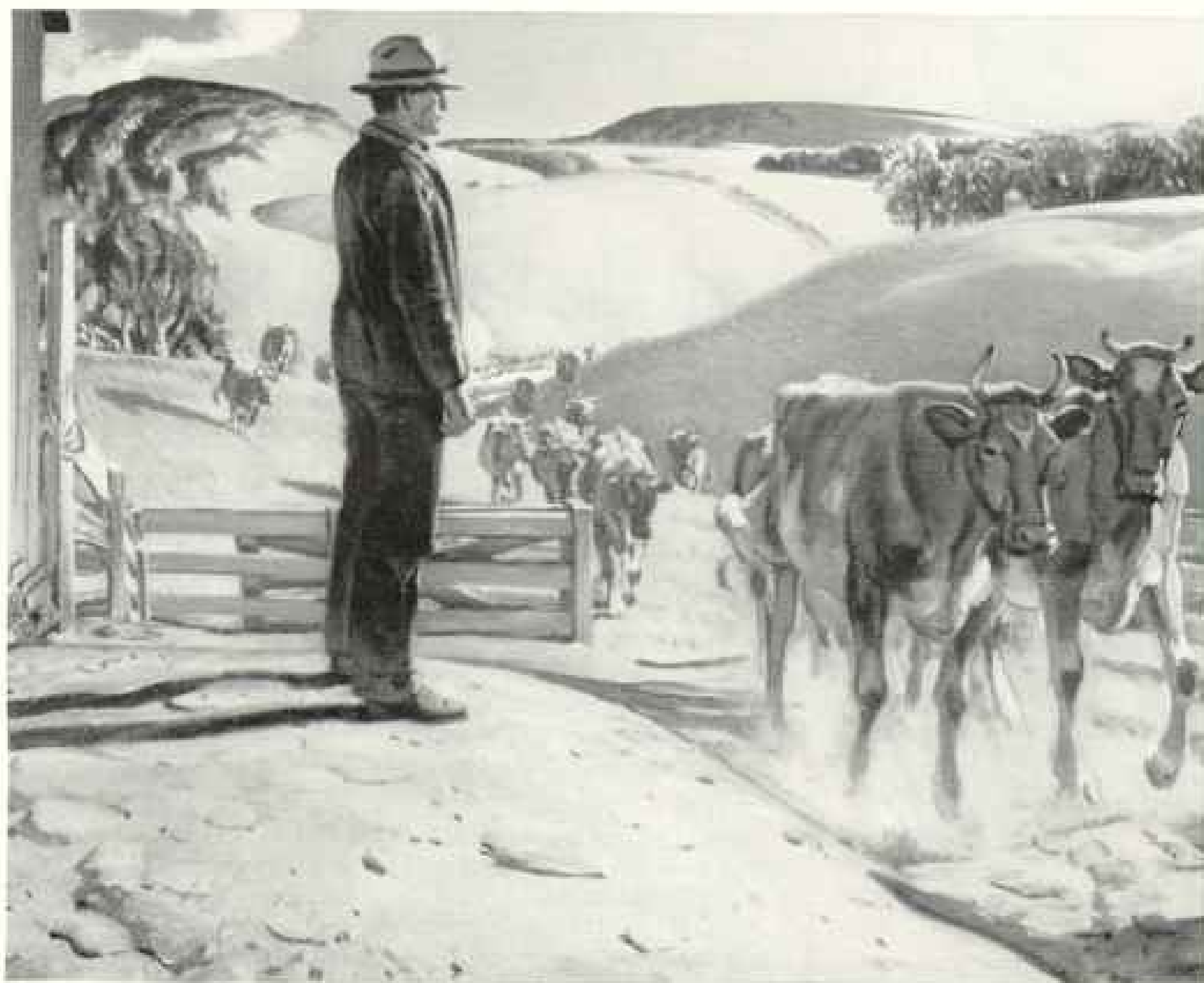


CUBA MAIL LINE ★ PORTO RICO LINE ★ CLYDE-MALLORY LINES ★ SOUTHERN S. S. CO.

Cuba, Mexico, Puerto Rico, Dominican Republic, Texas, Florida and the South



★ BUY U. S. WAR BONDS AND STAMPS ★



BUY WAR BONDS AND STAMPS

The General reviews his troops

There are no bands, no bunting. His field uniform is faded from work and weather. His ambling army is all out of step. . . . *But this veteran dairy farmer ranks high in America's military strategy!*

Men must eat before they can fight. Nations must have food with their freedom. And nature's best balanced food is milk.

America's dairy farmers made a magnificent contribution toward victory last year—nearly 120 billion pounds of milk—a world's record production. They did it in spite of labor and machinery shortages. They did it by working longer and harder—to help keep American workers and fighters fit.

The country can be proud of its farmers—for pitching in and producing bumper crops of corn, wheat, meat and other foods, too.

All food is life in a life-and-death struggle. Save food and you save lives. Save food and you help heroic farmers feed a hungry world.

We're sure that every American will cooperate in the nation's food conservation program. We're glad that our work at National Dairy can make an important contribution to this program, too.

Our laboratories will continue their far-reaching research—developing, from milk, new weapons for war and new products for peace.

Dedicated to the wider use and better understanding of dairy products as human food . . . as a base for the development of new products and materials . . . as a source of health and enduring progress on the farms and in the towns and cities of America.

**NATIONAL DAIRY
PRODUCTS CORPORATION**
AND AFFILIATED COMPANIES

Originators of the Sealtest System of Laboratory Protection



The Case of the Horrified Hostess

(Case No. 1-B-3580 from U. S. F. & G. files)

HORRIFIED? What hostess wouldn't be, if she discovered her guests' handbags had been stolen? What hostess wouldn't be embarrassed if faced by the loss of her guests' belongings? Because Mr. and Mrs. _____ of Brooklyn, N. Y., carried burglary insurance with the U. S. F. & G., their guests' losses were made good. With burglary insurance so low in cost, can you afford to go on trusting to luck?

On this page are other cases taken from U. S. F. & G. files illustrating today's war-increased hazards. Read them, then ask yourself this important question: "Could

any of these things happen to me?"

**Consult your Insurance Agent
or Broker as you would
your Doctor or Lawyer**

To help you avoid financial jolts, your local U. S. F. & G. agent places at your disposal *knowledge* of insurance—plus on-the-spot service in the payment of losses. He will be glad to make a Graphic Audit of your insurance—to help you guard against wartime risks which make such an audit imperative. Your U. S. F. & G. agent is one of thousands serving communities throughout the United States, its possessions, and Canada. Consult him today.

U. S. F. & G.

UNITED STATES FIDELITY & GUARANTY CO.

affiliates

FIDELITY & GUARANTY FIRE CORPORATION

HOME OFFICE



BALTIMORE, MD.

*— Could
any of these things
happen to you ?*



(Case No. 21-G-1332)

Customer breaks glass door

The sale was a success . . . so much so that a determined woman customer, eager to enter, kicked the jammed door and shattered the costly plate glass. Today plate glass is expensive, hard to get. If your business requires plate glass windows, door or show cases, they should be amply insured.



(Case No. 161098)

Purloined platinum parts

Naturally, the electrical supply company trusted him . . . he'd been a stock clerk for 17 years. But when platinum parts began to disappear, they found he'd stolen and sold \$23,311.57 worth of supplies. Under a fidelity policy, U. S. F. & G. settled the claim. Is your company adequately protected against employee dishonesty?



(Case No. 4-L-805)

Jitter-bug Jeopardy

Jitter-bugging was no joke to the man who was knocked off balance and fell. Nor was it a joke to the restaurant proprietor, faced with a \$1500 suit. But a public liability policy with U. S. F. & G. saved the proprietor loss and trouble, compensated the claimant for his injuries. What if someone were injured in your home or place of business?



First Step toward the fighting front

It leads him to a good night's rest in a soft, sleep-inviting bed.

And that's the *least* that anyone can wish him—although the demand for so many sleeping cars to move troops results in occasional inconvenience to civilians traveling Pullman in wartime.

AN AVERAGE OF ALMOST 30,000 TROOPS
A NIGHT NOW

GO PULLMAN

★ Buy United States War Bonds and Stamps Regularly! ★

We are grateful for the tolerance with which you accept the situation—for your understanding attitude that says as plain as words:

"He comes first with *all* of us!"



Copyright 1943, The Pullman Company

ANIMATOPHONE

16mm Motion
Picture
Equipment

VITAL

in Today's War—
and Tomorrow's Victory

Outstanding in training millions
for War... Outstanding in train-
ing more millions for Peace...
Victor Animatophones provide
the most modern medium for
faster learning, more intelligent
understanding, and lasting
knowledge. These amazing
16mm Sound Motion Picture
Projectors are continually do-
ing their dynamic training job.
Look to Victor for your future
training and teaching methods.



VICTOR ANIMATOGRAPH CORP.
DAVENPORT, IOWA

188 W. Randolph Street, Chicago
242 W. 55th Street, New York

DISTRIBUTORS THROUGHOUT THE WORLD

432 THOUSAND GOOD TURNS A DAY



Yes, 432,000 turns a day! This
is what the balance wheel—
shown here in magnified size—
does year after year without a
pause. If you are interested in
the fascinating story of watches,
write for the brochure, "What's
In a Fine Watch?"

GIRARD-PERREGAUX, Dept. G
ROCKEFELLER CENTER
NEW YORK, N. Y.

GIRARD-PERREGAUX

Since 1859

17 jewels
priced from \$35
featured by
leading jewelers.

A WELCOME GIFT!

for BRIDE
or GRADUATE

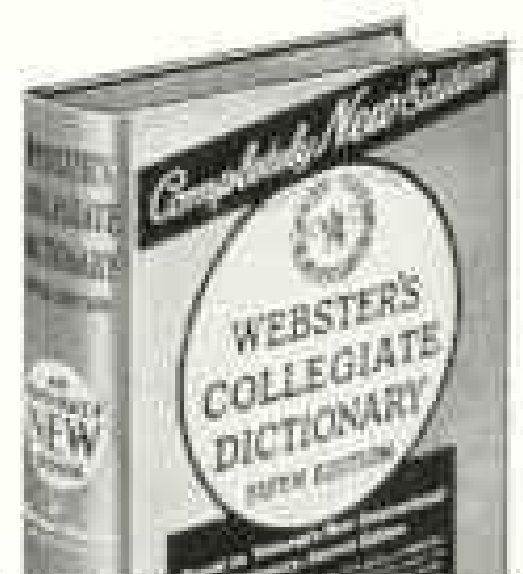


The Best Handy-
Sized Dictionary

WEBSTER'S COLLEGIATE

A Merriam-Webster

BE refreshingly different in
your June gift! Every
bridal couple, every high-
school or college graduate, will
appreciate Webster's Colle-
giate, especially in one of the
five gift bindings, 1,300 pages;
110,000 entries; 1,800 pic-
tures. \$3.50 to \$8.75, depend-
ing on binding. Buy of your
dealer or direct from publish-
ers. Mail coupon for FREE
Quiz and Picture Game. G. &
C. Merriam Co., 291 Federal
St., Springfield, Mass.



G. & C. Merriam Co., 291 Federal St., Springfield, Mass.

Please send me FREE Quiz and Picture Game, also full
information about Webster's Collegiate Dictionary, Fifth
Edition.

Name _____

Address _____



WE SUBMIT THIS CONCEPTION OF OUR CHANGED WORLD AS THE BASIS FOR OUR

WAR-THINKING

We exist upon one globe, and inside another globe.

Our planet-earth is the center of a larger air-globe . . . It is like a small spherical kernel within a large spherical shell. Both globes, as one unit, follow the same orbit. We take our air with us—and always have.

The new factor that changes our world is the use of air as the only *universal* realm for transportation. In ratio as we do use it, we change the proximity and accessibility of all places, and effectively we make the world smaller.

With this conception as the basis for our war-thinking the world *could* make Peace permanent.

Not that human nature will change that much, that quickly, but because, after centuries of recurring wars, the human race now does possess the physical means of enforcing Peace.

Consider the *protective* possibilities of air:

Since air is *everywhere*, it is not possible for any person, clique or nation to hide anywhere upon the earth from air surveillance. If we have mastery of the air, we can reach the spawning grounds of the war plotters and prevent their preparations for war.

Consider the *productive* possibilities of air:

Today, all world markets are much *closer* neighbors than cities of the United States used to be. Air transportation makes possible a quicker post-war rehabilitation and a better world economic system.

World War I was a localized war. It was won by *surface* strategy. World War II is a *universal* war where there are no safety zones, because every inch of the earth's surface is a potential target for bombs from the air.

The world geography of 1918 is as obsolete as that of the ancient flat-world. That is why the post-war world will present problems as great as does this war-world—and why we will need aviation more *after* this war than during it.

After the Peace Conference we will have a much more *vulnerable* nation, because it is no longer an isolated piece-of-land, but an integral, inseparable and indivisible part of today's air-world. The *waters* of our two oceans could no more prevent air attack than did the *cement* of the Maginot Line.

The pre-air conception of the world was one of nations protected by vast oceans. All world economic, political and mili-

tary thinking was predicated upon that surface-conception. Aviation has turned the page on that era!

Of course nations will continue to have boundary lines and will use land and water methods of transportation. But aviation changes all relative values; it nullifies the buffer nations, and makes possible that which has, for all man's prior history, been impossible.

Since it is primarily the use of *air* that makes this a Global War, it must follow inevitably that a *dominant* use of air can maintain Global Peace.

The United States has the beginning of the aviation machinery necessary to implement its democratic ideals and prevent a repetition of the war-crime by any nation.

Attain the most powerful position in the air and automatically we will become the greatest Power for Peace.

A. N. KEMP

President, AMERICAN AIRLINES, Inc.

MAINE—where you
can rest and relax!



**Send for this
FREE BOOK**



COME to Maine for rest and relaxation if you can—but if you can't, *keep Maine in mind!* Because we'll be waiting for you — with the same rockbound coast and tree-robed mountains . . . same lakes, streams and balsam-scented breezes . . . same glorious vacation land!

And even though *you* can't make it, you may still wish to send your family to a Maine lodge or camp or hotel.

In any case, you'll get a grand thrill from the official **MAINE VACATION GUIDE**. To get your free copy, mail this coupon right away!

HAVE THE TIME OF YOUR LIFE IN MAINE!

MAINE DEVELOPMENT COMMISSION
Tourist Service, 12 St. John Street
Portland, Maine

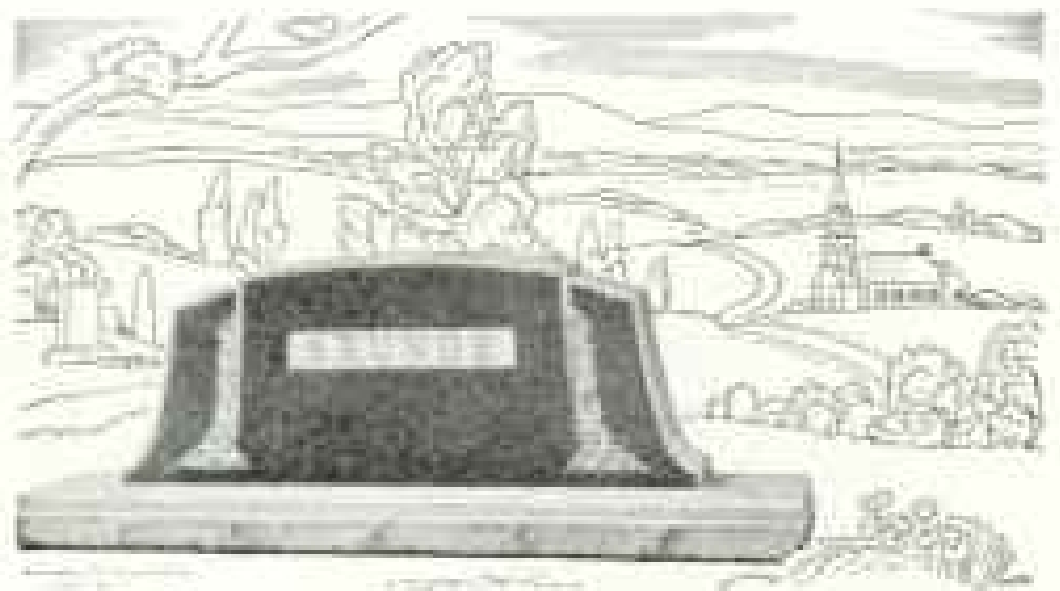
Please send me the new illustrated Official
Maine Vacation Guide for 1948.

Name _____

Address _____

City _____

State _____



Beauty... Through the Ages

You can count on the permanence of Rock of Ages granite. The life and brilliance of its original beauty never dims with time. Inscriptions and sculpturing keep their depth and sharpness. *Ask your dealer to show you proof in the cemetery.*



For your positive protection ask any authorized Rock of Ages dealer about our National Surety Guarantee. And send for the free, illustrated book, "How to Choose a Memorial".



ROCK OF AGES CORPORATION
Department N-17, Barre, Vermont

ROCK of AGES BARRE GRANITE
MONUMENTS

OLD CANVAS LOOKS LIKE NEW at a fraction of replacement cost!

Setfast Canvas Paint lends new beauty and adds greatly to the life of any canvas product. Setfast leaves the canvas pliable . . . is sun-resistant . . . water-repellent . . . retards rot and mildew. Ten attractive colors—also Black, White and Clear. Works wonders on Awnings, Beach Umbrellas, Cabanas, Gliders and Seances, Canvas Shoes, etc. Also ideal for Convertible Auto Tops, and Fiber or Grass Rugs. When Painting Canvas Furniture, Wearables and Fiber Rugs, follow, when dry, with Setfast OVERCOATING. At Department Stores, Hardware and Paint Stores.



Setfast CANVAS PAINT



KAMYR Corp., Dept. G-53 Fair Lawn, N. J.

Send Folder with Setfast-painted sample.

Name _____

Address _____

My Dealer's Name _____

Are you getting enough of these?

TODAY, we owe it not only to ourselves, but to our country, to keep physically fit. Every man, woman, and child should have a health program—one carefully adjusted to his physical

condition, age, and working hours. It should embrace *sleep, rest, recreation, exercise, and a nutritious diet*. Below are suggestions concerning three of these requisites of good health.



SLEEP?

Sleep is a great healer. It eases the work of the vital organs and gives the body time to mend worn-out tissues and build new ones. Most adults require eight hours of sleep daily. Children need considerably more, especially in the early 'teens. Refreshing sleep comes more easily when you avoid excitement or hard physical or mental work before bedtime. Daytime sleepers should be shielded from *light and noise*.

Enough sleep—especially tossing, fretful sleep—is not necessarily enough rest. Have you ever tried to relax completely? When you are completely relaxed, asleep or awake, the restorative powers of the body can get at their work of overcoming fatigue. The habit of complete relaxation for even brief periods is worth while cultivating. It helps conserve energy for *important tasks*.



REST?



RECREATION?

Uncle Sam plans adequate recreational facilities for our armed forces. Recreation is equally important for civilians. Hobbies, sports, music, are excellent. Try to get some of your recreation out of doors. For example, *plant a Victory Garden!* This year, it is not only healthful recreation, but a contribution toward winning the war.

Write for the Metropolitan leaflet, 53-N, "Blueprint for Health."

MORE NURSES ARE NEEDED! The health of our armed forces, our workers, our families, depends in large part on skilled nursing care. High school graduates and college girls! . . . America needs 65,000 of you to enter schools of nursing. Federal funds are available for scholarships for qualified students. Write the National Nursing Council for War Service—1790 Broadway, New York City, for information.

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Nature's Air Raid Wardens

THE WHISTLER, or hoary marmot (*Marmota caligata*) lives in the western mountains from central Idaho to the Yukon River.

One of his principal enemies is the golden eagle. These big birds are a constant danger every time the whistler goes into the open to feed.

To guard against these feathered marauders, the whistler has apparently devised an air raid protection system something like man's.

He frequently digs shallow shelter-holes along the pathways from his burrow to the feeding grounds which come in handy when an eagle is sighted.

In addition, the whistler generally lives in colonies. When one sights an eagle, like an air raid spotter he immediately gives a shrill piercing whistle. It is his version of an air raid siren and warns his fellows to take shelter.

Due to these precautions, the whistler is often able to reach home safely without becoming the main course of an eagle's dinner. And in his home the whistler is probably safer than you are in yours.

He can't fall downstairs, he has no bathtub to

slip in, there are no skidding scatter rugs in his hall. The whistler is unable to scald himself with hot water, or trip over toys on the floor. He doesn't have these worries. But you do!

Accident insurance was invented to help take these worries off your shoulders. It can't prevent an accident, but it can keep an accident from costing you a lot of money and worry.

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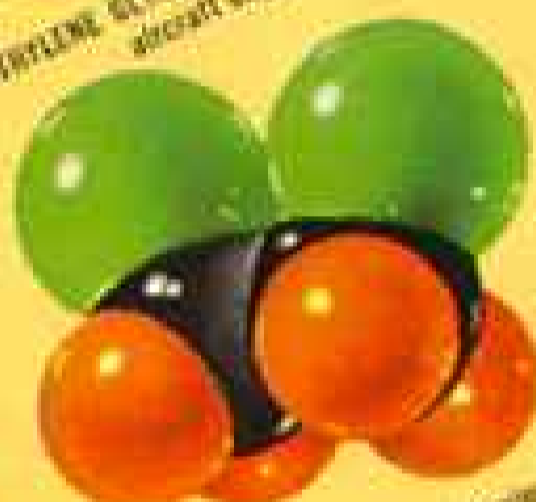
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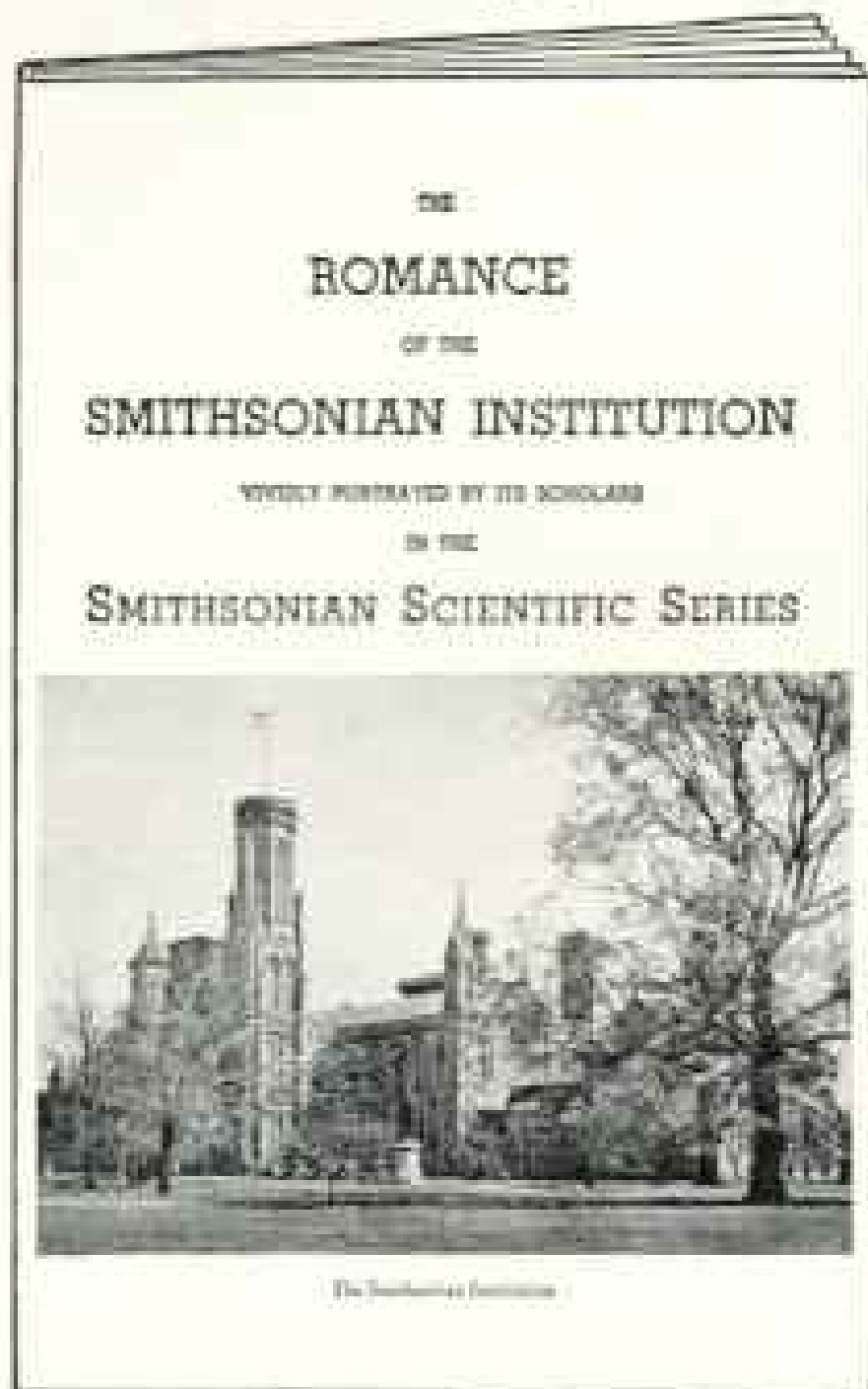
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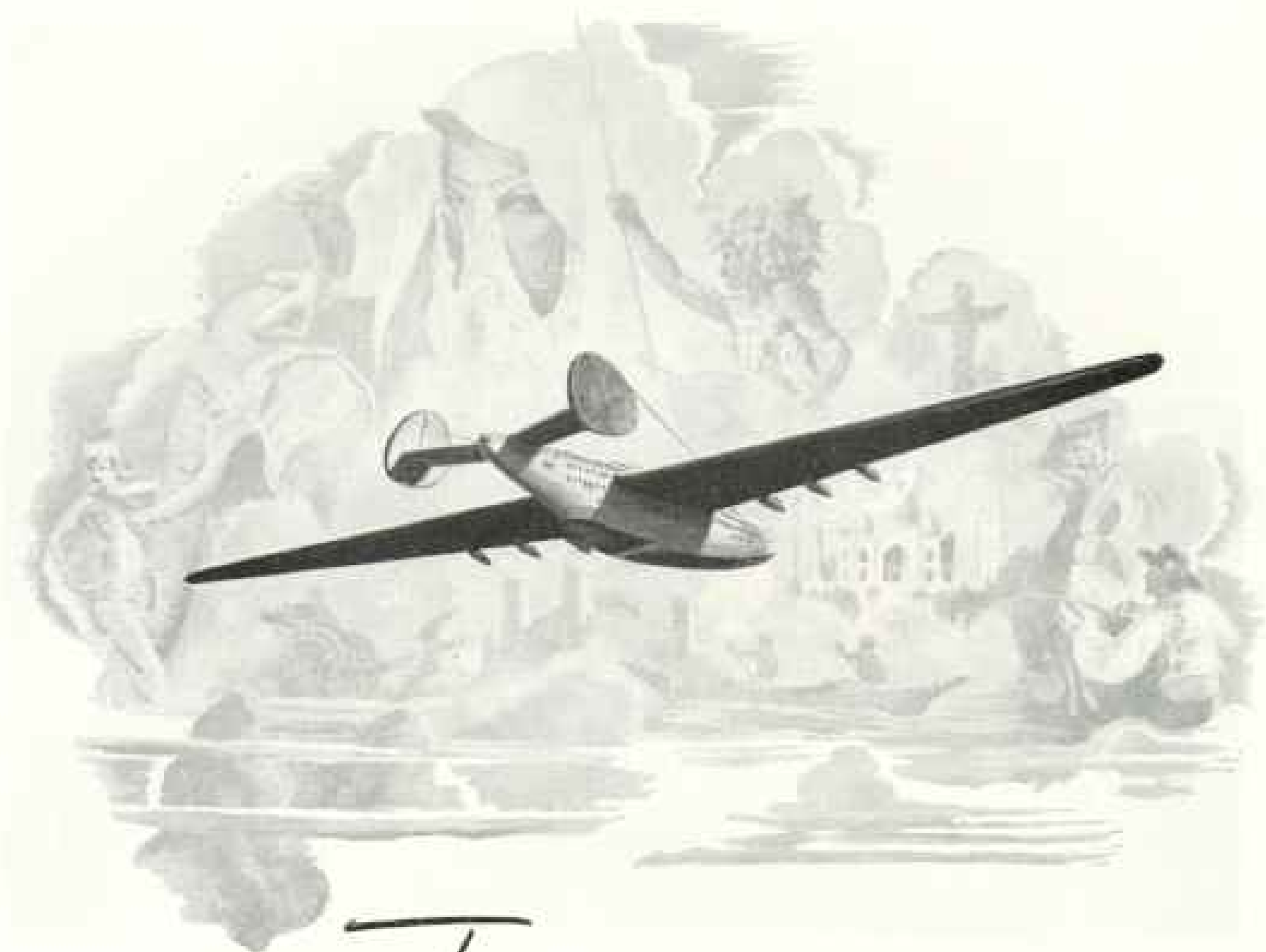
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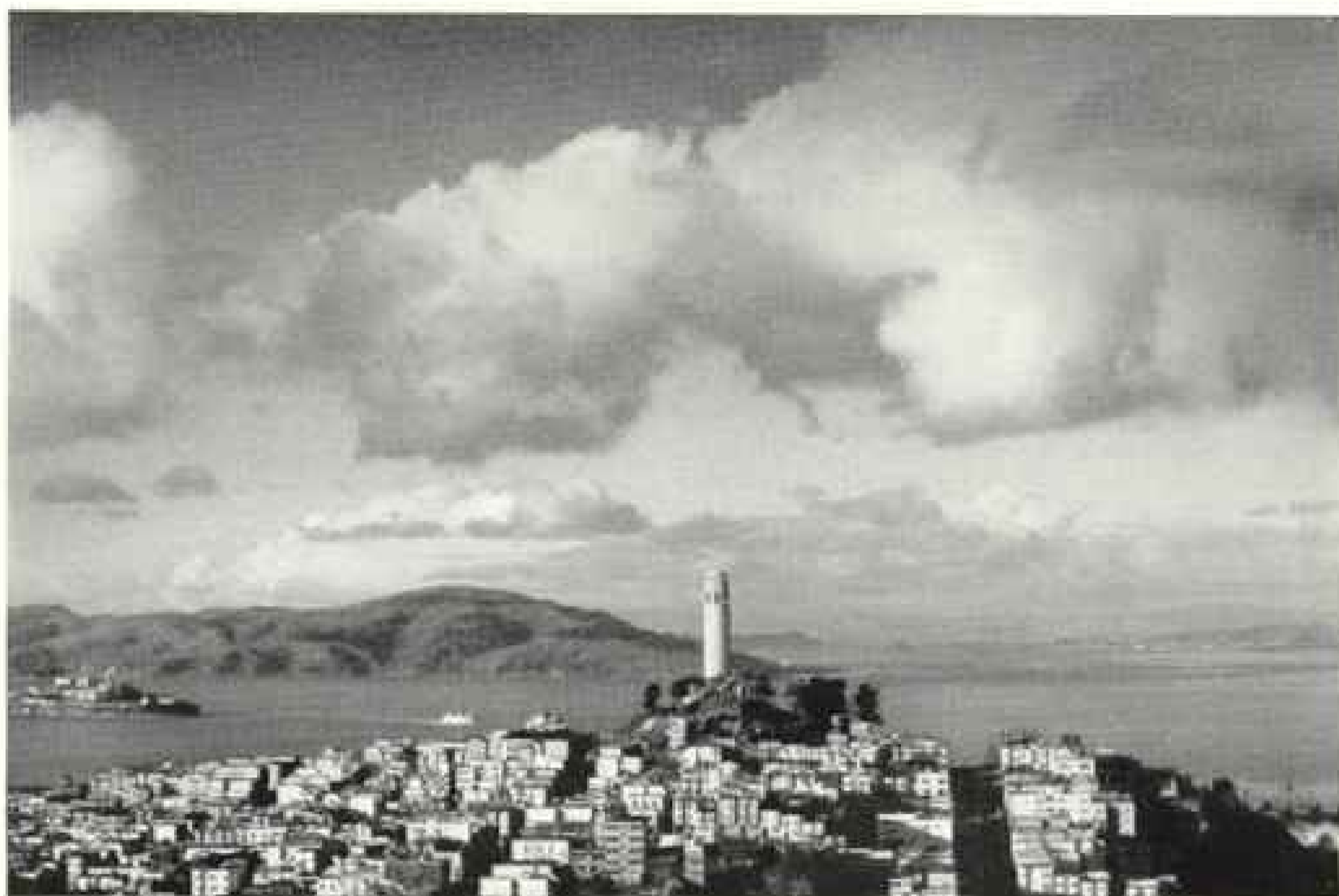
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The Pressed Flower



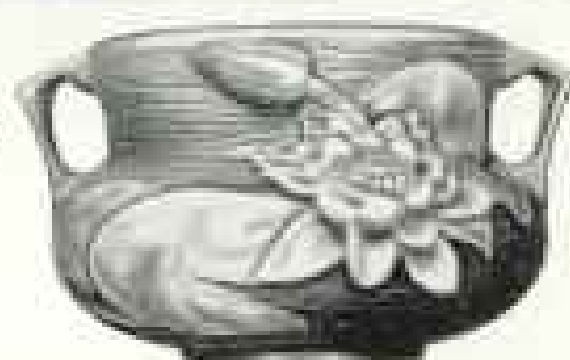
Its petals yellowed now, and crumbling — its once-proud fullness gone, its beauty stripped by the unburied years, and yet its fragrance, faint but unmistakable, fills you with long-ago memories, unforgettable and undying. This is the message of treasured things. This is the tradition of a faithful heart.

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