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## EXPLORATIONS IN THE GOBI DESERT

BY ROY CHAPMAN ANDREWS

AUTHOR OF "EXPLORING UNKNOWN CORNERS OF THE 'HERMIT KINGDOM'" AND "SHORE WHALING: A WORLD INDUSTRY," IN THE NATIONAL GEOGRAPHIC MAGAZINE

*With Illustrations from Photographs by J. B. Shackelford*

**T**HE Central Asiatic Expeditions went to Mongolia with a very definite purpose. After all, knowing exactly what you want to do is the first requisite of any expedition.

The main problems of the Expedition were to discover the geologic history of Central Asia; to find whether or not it had been the nursery of many of the dominant groups of animals, including the human race; and to reconstruct its past climate, vegetation, and general physical conditions, particularly in relation to the evolution of man.

### MONGOLIA JEALOUSLY GUARDS HER SCIENTIFIC SECRETS

Although Mongolia had been crossed and recrossed by some excellent explorers, mostly Russians, the country had not been studied by the exact methods of modern science. There were reasons for this neglect.

Mongolia is isolated in the heart of a continent and, until recently, a considerable journey was required even to reach the edge of the desert.

Distances are tremendous and transportation slow. Mongolia is, roughly, 2,000 miles from east to west and 1,200 miles from north to south. In all this vast area there is not a single mile of railroad. Transport is by camels, ponies, and ox-carts.

The climate is severe. During the winter the temperature drops to 40 or 50

degrees below zero, Fahrenheit, and the plateau is swept by bitter winds from the Arctic Ocean. Effective scientific work can be conducted only from April to October.

I believed that the automobile was the answer to the transportation problem. With motors we could go into the desert as soon as the heavy snows had disappeared, penetrate the farthest reaches of Mongolia, and return before continued cold and snow set in.

From previous experience, I estimated that in cars we could travel about a hundred miles a day. Camels, which all other explorers had used, average only ten miles daily. Thus we should be able to do approximately ten years of work in one season. We did maintain just about that ratio.

### CAMELS ESTABLISH DEPOTS FOR MOTORS

A supporting caravan of camels, carrying gasoline, food, and other supplies, was dispatched several months in advance to a well-known place in the desert, 600 miles from Kalgan, our starting point.

Upon connecting with the caravan, we transferred to it all equipment not in daily use, and took in the cars enough food and gasoline to maintain us until our next meeting with the camels.

Instructing the caravan leader to follow, we proceeded in the motors to a suitable region for work and established a central camp. Investigations were carried



#### AN EAGLE'S NEST LED TO THIS DINOSAUR EGG FIND

This deposit was located by chance when Norman Lovell was inspecting an eagle's nest under the edge of the escarpment. Dr. Walter Granger lost no time in getting to work on the treasure. The finding of the eggs was important because, while many deposits of dinosaur bones had been located, it was not previously known that dinosaurs laid eggs (see text, page 663).

on in a wide circle about this base. In the meantime I made advance trips of several hundred miles with one car, exploring the country and estimating its value for future research.

When all the scientists had completed their studies at the central camp, the Expedition moved forward to a new region which had been selected and operations were continued.

The Expedition was almost continually divided, except when we made long marches to new localities; frequently there were four camps, from 20 to 100 miles apart.

Altogether we completed five expeditions.

The first went to Mongolia in 1922; the second in the following year. Then came a year's interruption of field investiga-

tions, during which most of the staff returned to the United States.

In 1925 the third and largest expedition, comprising 40 men, foreign and native, explored Outer Mongolia. Because of war in China in 1926 and 1927, we could not reach the desert. In 1928 the fourth expedition took the field, and in 1930 the fifth and last party explored eastern Inner Mongolia.

#### BRIGANDS IMPEDE PROGRESS

Early in March, 1922, the camels left Kalgan for the first expedition (see map, page 656).

The caravan leader was instructed to travel straight up the Kalgan-Urga trail and await us at Tuerin, a monastery at the northern edge of the Gobi, 500 miles away, as the crow flies (see page 705).



ESCORTED IN A CLOUD OF DUST

Fifty Chinese cavalymen accompanied the Expedition across the dreary plain from Kalgan to the foot of the pass near Wanchuan. This picture shows strikingly how a road has been cut by the traffic of centuries into a deep ravine through the soft loess soil of northern China.

It was bitter cold when they started. Snow still lay on the desert and spring blizzards raged. Brigands were reported along the trail. Nevertheless, old Merin, the Mongol leader, swung himself to the back of his camel with a happy smile as he waved farewell. He was going into the desert, where he had been born. Blizzards and brigands were part of his daily life.

Shortly after leaving Kalgan he learned that 500 bandits were only a few miles ahead. He abandoned the main caravan road and struck across the plains, going from well to well. During the day he kept the camels close-herded in deep valleys and traveled only at night. He played hide-and-seek with the brigands and arrived at the rendezvous safely and on time.

Brigands must be considered in every expedition to the interiors of Mongolia or China. They swarm like devouring locusts, even up to the walls of the cities. Usually they are soldier-deserters from unpaid or defeated armies. The thinly settled region at the edge of the Mongolian plateau is their favorite hunting ground, because most of the major caravan routes across Central Asia converge in China at Kalgan and at Kweihwa on the railroad.

At the time of our fourth expedition, in 1928, bandits occupied this entire region. There were about 10,000 of them, and every camel, cart, or car that left Kalgan was certain to be robbed before it had gone 50 miles.

The merchants were being ruined and the brigands were starving because they





Drawn by Newman Barnstead

THE GOBI EXTENDS EAST AND WEST THROUGH THE HEART OF MONGOLIA

Motorcars usurped the immemorial monopoly of camel caravans and enabled the Expedition to explore this isolated region (see text, page 654).

had no one to rob. As usual in China, the matter was settled by the chamber of commerce. Several of the bandit chiefs came into Kalgan and \$5 a camel was paid to them as a tax for crossing the brigand area. In one week 13,000 camels left Kalgan under this arrangement.

We had to accept the same conditions. But I had one advantage, for the chief bandit proved to be an old friend. Over many cups of tea I argued that I ought to get cut rates. He finally agreed, and I paid only \$2.50 for each of my camels.

For the motors he wanted the usual fee of \$100 a car. I balked at this and hinted at a machine gun, as well as 30 men with rifles. We didn't have a machine gun, but the word went out, and we were not attacked that year.

Each year the camels left Kalgan early in March. We always started on April 15. Fifty miles from Kalgan there is a vast lowland, and in the spring we always battled with mud in this area.

Sometimes a thin crust formed over the bog and we would be lured out on what appeared to be a hard floor, only to have it break beneath us. The cars would sink

to the hubs. Then we had to collect stones and push them down with the jack beside the sunken wheels until a foundation was formed which would bear the weight of the car.

We were in such a bog once for 14 hours and made just three-quarters of a mile for the day's run.

Sand isn't so bad. One of our geological discoveries was that the Gobi is a bed-rock desert. Much of the surface is fine gravel, and loose-blown sand does not cover a very large area.

In the central Gobi, near the eastern Altai Mountains, are sand dunes, but usually the dunes are narrow and we could go around them. When we did have to cross soft spots, canvas strips, reinforced with pieces of rope, helped, but it was mostly a matter of every man getting out and pushing.

The major part of the Gobi is sparsely covered with sagebrush six or eight inches high and small clumps of hard, wiry grass or thorny bushes. Camels eat this vegetation, so we did not have to carry food for them. Any other domestic animal would prefer green grass. Feed that to a camel



### "HOLD EVERYTHING!"

The usual Chinese war had halted trains between Kalgan and Peiping, so the Expedition had to drive its cars through the Nankow Pass, which no automobiles had hitherto traversed. It took three and a half days to go 124 miles.

and it would make him ill. The drier and harder and thornier the bush, the more a camel enjoys it. His belly becomes fat and round and his two humps stand up hard and full of fat.

### PLUCKED PACKING WOOL FROM BACKS OF CAMELS

The Mongolian camels furnish the "camel hair" of commerce. They begin to shed their wool in late June and it comes off in strips and patches. One must not pull it off too fast, because the camel, for all his huge size, is a delicate animal and easily catches cold (see page 665).

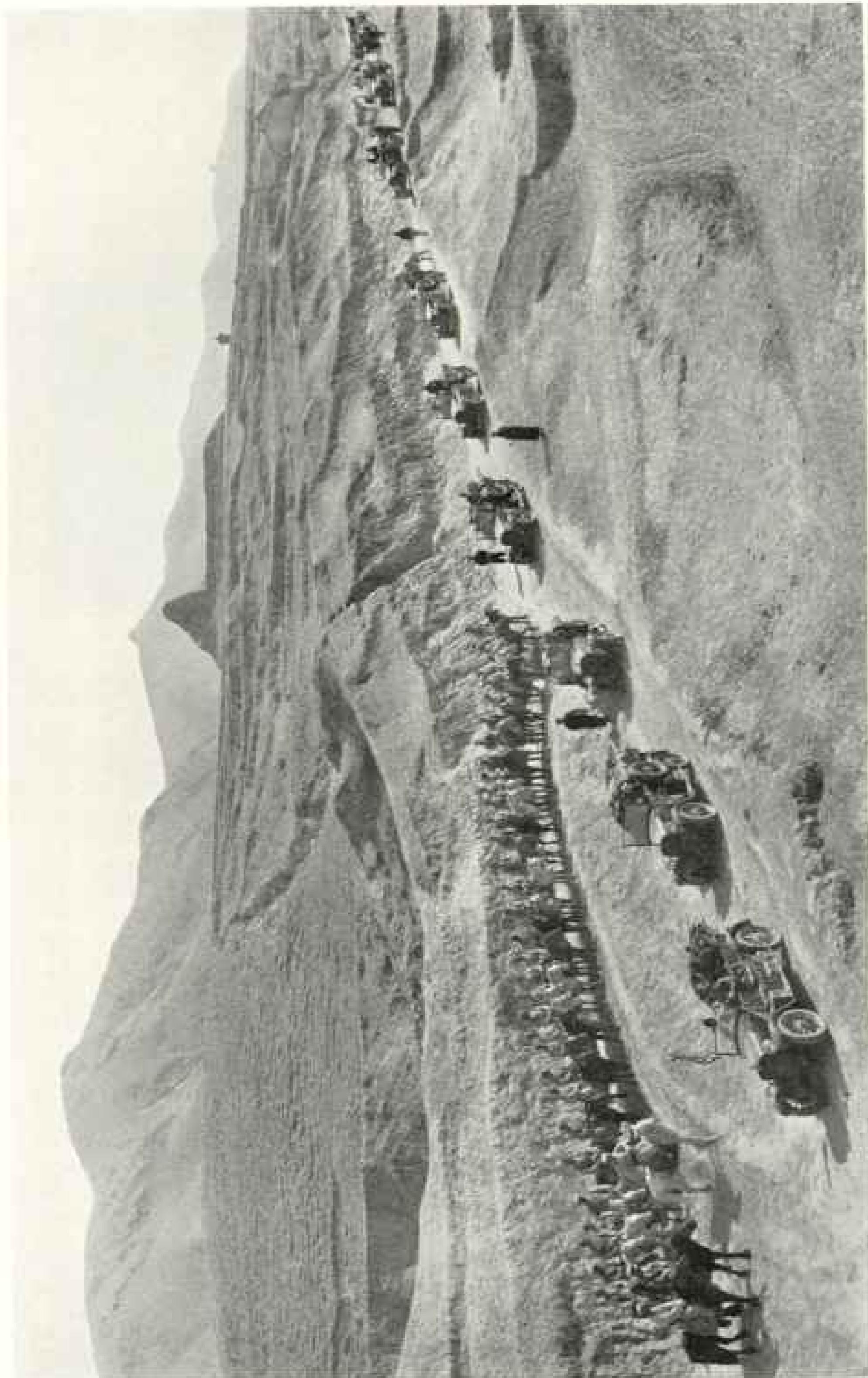
About the end of July the winter's coat is gone, leaving the beast naked, except for a covering of very fine hair. This grows rapidly and by cold-weather time is long enough to protect him.

Fortunately, the camels shed their wool at just about the rate we collected fossils. There is little packing material in the desert, so whenever we needed some for the delicate specimens we had a few camels brought in and pulled it off the "living wool trees."

Maj. L. B. Roberts, our topographer, developed a new system of desert mapping. In a country so flat that for many miles there are no natural landmarks, it was a problem to know how to carry on a rapid survey. He solved the difficulty by using the cars as stadia rods. The heights of the hub, fender, and windshield were measured and these were sufficient, because the sights were from one to two miles. The distance was kept by a speedometer, which was frequently checked over known courses.

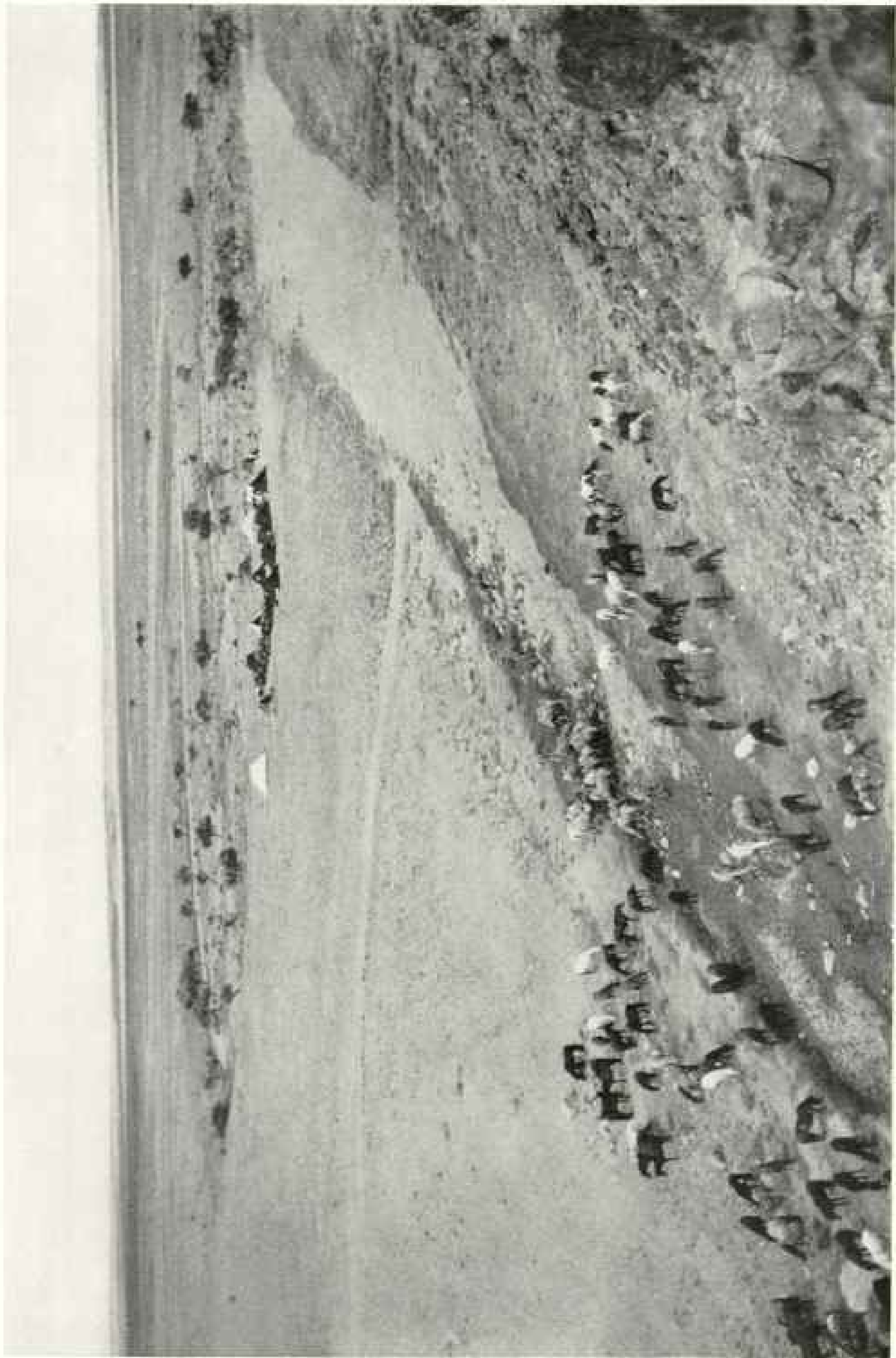
Starting from the Kalgan railroad station, Major Roberts carried his survey for more than a thousand miles straight through the heart of Mongolia. His maps are much more accurate than any reconnaissance topographic work ever before attempted on the Asiatic plateau.

Major Roberts was assisted by Lieut. F. B. Butler, United States Army, and Lieut. H. O. Robinson, First Royal Lancashire Regiment. During other expeditions the topography was in charge of Prof. F. K. Morris, Capt. W. P. T. Hill, United States Marine Corps, and Lieut.



THE LONG TRAIL, STARTS THROUGH A LAND OF BRIGANDS

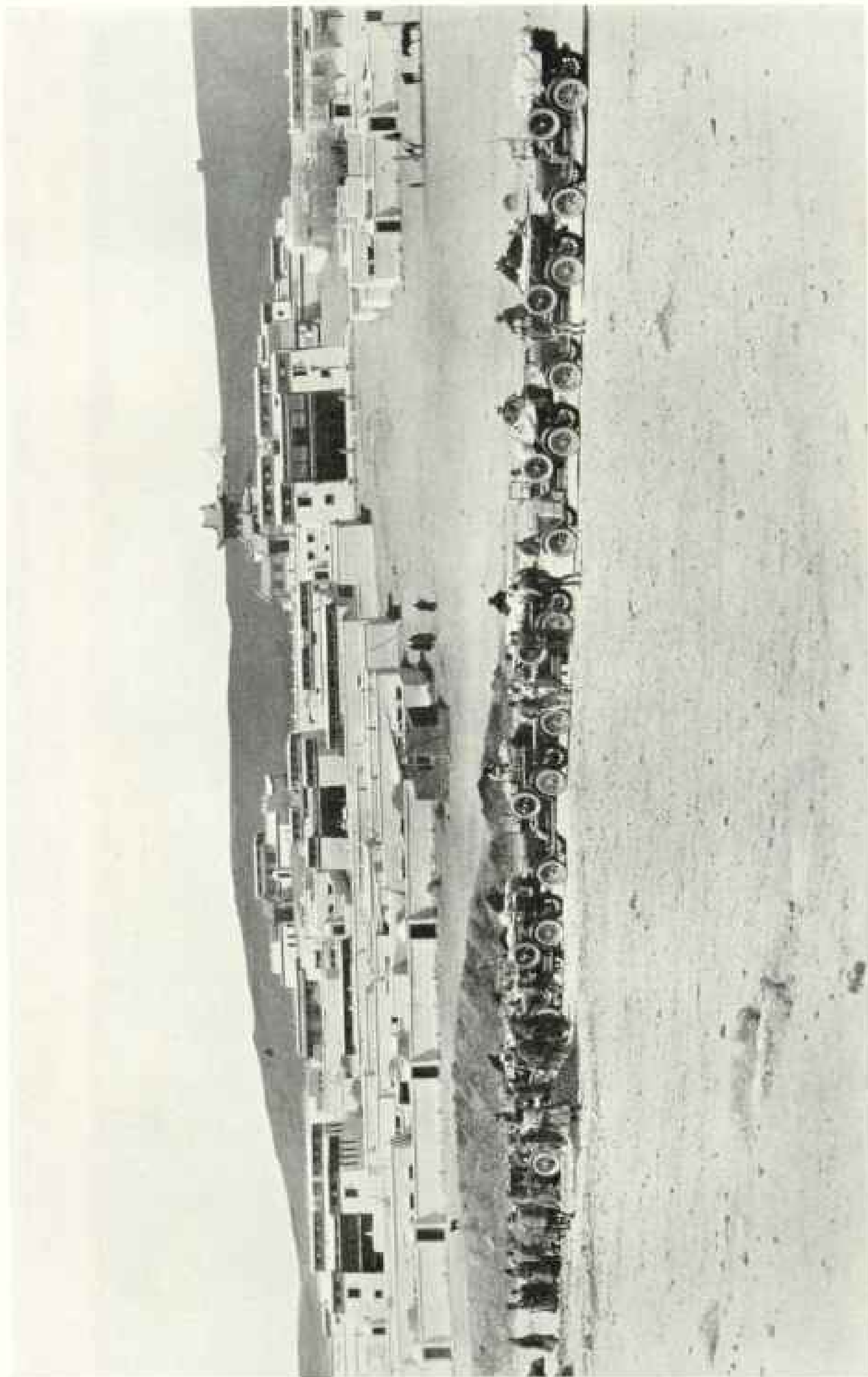
On the way from Kalgan to the pass near Wanchuan a guard of Chinese cavalry was furnished by Government officials because bandits were swarming in that vicinity.



CAMPING ON THE OUTSKIRTS OF THE Gobi

A welcome stream emerged from the mountains as the Expedition came out of the arid desert, and, aided by this faint trickle, a few cottonwood trees wage their fight for existence.





A LAMASERY LOOMS CONSPICUOUSLY ON THE SKYLINE OF BARRÉN WASTES

These religious communities often are situated in hollows, and are invisible from the level of the plain. It was thrilling to come suddenly upon such a group of buildings when the explorers had seen no human habitations of any sort for hundreds of miles. The low, angular construction gives many of them a modernistic aspect.



"WHERE DOES THE LIGHT COME FROM?"

Mongols invariably were fascinated by the flashlights and, next to field glasses, were more desirous of possessing them than any other items of the Expedition's equipment.



DR. ANDREWS FEEDS TWO PET EAGLES WITH CHIPSTICKS

These birds ate about two pounds of meat every four or five hours. Their appetite indicates what an enormous amount of game must be killed by the parents to feed the young.



THE AGE-OLD MAN POWER OF THE EAST AIDS THIS MOTOR INTRUDER

The Gobi is a bedrock desert, and sand spots are comparatively rare. Because the surface mostly is fine gravel, motorcars can be used successfully, but occasionally human energy, which still moves most of the goods and passengers of China, comes into play.



TO DESERT FOLK AN AUTOMOBILE WAS A TERRIFYING SPECTACLE

None of the Gobi nomads Dr. Andrews encountered had seen a motorcar. At first sight they were so frightened they would leap on their horses and race for the hills. Usually the women and children were left behind, and when the men saw no harm came to them they would return sheepishly.

W. G. Wyman, United States Army.

We could have accomplished an enormous amount of mapping in a short time by the use of airplanes. Moreover, they would have helped the Expedition in every department of its work. The country is a natural landing field, the visibility is excellent, and, except for the spring gales, one could fly every day. But the Chinese authorities refused to allow us to use airplanes, as they did in the case of Sven Hedin, the famous Swedish explorer.

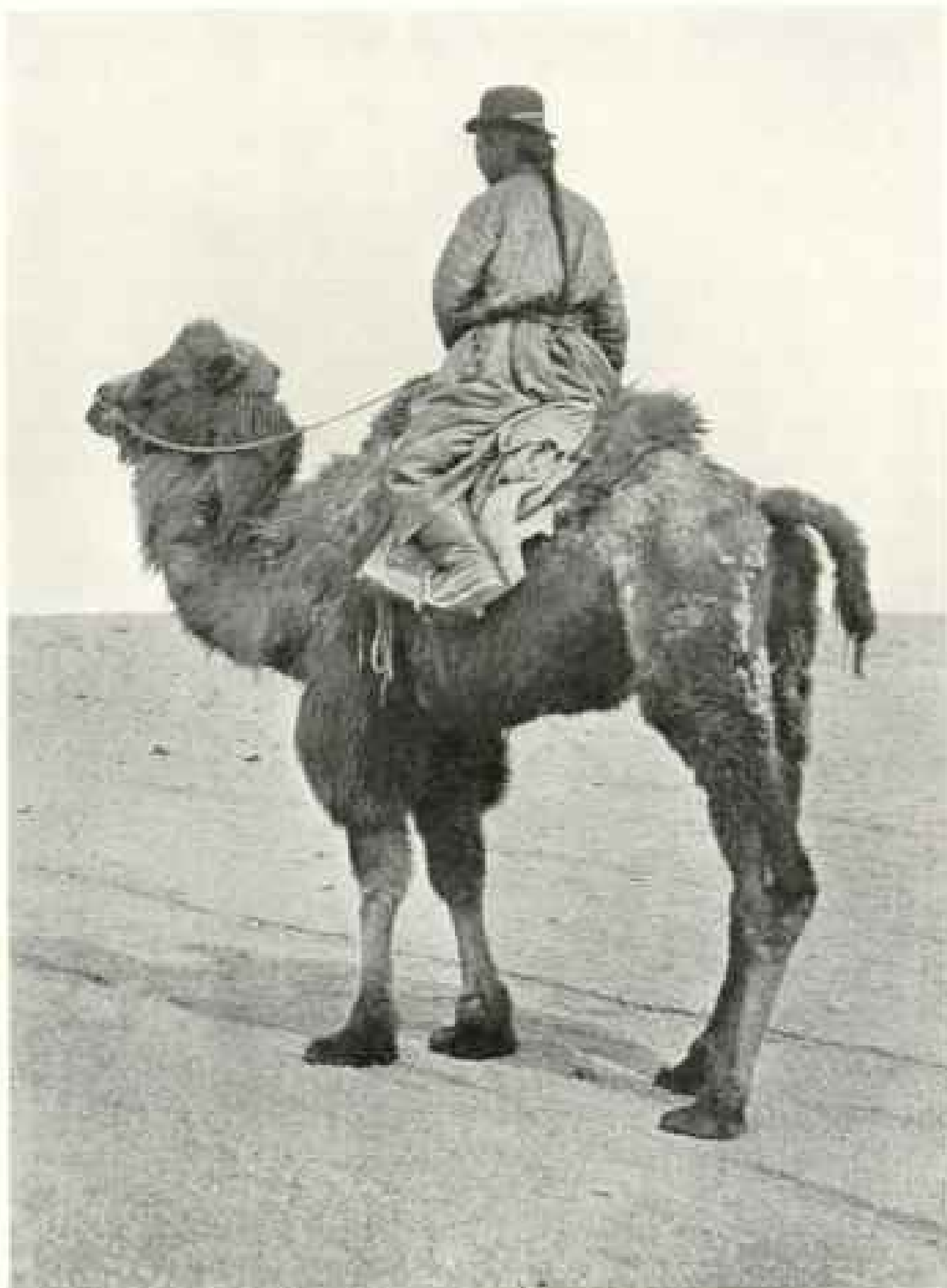
#### FINDING THE DINOSAUR EGGS

Before the first season in Mongolia was ended, it was evident that we had discovered one of the richest and most important fossil fields in all the world.

The dinosaur eggs alone made it famous, but they were by no means the most important of the thousands of specimens we brought from the Gobi. We were surprised at the universal popular interest that the dinosaur eggs aroused.

The discovery was important because no one knew that dinosaurs laid eggs. We supposed that they did, for most reptiles lay eggs, and dinosaurs are reptiles. Still, in all the hundreds of deposits of dinosaur bones in various parts of the world, not a single trace of eggshell had been known.

Shackelford, our photographer, discovered the place in 1922, and at that time found the skull of a small dinosaur representing a type unknown to us. We spent only a few hours in the deposit, and Granger picked up some bits of dinosaur eggshell which we did not then recognize. It



A FASHION NOTE FROM THE DESERT

It was a strange apparition—this Mongol with his bowler and his queue—jogging along the barren Gobi on his shaggy camel.

was not until we returned the following year that the real discovery was made.

Everyone asks, "How big are the eggs?"

Prepare to be disappointed. The largest are only nine inches long! They were laid by a small species of dinosaur. The majority of people think of dinosaurs only as the huge types like *Brontosaurus* and *Diplodocus*, animals 60 or 70 feet in length. They forget that there were large dinosaurs and small dinosaurs, just as there are large and small reptiles living to-day (see page 667).

The eggs which we found were laid by a dinosaur only nine feet long. Since the eggs are nine inches in length, that gives a ratio of an inch of egg to a foot of dino-



saur—which isn't such a bad effort, when you come to think about it.

"How do you know that they are dinosaur eggs?"

There are many reasons why we know. We found them in a deposit where there were only dinosaur bones. Microscopically, the shell exhibits a structure unlike that of any other eggs of birds, reptiles, or turtles, living or fossil, known to science. But most conclusive of all is the fact that two of the eggs contain parts of the embryo skeletons of unhatched baby dinosaurs!

In addition, we discovered 75 skulls and 14 skeletons of this species, *Protoceratops andrewsi*. It is the finest age and growth series of any known fossil animal. The skulls range from those only two inches long, of animals just out of the eggs, through every stage to those of old males several feet in length.

The Flaming Cliffs (see page 688), where we found this deposit, represented a favorite dinosaur breeding place. Probably the sand was just the right consistency to allow the proper amount of heat and air to pass through to the eggs after they had been covered and left to hatch.

During several millions of years countless thousands of dinosaurs laid their eggs in this one spot. Probably most of them hatched, but many did not, and the 70 or 80 eggs we found represent an infinitesimal part of those still buried in the rocks.

#### A CHANCE DISCOVERY

The most perfect nest of all was a chance discovery. Norman Lovell, one of our motor experts, was interested in getting young birds for pets. One day he saw an eagle's nest just under the edge of the great peneplain which sweeps down from the Altai Mountains and breaks off at the basin (see illustration, page 654).

After several unsuccessful attempts to climb the face of the cliff he gave it up and approached the nest from above. Crawling on his hands and knees to the very edge, he lay flat on his stomach trying to peer into the nest, when he scratched his hand on something sharp. It was the knifelike edge of a broken dinosaur eggshell! Several eggs were partly exposed and evidently there were others buried in the rock.

To remove the eggs was a delicate and dangerous operation. A high wind blew,

and while at work Walter Granger had to lie at full length to avoid being swept over the brink. He took out a section of sandstone weighing several hundred pounds and sent it to the Museum.

Although the exposed surfaces of the eggs are weathered and broken, the lower halves are intact and make a superb exhibit. In the block there are 18 eggs standing on end in an irregular double circle. Doubtless the nest originally contained more, for there was evidence that others had broken out as the edge of the cliff crumbled away.

#### EGGS SOME 95 MILLION YEARS OLD

I have often wondered why the dinosaur eggs hold such interest for the layman. I suppose it is because of their great age. Ninety-five million years is the estimated age of the strata in which the eggs were embedded. Probably that is not far wrong, but a few million years either way would not be important.

Just half a mile from the Flaming Cliffs is an area of old, dead sand dunes bearing a sparse growth of desert trees allied to the tamarisk. They reach a maximum height of only 15 feet, but Dr. R. W. Chaney, our botanist, found by sections that many of them were more than 200 years old.

The day after reaching the Flaming Cliffs, Shackelford reported finding many pieces of worked flint in ravines which had been cut through the dunes by erosion.

Sculptured red bluffs marked the entrance to shallow valleys through the dunes, floored with soft sandstone where the wind had swept away the loose sediment.

On the clean surface, flakes of red jasper, slate, chalcedony, and other white stones were scattered like newly fallen snow. Pointed cones, neatly shaped where their strips had been flaked off, tiny rounded scrapers, delicately worked drills, and a few arrowheads gave Nelson the first indications of the type of culture with which he had to deal.

We held a consultation. Where did the artifacts come from? Could they have been washed down from the surface? We must find flints actually in the rocks and bones to date the deposit geologically.

Shortly after our consultation I discovered a bit of eggshell of the giant ostrich, *Struthiolithus*. A few yards to the left



ALWAYS UNGAINLY, CAMELS ARE UNSIGHTLY WHEN MOLTING

Across the desert they amble, like antique pieces of furniture with the upholstery falling out in patches. Their "restoration" occurs when their new winter crop of hair grows (see text, page 657). On the right-hand camel is a woman with typical Mongol headdress (see Color Plate IV).

Morris found another fragment of shell drilled with a neat round hole. Nelson said it was one of the beads in a necklace.

We were in a fever of excitement, for the trail was getting hot. Nelson, most conservative of conservatives, was skipping about from place to place like a boy of sixteen. At last Dr. C. P. Berkey found a spot where half a dozen chipped flints were deeply embedded in the sandstone floor.

Before noon we had discovered a dozen such spots and were satisfied that some at least of the artifacts had weathered out of the lowest level and had not washed down from the surface of the dunes.

An unlooked-for complication entered when we began to discover fragments of pottery. It was primitive enough, to be sure, but a people who used such crude stone implements had no business to be making pottery! The problem became more interesting and more complicated every hour.

I have never seen the advantages of correlated work more clearly displayed than in solving this human problem. The geologists, paleontologists, topographers, and botanist all assisted the archeologist. Without such a combination of experts' knowledge *available on the spot*, it would have been impossible to settle many of the puzzling questions presented by this deposit.

The subject became so interesting that it was difficult to keep all the men from hunting artifacts. Dr. H. A. Loucks, our surgeon, was one of the most enthusiastic workers. In company with Dr. Berkey, he discovered a vast workshop where flint chips were scattered over the surface in tens of thousands (see illustration, page 667).

They took four of our Mongols to the spot one morning and returned with about 15,000 flakes. Nelson worked for days sorting the pile and selecting specimens.

The second day's work revealed dark spots in the lowest layers of the soft red



FOSSIL "BONE-SETTERS" APPLY A BANDAGE

Strips of burlap, soaked in flour paste, are put on to strengthen the humerus and radius of a giant *Baluchitherium*. Pieces of wood are made into enormous "splints" for the same purpose.



YEARS OF STUDY, TRAVEL, EXPLORATION—AND THIS WAS FOUND!

The cherished object is a skull of one of the earliest known mammals, which lived in the Age of Reptiles. Seven of these tiny, priceless skulls are accounted the most important single scientific specimens collected by the Expedition (see text, page 716).



## AN OUTLINE OF A 10,000-YEAR HISTORY

Dr. N. C. Nelson, archeologist, is laying out flints cut by the Dune Dwellers many thousand years ago. The specimens show successive phases of a "mystery people" (see text, page 668).



## "THE COSTLIEST EGGS IN THE WORLD"

This nest of dinosaur eggs adhered to the under side of a rock. George Olsen turned the rock with his pick, exposing the prehistoric nest. This set now is in the Field Museum of Natural History, Chicago (see text, page 663).



sandstone. Evidentially these were ancient fire sites. When they were dug through in cross-sections, layers of ash containing charcoal, flints, and burned bones were revealed.

Very soon we found square bits of dinosaur and ostrich eggshells embedded in the sandstone. Then we realized that these people were the original discoverers of the dinosaur eggs.

Apparently they had picked up both the ostrich and dinosaur eggshell at the Flaming Cliffs, two miles away, and brought them to their workshops in the dunes.

A very few bones were found embedded in the flint-bearing strata, but they were so badly preserved that identification was impossible.

#### ONE JOKE BRINGS ANOTHER

On the second day, after many flints had been found, and Nelson had come to the conclusion that we were dealing with a late Paleolithic or Mesolithic culture, Dr. Chaney played a joke. He found a bit of rusted iron saw blade and planted it neatly in the flint-bearing layer. Dr. Berkeley was the one who discovered it first.

There was consternation in camp. It completely upset all our theories and gave us a bad hour. But while we were sitting disconsolately about the spot racking our brains to account for its presence, Nelson strolled up and produced the other part of the blade which he had found near camp.

We determined to get even with Chaney. He was an enthusiastic collector of birds' eggs and spent every leisure moment blowing and labeling them. Shackelford and I got two well-matched hen's eggs and had the cook boil them hard. Then they were beautifully stained in potassium permanganate.

I found a bush near the sand dunes where the ground was splashed with bird droppings, scooped out a hollow depression and "set" the eggs. A pair of demoiselle cranes lived near the spot and I told Chaney that probably there was a nest in the vicinity. He never had seen a crane's nest and eggs, so the rest was easy.

When I returned to camp and announced the discovery, he was all excitement. Four of us piled into a car and drove down to the spot. He was so delighted that I almost relented and confessed the joke. Then I

remembered the saw and hardened my heart.

After Chaney had photographed the "nest" from three angles and made a close-up with the portrait lens, we went back to camp. Word had been passed around and eight or ten men gathered to see the dénouement.

First attempts at blowing were not successful, and after a serious discussion as to the best method of preservation he decided to remove the embryo through a hole in one side.

I never shall forget the expression on his face when he discovered that they were hard boiled! With a roar he hurled one at Mac Young and the other at me, but we already had a good start across the desert.

The artifacts represented a new culture not closely related to any known from other parts of the world. We named these people the "Dune Dwellers," for wherever there were dead sand dunes we could be sure to find their implements. Obviously, they lived in the dunes, which are always formed near desert lakes, because there they could find water, shelter, and wood.

Later we found Dune Dweller implements in many other parts of Mongolia. In the east, where there was always more water, the remains were particularly abundant. Afterward Sven Hedin traced the culture far to the west, in Chinese Turkestan.

#### THE DUNE DWELLERS A "MYSTERY PEOPLE"

We began to realize that these people had inhabited the Gobi in great numbers. To-day there are less than a million natives in all Mongolia. Twenty thousand years ago there were many millions—more than there ever have been in historical or traditional times. But they are a "mystery people."

Where did they come from and where did they go? Doubtless they were driven out by increasing aridity.

As the Dune Dwellers saw the lakes and streams disappear and the game decrease correspondingly, they had to migrate. They certainly did not all die. What was their relationship to the early tribesmen of Europe and America? At present we do not know.



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LAMA PRIEST TURNING A PRAYER WHEEL.

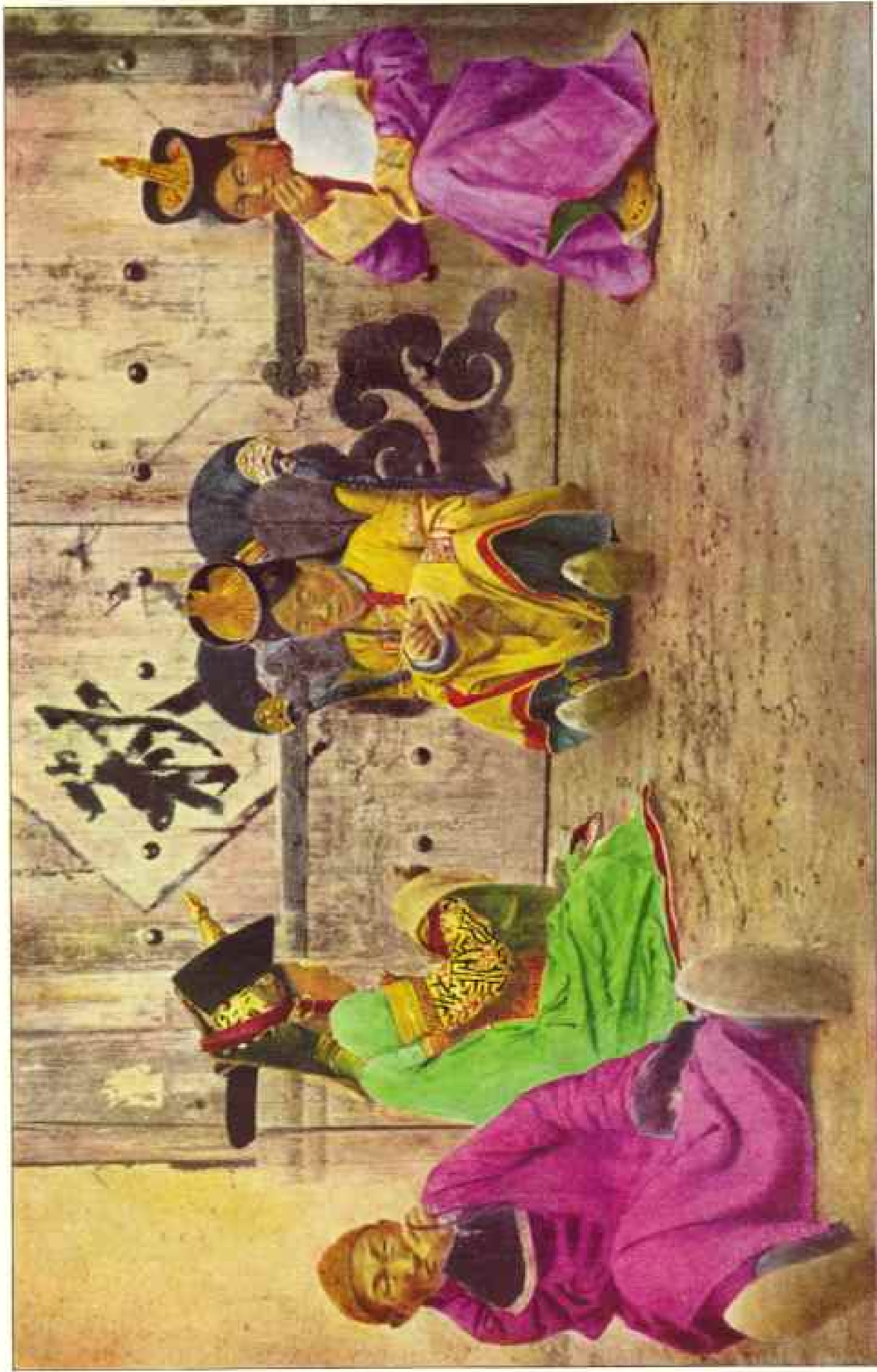
Mounted on the wheel is a gorgeous colored box filled with many thousands of bits of paper upon which prayers have been inscribed. The zealot believes that every time the wheel is turned a prayer automatically goes up to Buddha in his behalf. Prayer wheels sometimes are fixed in a small stream so that the current will keep them in constant motion. A caravan usually carries a prayer flag on the leading camel; thus, when the wind blows, a prayer is automatically given.



© National Geographic Society

WOMEN IN THE COURT OF THE GREAT TEMPLE AT URGA

Women are seldom admitted to temples, but on certain special days they come in great numbers to participate in the ceremonies. As they passed through the door for this special service, a little temple water was poured into their hands. They prostrated themselves before the feet of the gigantic Buddha and gathered handfuls of dirt from the floor, which they carefully wrapped in bits of cloth.



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THEY KNOW NO SUNDAY, BUT THEIR "BEST" IS DONNED FOR A TEMPLE VISIT

Women waiting for the temple to be opened for the ceremony. At the left is a lama priest with a circle of prayer beads in his hand. Like the men, the women wear wide leather boots with high upturned toes. As neither men nor women walk when a pony is available, the fact that the boots are so cumbersome is not important to the wearer.





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MONGOL WOMEN IN ORDINARY DRESS

The women of Mongolia are probably the most highly decorated of any in the Orient. They wear every color of the rainbow. On their heads are the saucer-shaped hats of the men and they have the same clumsy boots. The gown always has high pads or puffs over the shoulders.



TYPICAL HEADDRESS OF THE KHALKA TRIBE NEAR URGÄ

The hair is arranged over a framework like the horns of a mountain sheep. On the head is a filigree cap of gold or silver studded with precious stones in the case of the richer people and bits of colored glass in the poorer. Plaques of gold or silver ornament the ends of the "horns" and the braids are often enclosed in cylinders of gold or silver.



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WOMEN OF THE CHAHAR TRIBE OF INNER MONGOLIA

These women are standing in front of the felt-covered yurt, a portable dwelling adapted to the Mongols' needs, since it can be easily taken down, transported, and erected again.



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A TELEGRAPH STATION IN THE GOBI

This is the second telegraph station on the road between Kalgan, in China, and Urga, capital of Mongolia. It is in the lowest and one of the most desolate parts of the Gobi. Here was the last contact with the outside world when the Expedition started into the western part of the desert.



© National Geographic Society

A NORTHERN MONGOL

The Mongols literally live on the backs of their ponies. Their brilliant gowns make a pleasing splash of color on the brown desert. The hardy ponies subsist on grass and are seldom given shelter.



ON THE STREET OF AN URGA-SUBURB

Almost every house in Mongolia's capital is surrounded by a high palisade of unpeeled logs like the stockades used in the pioneer days of America.





A WOMAN OF THE CHAHAR REGION, INNER MONGOLIA

Wearing the usual headdress of gold or silver-studded with turquoise, red coral and pearls:  
(see Color Plate V).



© National Geographic Society

A BACK VIEW OF THE MONGOL HEADDRESS

This network of red coral is used only when in full dress.



The problem can only be solved by a careful study of the regions surrounding Mongolia to the north, west, and south. Fascinating possibilities are opened to the archeologist, because we know that wave after wave of primitive people swept into Europe from Central Asia in early times. Some may have been the descendants of our Dune Dwellers.

In the earliest stages of their culture they did not know the use of bows and arrows, but later they made the most beautiful spear and arrow points, skin scrapers, knives, and drills. Still later they must have used the seeds of certain plants for food, since we found well-made stone mortars and pestles.

Evidences of a still older culture, Mousterian, were discovered in several places. This is the type made by Neanderthal man, who lived several hundred thousand years ago.

#### OLDEST KNOWN DRY-LAND AREA

Doctors Berkey, Morris, Spock, and Teilhard de Chardin, our geologists, have read a fascinating story of earth history in the rocks of the Central Asian plateau. They have learned that this is the oldest continually dry land known to science.

Since the middle of the Age of Reptiles, a period of something like a hundred and fifty million years, Mongolia has never been submerged. In those early ages much of Europe and America was rising and sinking above the sea. Because of this incredibly long history of continuous dry land in Central Asia, a record of continental animal life is preserved there as in no other part of the world.

The geologists learned another interesting fact—the Central Asian plateau has never been covered with glacial ice as were many parts of Europe and America. Glaciers existed in the mountains, but they did not reach far out upon the plains. During the Ice Age the climate probably was cold, with high winds.

This is significant when one considers how, in successive waves, glaciers pushed far southward over Europe and America, sweeping all animal and human life before them.

Strangely enough, deserts often have more animal and bird life than do heavy forests, particularly if they are coniferous. That is true of the Gobi.

Raptorial birds are particularly abun-

dant, and we found half a dozen species of hawks and owls, several species of eagles, and two great vultures. The black vulture is one of the most interesting sights of the Gobi, as it sails on apparently motionless wings far up in the air. One that we killed had a wing-spread of nearly ten feet.

Dr. Chaney took a young black vulture from the nest at Baga Bogdo, eastern Altai Mountains, and brought it back to camp. It flourished and became as tame as a chicken. Eventually I took it back to the New York Zoological Park, where it still lives (see illustration, page 679).

From the very first we fed this bird upon fresh meat; it refused to eat carrion of any sort. If meat had the slightest decayed odor, the bird would have nothing to do with it.

It cared for itself in the most astonishing manner. If we were camped near a lake, it would wade into the water for a bath two or three times a day and delight to drowse in the sun, with wings half spread, drying its feathers. It was always allowed the freedom of the camp and never attempted to leave. In fact, it got distinctly lonely if most of the men were away and always preferred to be near some one.

Its favorite sleeping place was in the rear of my tent. My police dog, Wolf, also liked to sleep there, and the contests for supremacy were amusing. The dog was usually worsted in these encounters, for he evidently considered it beneath his dignity to fight with a bird.

#### A VULTURE RAPS FOR WATER

I was much surprised at the amount of water which it consumed. Drinking by itself from a pail was too slow a process, and it much preferred to open its great beak, throw back its head, and have some one pour water down its throat.

One day I was sitting in my tent writing. A gasoline tin of drinking water was near the door. The vulture came up to the tin and rapped on it significantly with its beak. I paid no attention, and after three or four raps the bird entered the tent, jerked my coat, and returned to the tin. Of course, I gave it water.

When we were camped opposite Baga Bogdo, a beautiful snow-covered peak, Shackelford and I visited Tsagan Nor, a desert lake 20 miles from the foothills. It proved to be a lovely spot.



#### MAPPING THE BAD LANDS OF URTYN OBO

Capt. W. P. T. Hill, United States Marine Corps, one of the Expedition topographers (right), is mapping the rich fossil fields of the Gobi, while Dr. Andrews (left) scans his charts. In a flat country, with few natural landmarks, a new survey method had to be developed, using automobiles as stadia rods (see text, page 657, and Color Plates XIV and XV).

Coarse, green grass margined the water, which reflected Baga Bogdo in its mirror-like surface. Hundreds of ducks, geese, sheldrakes, and grebes were paddling about, followed by trailing wakes of downy young. Between the mountain and the lake on the south side is a long line of cream-white sand dunes beautifully sculptured by the wind.

#### MOONLIGHT ON BAGA BOGDO

Our tents were pitched on the gravel beach not 50 yards from the water's edge. Short grass gave it a lawnlike effect.

Neither of us will ever forget the first evening there. Just as the sun disappeared, Baga Bogdo was flooded with a wonderful lavender light which edged the lake with deepest purple. Then the moon rose in a splendor of gold from behind the sand

dunes, drawing a glittering path across the water to the very door of my tent.

In the marsh grass and rank vegetation beside the lake a species of green insect, like a mosquito, swarmed in countless thousands. At dark they began to rise with a hum like distant motors. The noise was appalling.

Fortunately, the insects are exclusively vegetable feeders and did not bite us. They formed a stratum three feet thick and seemed to be following the lake shore from west to east. The flight line lay five feet above the ground, and below that level there was hardly an insect. Not many came into the tents when the candles were lighted; there were no mosquitoes or sand flies; it was an ideal summer resort.

Of course, we were curious to know whether there were fish in the lake.



PERHAPS YOU HAVE MET IT IN NEW YORK?

George Olsen is playing with a black vulture which was taken from a nest in the Altai Mountains when it was a fledgling. It stayed with the Expedition for an entire season. Then Dr. Andrews took it to the New York Zoological Park, where it has lived happily for eight years. It ranks among the largest birds in the world (see text, page 677).

The first evening we saw a number of suspicious-looking swirls in the water which we were certain must be made by fish. Hooks and lines gave us nothing, but I had a 20-foot seine which yielded a plentiful supply of small fish. They were all of a single species and few of them were more than eight or ten inches long. Mr. J. T. Nichols, who has identified the fish, says that their affinities are to species of the far western Altai Mountains.

How these small inland lakes became stocked with fish remains a mystery.

About the lake there were many species of small mammals peculiar to the desert and an important part of our work was the collecting of the living fauna of the Gobi.

In the late afternoon our three Chinese taxidermists would go out carrying 50 or

60 wooden traps. Wherever they found holes, runways, or other favorable indications they placed a trap baited with peanut butter. Usually there was a nightly line of 150 traps.

In the morning kangaroo rats, hamsters, voles, sand rats, and other small species would keep our men busy all day preparing specimens for study in the Museum.

The mammals alone number 10,000 specimens and represent by far the largest collection that has ever been taken from a single region in Asia.

Most of the specimens are rodents, but there was one interesting and amusing insectivore, the hedgehog. It is about half the size of a hare and covered with quills as sharp as needles. The little fellow can roll itself into a ball and is impervious to the attack of an ordinary animal. At



LUNCHEON IS SERVED!

The scientific staff is seated in the shade of the Expedition's mess tent. The tent is the Mongolian type, especially adapted for the high desert winds. It is so constructed that the sides present a sloping surface to the wind from any direction; hence it resists gales that would blow down tents of other types. The decorations are Chinese characters for good luck and hats, also considered symbols of fortune.



THE EXPEDITION PET BEGS FOR ITS BOTTLE

This baby wild ass was roped from a car traveling 20 miles an hour. It lived precariously on dried milk and goats' milk, but died from overeating when the Expedition arrived on the slopes of the Altai Mountains, where there was a plentiful supply of cows' milk.



PRESERVING FISH FROM TSAGAN NOR, MONGOLIA

Many desert lakes have small fish. These minnows were related to a species living in the far western Altai Mountains, nearly a thousand miles distant. They gave the geologists an important clue to the prehistoric drainage system of the desert.

Tsagan Nor they were abundant in the long grass near the water's edge.

We would throw a piece of antelope meat into the grass and shortly after dark visit it with a flashlight. Usually we would discover one or more hedgehogs in the vicinity and could catch them without much difficulty.

The older individuals were not easily tamed, but one half-grown male became as gentle as a kitten.

Mr. Shackelford kept this little fellow as a pet all through the summer and eventually took it to New York with him. After living for some time in his apartment it was transferred to the New York Zoological Park. It ate grasshoppers and other insects and bits of fresh meat voraciously, and after a few days could be handled with impunity. Only when angry or suddenly startled would it erect its quills.

On the gravel peneplain north of the lake, desert gazelles, *Gazella subgutturosa*, were abundant. The great flat plain was an ideal place for the does to rear their young. When we reached there, on July 11, most of the baby antelopes were two

or three weeks old and were running with their mothers.

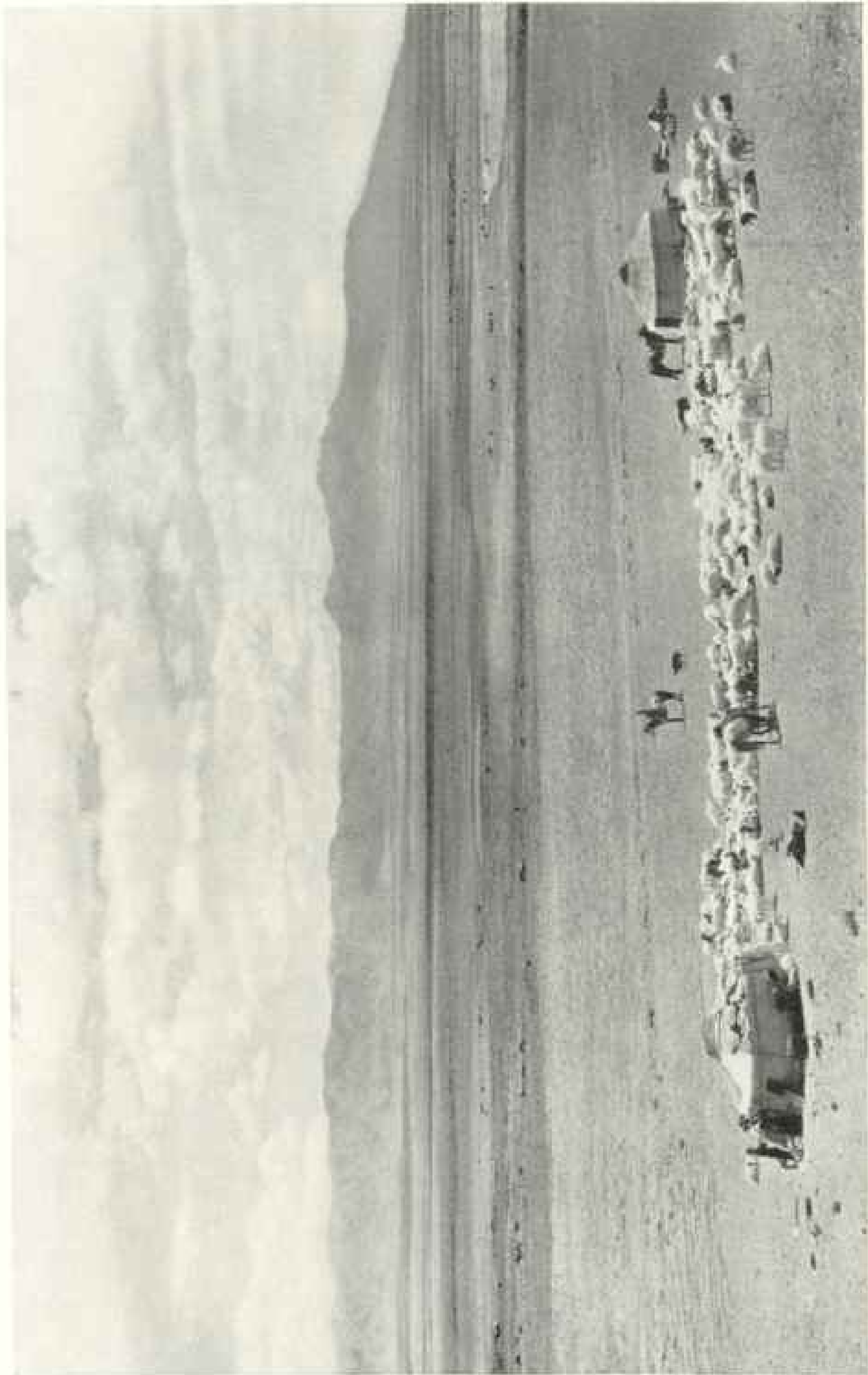
A grassland gazelle, *Procapra gutturosa*, gathers into great herds of does in the spring, just before the young are born, and again into mixed herds in the autumn. The desert gazelle never does this. I believe the reason is that at no spot in the desert is there sufficient vegetation to support a large, slowly moving herd; in the grasslands there is ample feed.

#### THE CAMOUFLAGE OF A FAWN

The fawns were clever at hiding. They would lie flat upon the ground beside a sagebush only a few inches high, their ears dropped and neck stretched out. Many times I tried to creep up and throw a coat over one, but just before I got within reach it would dash away. The brown, woolly hair is so exactly the color of desert gravel that the little fellows were almost invisible when motionless. I usually discovered them by their brilliant eyes.

The fawns hide until they are about two weeks old; then they prefer to trust to their legs and speed. Nevertheless, they





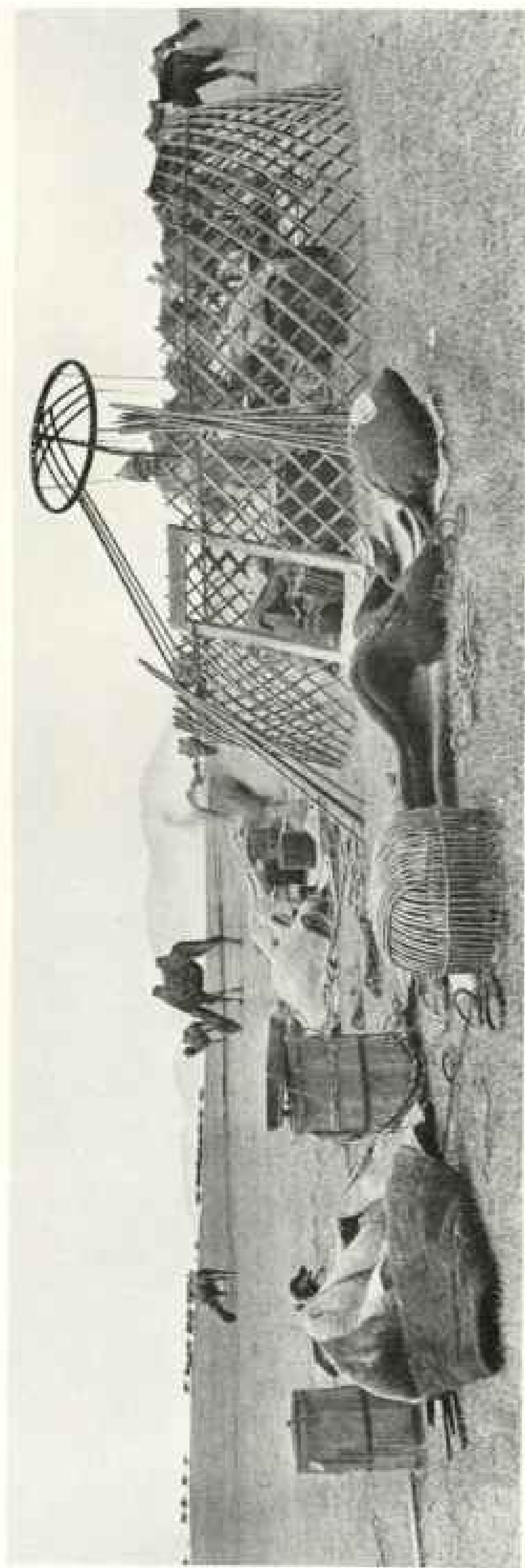
AN OASIS IS THE PORT OF DESERT CARAVANS

This Mongol village is located near a brackish lake at the eastern end of the Altai Mountains. A half dozen small streams running out of the mountains form the precious water body. The green meadows in the middle ground are dotted with herds of ponies and cattle.



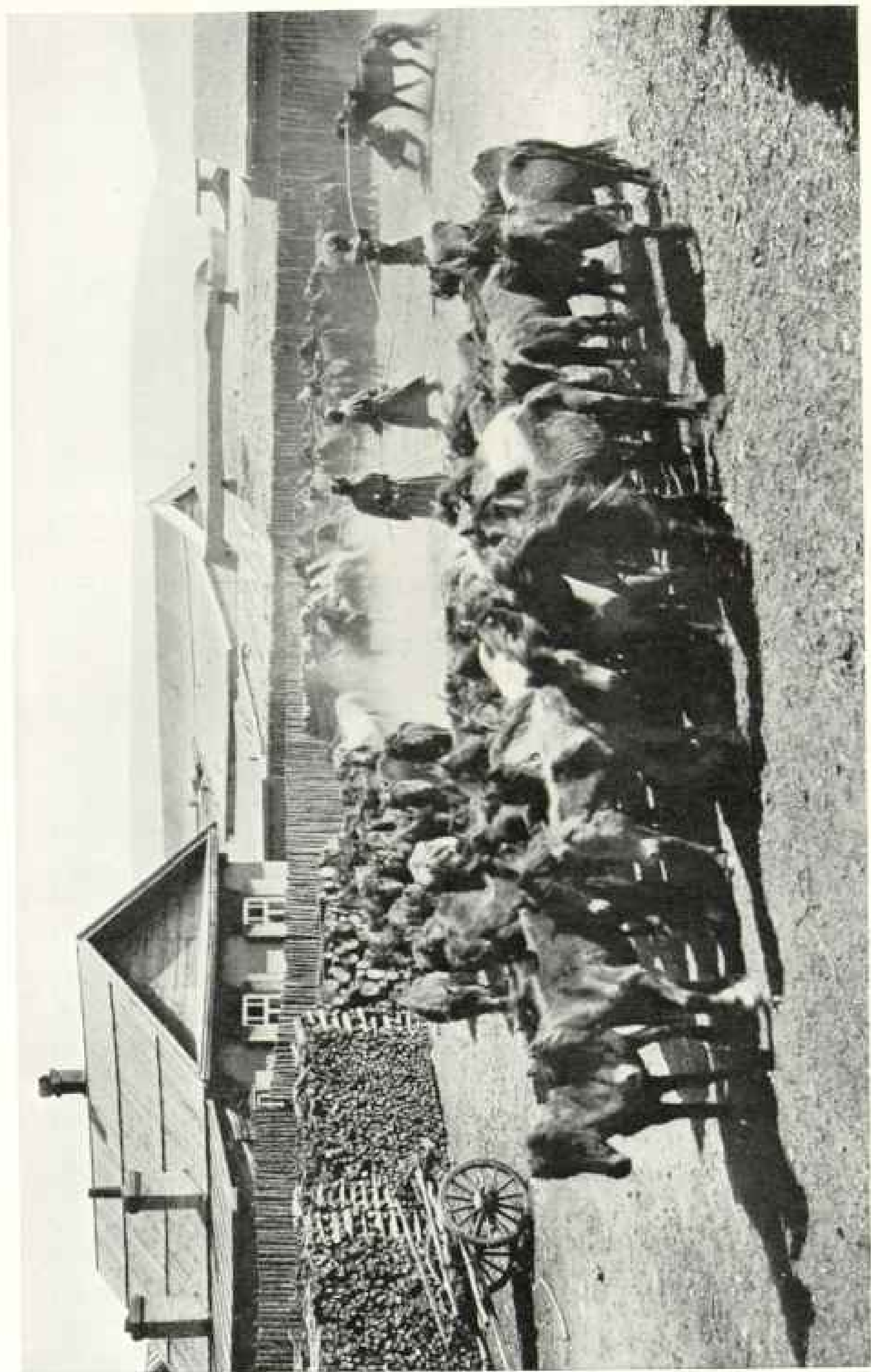
THIS HOLD IS NOT BARRED IN THE DESERT MEETS

A Mongol Londres catches his opponent by the waistband, and by tripping and sheer strength forces him on his back. Our wrestling holds are not used.



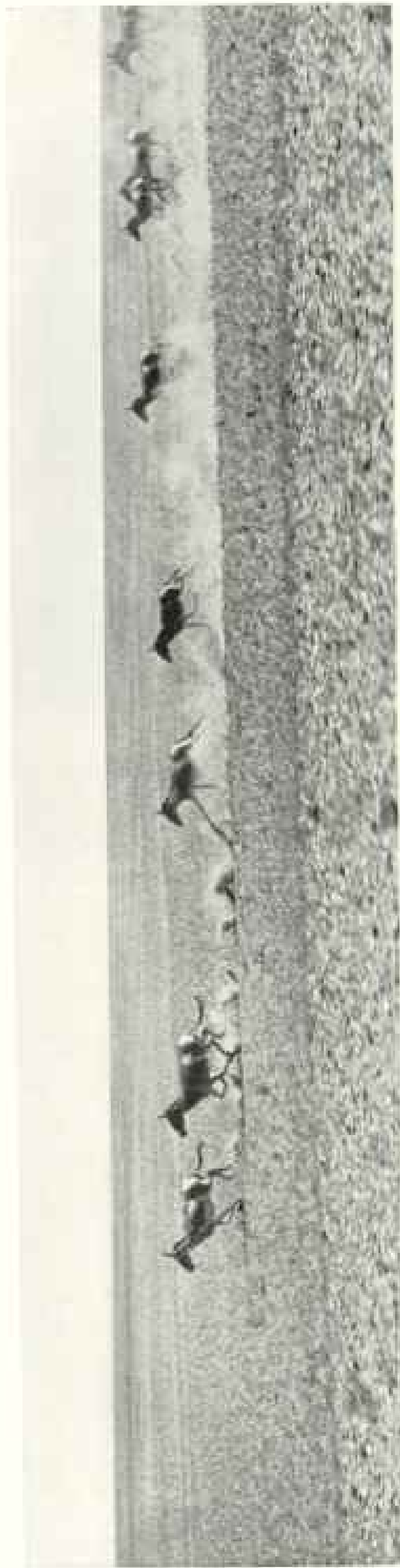
A YURT IS THE MOBILE BUNGALOW OF NOMAD TRIBES

The Mongol yurt is a collapsible framework over which felt is spread and tied in place. The natives can erect and dismantle this type of dwelling as speedily as a crew can handle an American circus tent. Setting it up requires about 20 minutes, and in the same time it can be taken down.



BRANDING DESERT PONIES IN AN CIRCA COMPOUND

The scrawny ponies, just off the plains, show the effects of the long winter, when they lived, without shelter, in temperatures down to 40 to 50 degrees below zero (Fahrenheit), and foraged under the snow for food. They will put on weight when the grass begins to grow, and then will be sold in China.



WILD ASSES IN FULL FLIGHT

Mongols tell extraordinary stories about the speed and endurance of these animals. By test with motorcars the explorers found the highest speed of an individual was 40 miles an hour, but this could be maintained for only a short dash. One fine stallion ran for 10 miles at an average of 30 miles an hour.



WILD ASSES OF THE MONGOL PAMPAS

These animals were little known to science until the Expedition studied them. There were no skins in America and only two in the British Museum. Specimens, motion pictures, still photographs, and many data about their life history were obtained (see text, page 687).



A MONGOLIAN GOAT NURSES A PET ANTELOPE

The goat's legs were so short that it had to be elevated on rocks to permit its tall foster child to feed comfortably.

can run at a respectable rate within a few hours of birth. One not yet dry behind the ears tired my pony out in a chase. Although the fawn could not run as fast as the pony, by rapid turns it would gain so much distance that I could not catch it.

After the first three weeks a wolf would not have a chance in speed with a baby antelope. We did not find any wolves that could exceed 36 miles an hour, even on the first dash, and the fawns could easily reach 40 miles an hour.

#### MOTORCARS TEST SPEED OF GAZELLES

We have demonstrated, with the aid of our cars, that beyond a doubt the desert gazelle can reach a speed of 60 miles an hour in its initial dash. It can maintain this speed only for about half a mile; then it will slow to 40 or 45 miles an hour. The grassland species, which is larger and has a heavier body and shorter legs proportionately, cannot reach a greater speed than 50 miles an hour.

We followed one desert gazelle, a fine buck, for ten miles. We were on a flat plain, where the going was excellent for the car. He left us easily in the first three

miles and we could just keep his bobbing white rump patch in sight; then he settled down to a steady pace of 30 miles an hour, keeping about 100 yards in front of the car. He continued at this speed for seven miles, when we got a puncture but he did not.

Of course, ability to reach such a high speed in the initial dash is a protection from wolves, their only important natural enemy. A wolf can hope to catch an antelope only by lying in wait behind some cover until it is near enough for a surprise attack. The ability to "get away" like a flash and leap into high speed instantly is the gazelle's only safeguard.

In August Shackelford had an opportunity to photograph the largest herd of grassland antelope I have ever seen.

We discovered them one morning six miles from camp, streaming up to the plain out of a wide basin; thousands upon thousands of bucks, does, and fawns poured in a yellow flood over the rim and spread out like a vast fan upon the plain. Eventually they arranged themselves as though directed by a stage manager; perhaps 50,000 were in the bottom of a shallow valley,





A MAN-EATING DOG LOOKS THE PART

Mongolian dogs are of the Tibetan mastiff breed, and are black, with brown points. They are so fierce they will attack a stranger on sight (see page 701).

where from the rim we could "shoot" down at them with the telephoto lens. There was a light wind, and for the first time in my life I could *smell* live antelope.

A mile away the squalling of the babies could be heard.

#### RACING THE WILD ASS

At Tsagan Nor we had splendid opportunity to study the wild ass (*Equus h. hemionus*), a mammal new to me and but little known to the scientific world. No museum in America had specimens of the Mongolian ass, although the Tibetan species is fairly well known (see illustration, page 685).

The animal stands 52 inches high at the shoulder and is rather like a fine-bodied mule. The yellow fawn color of the upper parts shades beautifully into the pure white belly and rump patch. The mane is dark brown, and along the median line of the back a chocolate-colored band runs to the tail, which is tufted and mulelike.

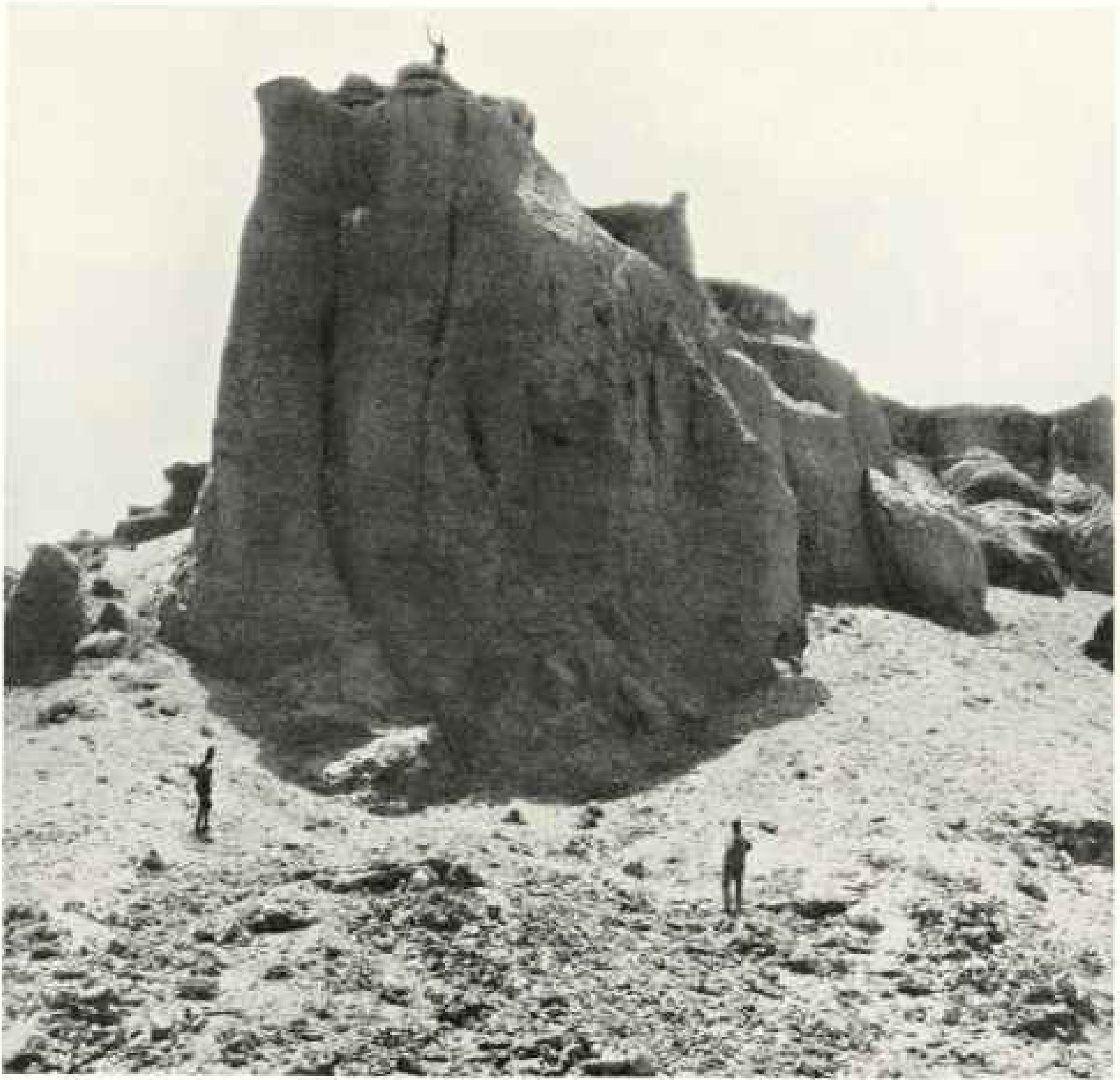
The Mongols told extraordinary tales of its speed and endurance. One day we discovered a fine stallion well up on the plain near camp at Tsagan Nor.

Shackelford and I spent two hours in the car following the animal. Its highest speed was 40 miles an hour. However, this could be maintained for only a short dash, perhaps a furlong. Subsequently, we found that only a few of the fleetest individuals could reach that speed, but that all could do 36 miles an hour when galloping full out.

To me the most amazing exhibit was the endurance of the wild ass. The stallion traveled 29 miles before it gave up and lay down. The first 16 miles were covered at an *average* speed of 30 miles an hour, as well as we could estimate. During that time there never was a breathing space. It would sometimes slow up to 25 miles when it had evaded us by a sharp turn, but a few moments later would speed up to 40 miles, as it tried to cross in front of the car. Once, at 36 miles an hour, we pounded along 50 feet apart.

The wild ass feeds upon the dry desert vegetation, such as camel sage, low, thorny bushes, and stiff brush grass.

It is my belief that the wild ass requires very little water; that, as in other desert animals, the starch in the vegetation which



A LOFTY CLIMB IN SEARCH OF AN EAGLE'S NEST

This sandstone rampart of the Flaming Cliffs, at Shabarakh Usu, was called Battlement Bluff, because of its resemblance to the walls of a fort.

it eats is converted by digestive processes into water sufficient for its needs.

One July, Shackelford and I caught a baby wild ass, which we kept as a pet for six weeks.

#### A BABY ASS PROVES UNTAMABLE

I have never seen such a wild, untamable animal. Even though he was treated with the greatest kindness, he never lost his fear except with Buckshot, a Chinese assistant, who fed and tended him constantly. Whenever anyone else approached the colt, fear dilated his eyes and he kicked viciously. Eventually he learned to follow Buckshot like a dog, and would even enter the cook tent if he happened to be inside (see page 680).

A Mongol told me that he had reared a wild ass colt which he persuaded a pony mare to adopt. At first the mare would not allow the youngster near her; then the Mongol conceived the idea of pouring some of her own milk over the baby ass, and this soon solved the difficulty. The animal flourished, but was always wild and difficult to approach except by its owner.

He never was able to break it to the saddle or use it in any other way. The ponies would not allow it in the herd with them. The Mongol bred it to a pony mare, and the resulting mule, although a fine, strong animal, never could be ridden.

The Gobi is so dry and cold that there are very few reptiles. Pit vipers, the only



THE TOMB OF A DESERT PRINCE

Mongols seldom bury their dead, but throw their bodies out on the plain, to be devoured by wolves, birds, and dogs. Lamas of highest rank and princes are buried and tombs are erected. The size of this shrine of the sands may be estimated by comparing its height with that of Dr. Granger, standing at its base.

poisonous snakes of the Gobi, caused us some annoyance at times. Once our tents were pitched on a lofty promontory, which projected far out into the basin of the dry river, Shara Muren. Near them was an *obo*, or religious monument, and shortly after our arrival two lamas came to call. They were delegates from a temple four miles away and asked us to be particularly careful not to shoot or kill any birds or animals on the bluff.

It was a very sacred spot and the spirits would be angry if we took life in the vicinity. Of course, I agreed to respect their wishes and gave orders to this effect at once. But we had promised more than we could fulfill, as events proved.

Within the first two hours of prospecting for fossils three pit vipers were discovered close to the tents. A few days later the temperature suddenly dropped in the late afternoon and the camp had a lively night, for the tents were invaded by an army of vipers which sought warmth and shelter.

Norman Lovell was lying in bed when he saw a wriggling form across the triangular patch of moonlight in his tent door. He was about to get up to kill the snake when he decided to have a look before he put his bare feet upon the ground.

Reaching for his electric flash lamp, he discovered a viper coiled about each of the legs of his camp cot. A collector's pickax



A CAMEL IMBIBES NOT OFTEN, BUT VERY LONG

In summer the Mongolian camel usually is watered every other day, but in winter, when on march, four or five days is the usual period between drinks. They can go for seven days without water. These camels have just shed their hair, and their hide is practically bare.



GOATS "GO INTO A HUDDLE" FOR MILKING

The animals are often tied head to head when a herd of them is to be milked. Goats' milk is a principal food of the Mongols, who make it into cheese and butter.



A WELL IS THE MEETING PLACE OF THE DESERT

There business is transacted, gossip is exchanged, news is distributed (see text, page 701). In Mongolia wells are dug along caravan trails. Water is only 15 or 20 feet below the surface in many places in the Gobi, so the Expedition often dug its own wells when necessary.



SALT, NOT TIME, IS MONEY IN MONGOLIA

This lake has a salt crust about an inch thick. Each spring the lake fills, and evaporates in summer, leaving the deposit of practically pure salt.



was within reach and with it Lovell disposed of the two snakes which had hoped to share his bed. Then he began a still hunt for the viper that had first crossed the patch of moonlight in the door and which he knew was somewhere in the tent. He was hardly out of bed when a serpent crawled from under a gasoline box near the head of his cot.

Lovell was having rather a lively evening of it, but he was not alone. Morris killed five vipers in his tent, and Wang, a Chinese chauffeur, found a huge snake coiled up in his shoe. Having killed it, he picked up his soft cap which was lying on the ground and a viper fell out of that. Dr. Loucks actually put his hand on one which was lying on a pile of shotgun cases.

#### 47 SNAKES KILLED IN TENTS AT "VIPER CAMP"

We named the place "Viper Camp" because 47 snakes were killed in the tents. Fortunately, the cold had made them sluggish and they did not strike quickly. My police dog was the only one of our party to be bitten. He was struck in the leg by a very small snake and, as George Olsen treated the wound at once, he did not die. The poor animal was very ill and suffered great pain, but recovered in 36 hours.

This snake business got on our nerves. The Chinese and Mongols deserted their tents and slept in the cars and on camel boxes. The rest of us never moved after dark without a flashlight in one hand and a pickax in the other. When I walked out of the tent one evening I stepped upon something soft and round. My yell brought the whole camp out, only to find that the snake was a coil of rope!

We had to break our promise to the lamas and kill the vipers, but our Mongols remained firm. It was amusing to see one of them shooing a snake out of his tent with a piece of cloth to a place where the Chinese could kill it.

The vipers are about the size of our copperheads, or perhaps a little larger. While their fangs probably do not have enough poison to kill a healthy man, it would make him very ill.

We collected only one nonpoisonous species of snake in the Gobi.

Although the Gobi is one of the most arid deserts of the world, there are many places which furnish scanty grazing, and there Mongols can almost always be found.

Conditions forced them to become a pastoral and nomadic people. They depend entirely upon their flocks and herds for the necessities of existence. Their independence, love of sport, hospitality, and admiration of the strenuous aspects of life are a direct result of the conditions under which they live.

Mongols are fond of children, but the youngsters do not have an easy time in life. They are examples of the "survival of the fittest." They grow up as best they can, with no attention to the most ordinary rules of health, cleanliness, or diet. From the moment they stop nursing, they eat and drink whatever comes their way. If they are ill, the only medical services are the prayers of the lamas. They must become hardened to the greatest extremes of temperature.

Often I have seen babies, only two or three years old, running about stark naked outside the yurt in a bitter wind, when I was shivering in a fur coat (see page 707).

When a child is about four years old it is taught to ride a pony. No sympathy is wasted if it falls off; it is only put into the saddle again and sometimes tied in place.

#### THE MONGOL'S REAL HOME IS A PONY'S BACK

At five or six the children begin to do their bit at herding sheep and goats; a few years later they graduate to the care of camels and ponies, work necessitating long hours in the saddle and often nights alone on the desert. They must learn self-reliance long before their time. They have accumulated most of what their elders have to teach them by the time they are 16, and from that age onward they make little mental progress.

Since animal droppings (*argul*) are the only fuel, and these burn rapidly, a considerable quantity is accumulated for winter use. Sheep dung is made into large bricks during the summer. They are frequently piled about the yurt as a wall, and act as windbreak for the dwelling, corral for the animals, and fuel supply. If a family moves away from such a place in the spring, leaving a quantity of unused *argul*, other Mongols do not take it, as they know the owners will return.

A Mongol's real home is the back of a pony. He is uncomfortable on the ground. His great boots are not adapted for



LOOKING THROUGH THE TELESCOPE OF THE EXPEDITION'S TRANSIT

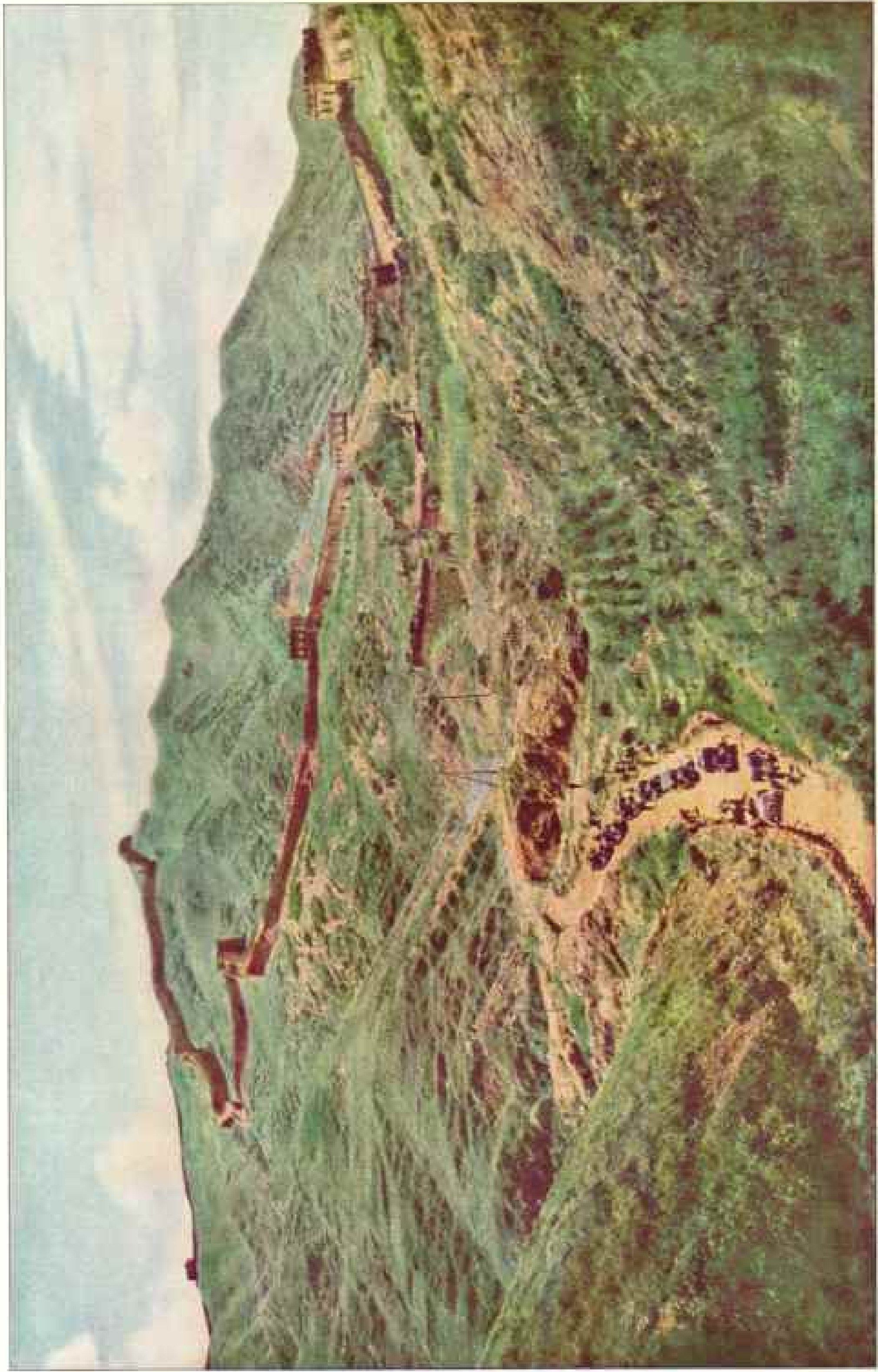
These Mongols had never before seen a telescope and would gaze through it by the hour. They would give any of their possessions, not excluding a wife, to obtain field glasses.



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GUIDES, INTERPRETERS, AND HUNTERS

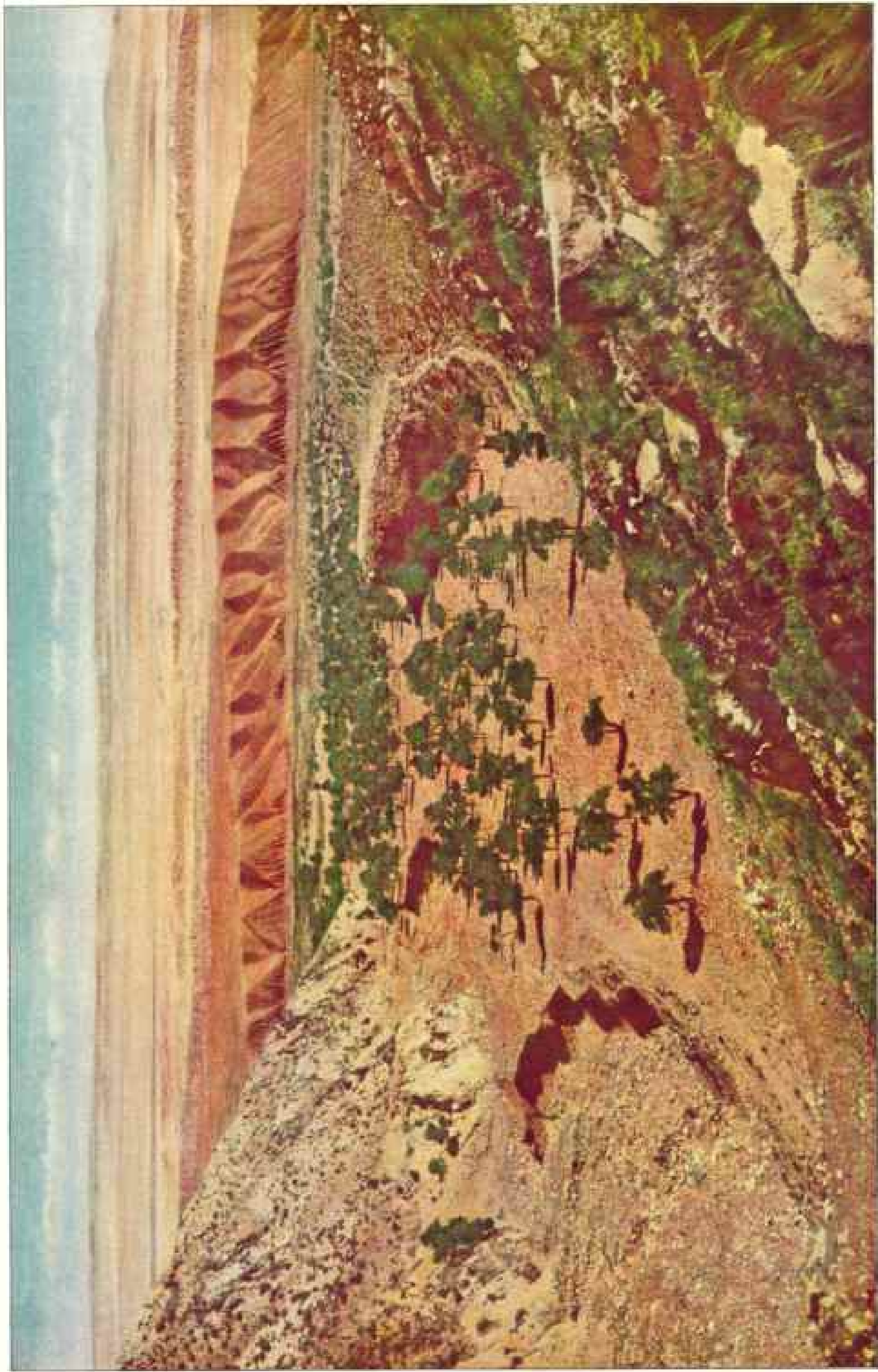
Mongol caravan men and Chinese servants, by their loyal support, did much toward making the Expedition successful. Tserin (left) was an excellent rifle shot. Note chopsticks in the felt case, over knee.



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THE GREAT WALL OF CHINA AT THE NANKOW PASS

This, the innermost part of the Great Wall, is well preserved. Its earth core is faced with brick. The outer rampart is 20 miles beyond Kalgan on the edge of the Mongolian plateau. The Nankow Pass, being one of the principal passes from Mongolia to China, is heavily fortified. The Wall at Kalgan was the outer line of fortifications; the Wall at Nankow, the second line of defense; and the Walls of Peiping (Peking), the third and last line.



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LOOKING NORTH OUT OF TIGER CANYON, IN THE EASTERN ALTAI MOUNTAINS

In the foreground is a sparse grove of trees which find sufficient moisture in the dry river bed of the canyon. Beyond is a line of sand dunes, and in the far distance, the gravel plain of the Gobi. The Expedition members often watched terrific rain storms in the mountains, while out on the desert, ten miles away, not a drop of water fell.





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THE EXPEDITION'S CAMELS IN THE SAND DUNES

On the southern and western sides of the desert salt lakes huge dunes were found. They were presumably formed from the debris which had been blown out of the basin to excavate the lakes. In the lowest parts of the valleys, between the dune ridges, water often was close to the surface.

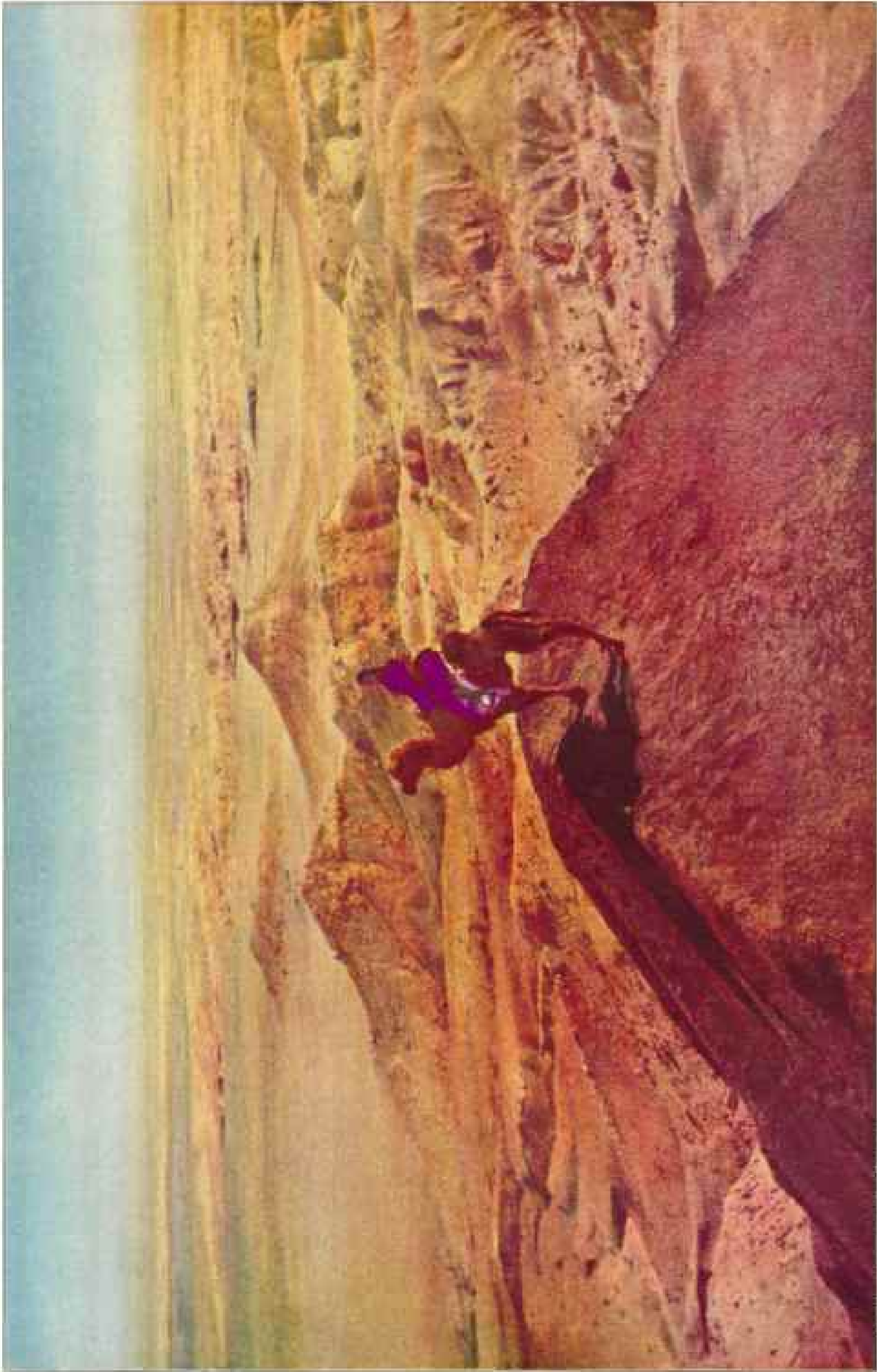




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A MONGOL FIELD MEET NOT FAR FROM ULIASSUTAI

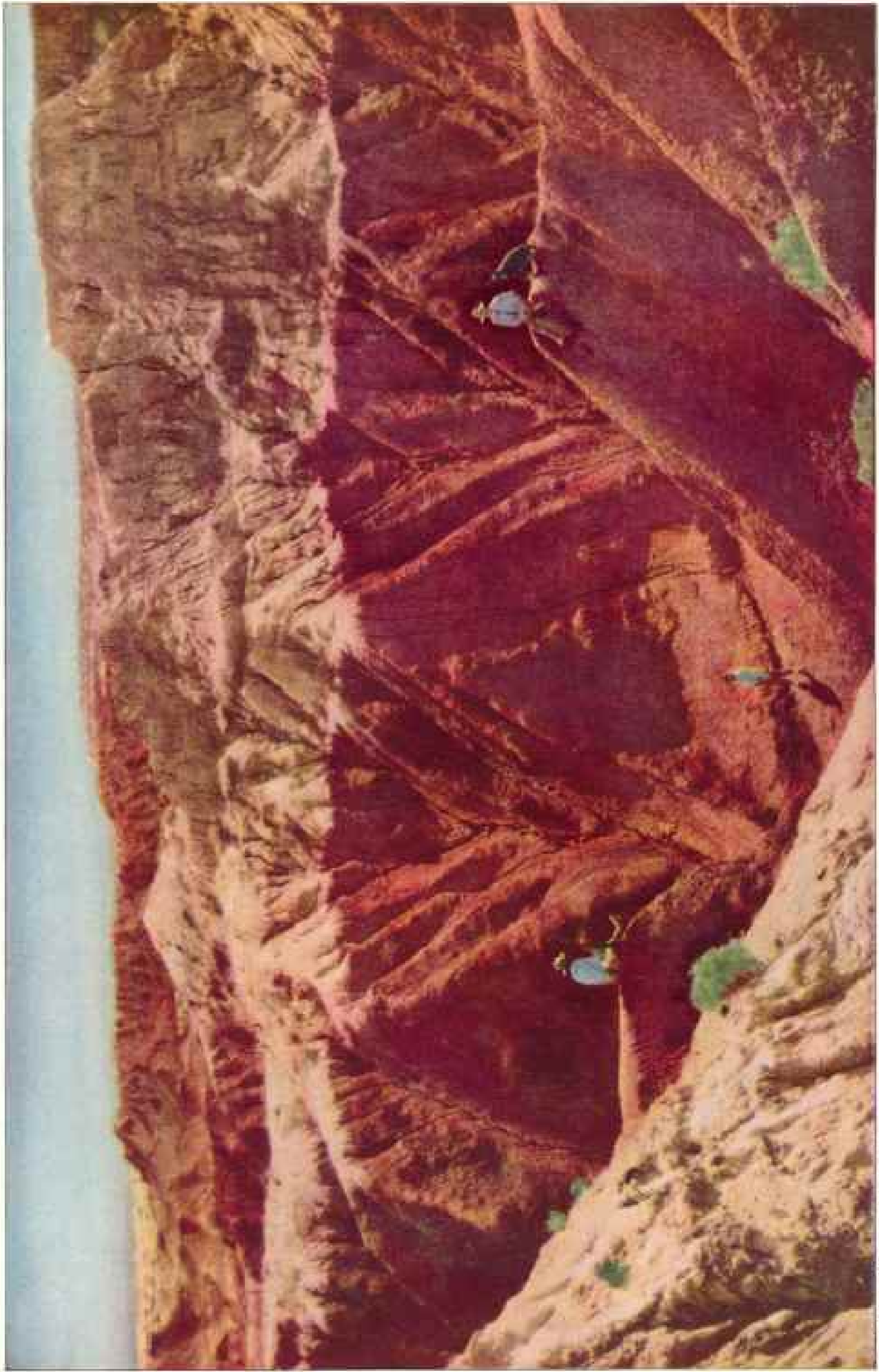
Usually once during the year, the Mongols in every district gather for athletic contests which consist of horse racing and wrestling. There is a feast of boiled mutton at the end of the contests.



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LOOKING OVER THE BAD LANDS AT URTYN OBO

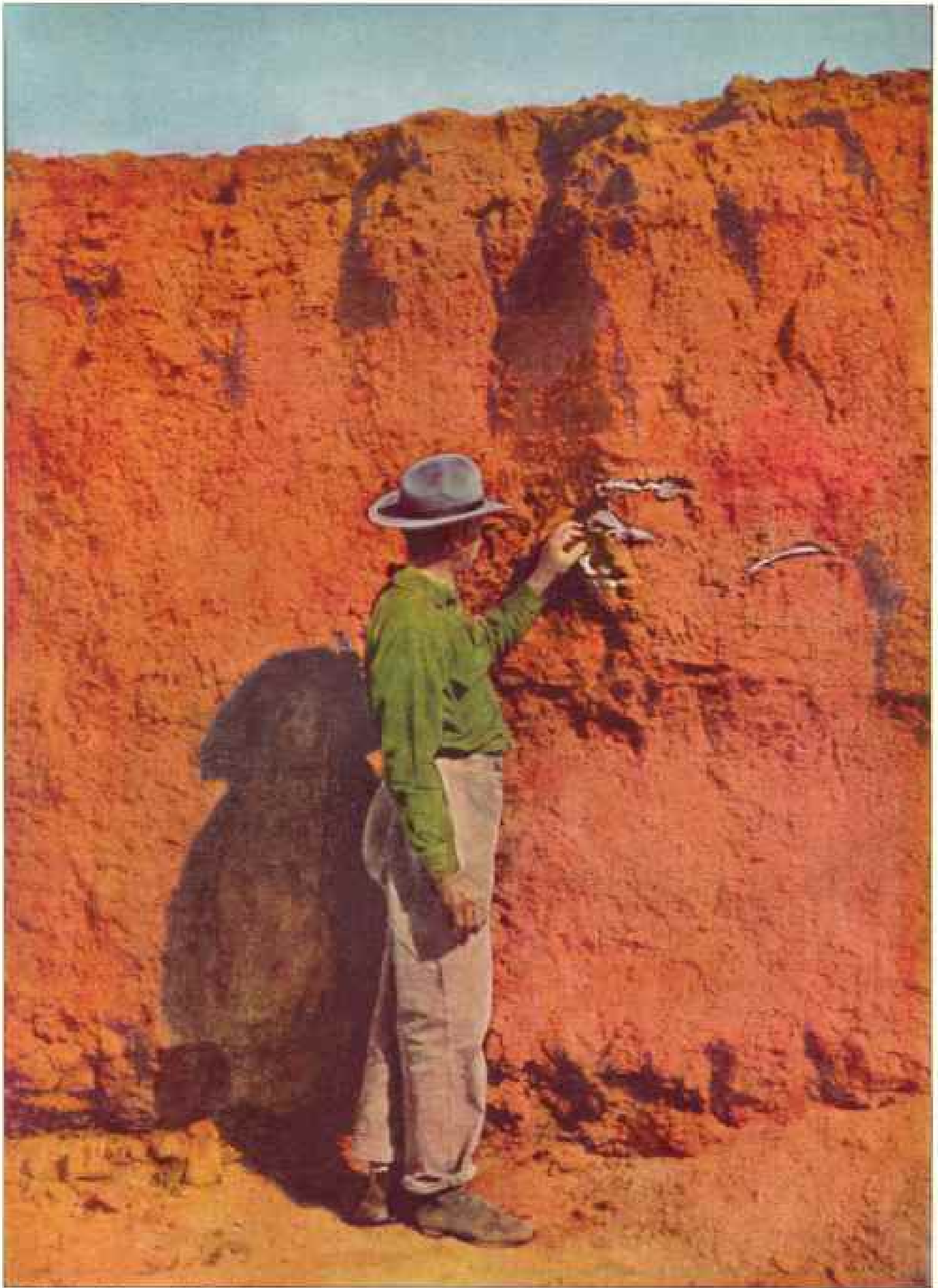
Here was one of the richest fossil fields discovered by the Expedition in the Gobi. Specimens of the giant prehistoric animals, including several types of rhinoceros, were abundant.



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THE "RED BEDS" OF URTYN SHOW FOSSEL TRACES OF MONSTER ANIMALS

The light upper third was Oligocene gravel in which the Expedition found the enormous bones of the ancient *Bachkikhertana*. In the lower third, Eocene sediments were barren except for remains of a few turtles. Farther out in the basin, still lower, sediments were extraordinarily rich in the bones of rhinoceros and titanotheres.



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DR. WALTER GRANGER STUDIES THE BONES OF A FOSSIL RHINOCEROS

This illustration shows how fossil bones are discovered. These are buried six or eight feet beneath the surface, but by walking down a dried river bed or ravine where a cross-section of the sediment can be obtained, the fossils are located.



walking, and he is so seldom on foot that to walk a mile is punishment. To go only a hundred yards or so he will jump on his pony, which always stands hobbled within reach. A Mongol has no respect for a man or woman who cannot ride, and nothing wins his admiration so quickly as good horsemanship.

Ponies are fairly cheap in Mongolia, but not extraordinarily so. Racing is almost a business, and if a native owns a fast pony his fortune is made. He goes to the annual field meets at all the temples in his neighborhood, and will race for a sheep or goat in the interim, if he needs the money.

The races are really endurance contests. Five to ten miles is the usual distance, and I have known some to be 20 miles. The ponies are ridden by boys 12 or 14 years old, who beat their mounts from start to finish.

#### ABILITY TO SHOOT ADMIRED

Next to horsemanship, ability to shoot is most admired by a Mongol. Almost every native possesses a flintlock gun, with an enormously long barrel. Its effective distance is less than 100 yards, and they seldom shoot even at that range. They cannot shoot offhand. Two long sticks attached to the barrel on either side are used as a rest. When carrying the gun, these are folded back on either side of the stock.

The natives never cease to talk about the ability of our men to shoot running antelope offhand at three or four hundred yards.

One seldom sees sick natives. Probably one of the reasons is that if a person is very ill the relatives simply decamp and leave the invalid to die.

Believing that evil spirits take possession of a body as soon as life is extinct, they are extremely loath to have anyone die in their yurt. I have often seen mute evidences of a desert tragedy—a human skeleton lying beside the dead ashes of a fire; near by a wooden bowl with a little food; there, the mark left by the yurt.

The story was plainly told. The person was about to die and the other members of the family had moved to new grazing grounds, leaving the invalid to pass the last moments of his life alone.

The Mongols are superstitious about human remains. Under no circumstances

will they touch or disturb a skull or skeleton. As soon as a person dies the body is dragged off to a considerable distance and left to be devoured by dogs, wolves, and birds. Sometimes the corpse is placed upon a cart, which is drawn rapidly over rough ground. At some point the body falls off. The driver does not look back for fear that he will be followed by the evil spirits of the dead.

#### HOSPITALITY A MONGOL LAW

Life in the desert and on the plains of Mongolia is much like that of our own West in the pioneer days: assistance to a traveler is taken as a matter of course.

When one comes to a Mongol yurt, he enters, sits down beside the fire, and helps himself from the common pot without the slightest question. He may stay a day or several days without thought of payment. Every Mongol knows that he himself will ask for hospitality many times during the year.

I have often had Mongols ride several miles to bring my ponies to camp, or tell me in which direction they had strayed; they would expect as much themselves in similar circumstances.

To be left without a pony is a serious matter, for the distance between wells in the desert is often great.

Horse stealing is a capital crime. In the days before the Soviet dominance, if a Mongol reported a pony stolen, soldiers took up the trail and followed it until they ran the thief to earth; usually he was shot at once.

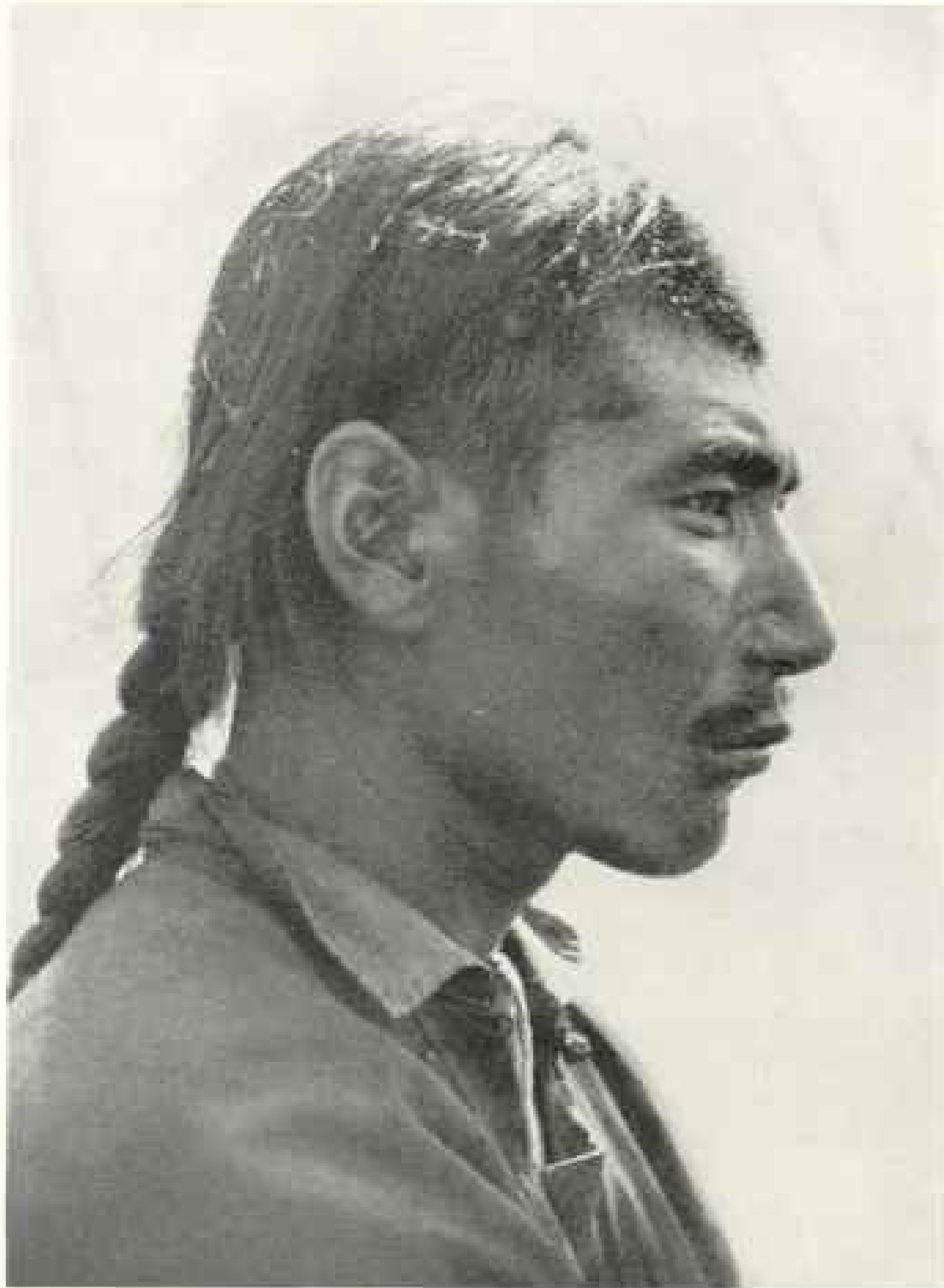
Next to ponies, dogs are probably the Mongol's most valued possession. The large Tibetan mastiff is the main breed, but smaller mongrels are found everywhere. All are exceedingly savage. They make excellent watchdogs for yurt or caravan and are trained to attack on sight. The owners do not pet them, for ferociousness is a virtue (see page 687).

#### THE DESERT WELL IS A PLACE FOR GOSSIP

Every newcomer in Mongolia is impressed by the rapidity with which news travels for great distances.

The wells all over Mongolia are the natural meeting places and concentration points. Here the Mongols gather to water their stock and to gossip (see illustration, page 691).





TSERIN, LEADER OF THE 125-CAMEL CARAVAN

It would be difficult to distinguish many Mongols from American Indians if they wore similar attire.

If a traveler is near a well, he always rides over to see who is there and hear the news. There is little to talk about, and the slightest novelty is discussed and re-discussed for hours. Very often a Mongol will ride 50 miles to carry news to his friends, who in turn send it on to other yurts.

Mongols have an amazing direction sense. I often hunted gazelle on plains where there seemed nothing to serve as a landmark. I might drop an animal and leave it for an hour. With a quick glance around, my Mongol would fix the spot in his mind and dash off on a chase which might carry us back and forth toward every point of the compass. When it was

time to return, he would take us back unerringly to that single spot on the open plain.

This wild, free life of the plains has made the Mongol exceedingly independent. He relies entirely upon himself, for he has learned that in the struggle for existence it is he, himself, that counts.

Of the Chinese the opposite is true. His life is one of the community and he depends upon his family and his village. He is gregarious above all else and hates to live alone.

#### THE MONGOL IS A GOOD FIGHTER

Although Mongols are lazy under ordinary circumstances, they are not always so. Herding sheep and goats requires little exertion. But at certain times their life demands extreme exertion, and then their energy and endurance are amazing. I believe that the Mongol of to-day is fully equal to the warrior of Genghis

Khan's time, as far as hardihood and endurance are concerned.

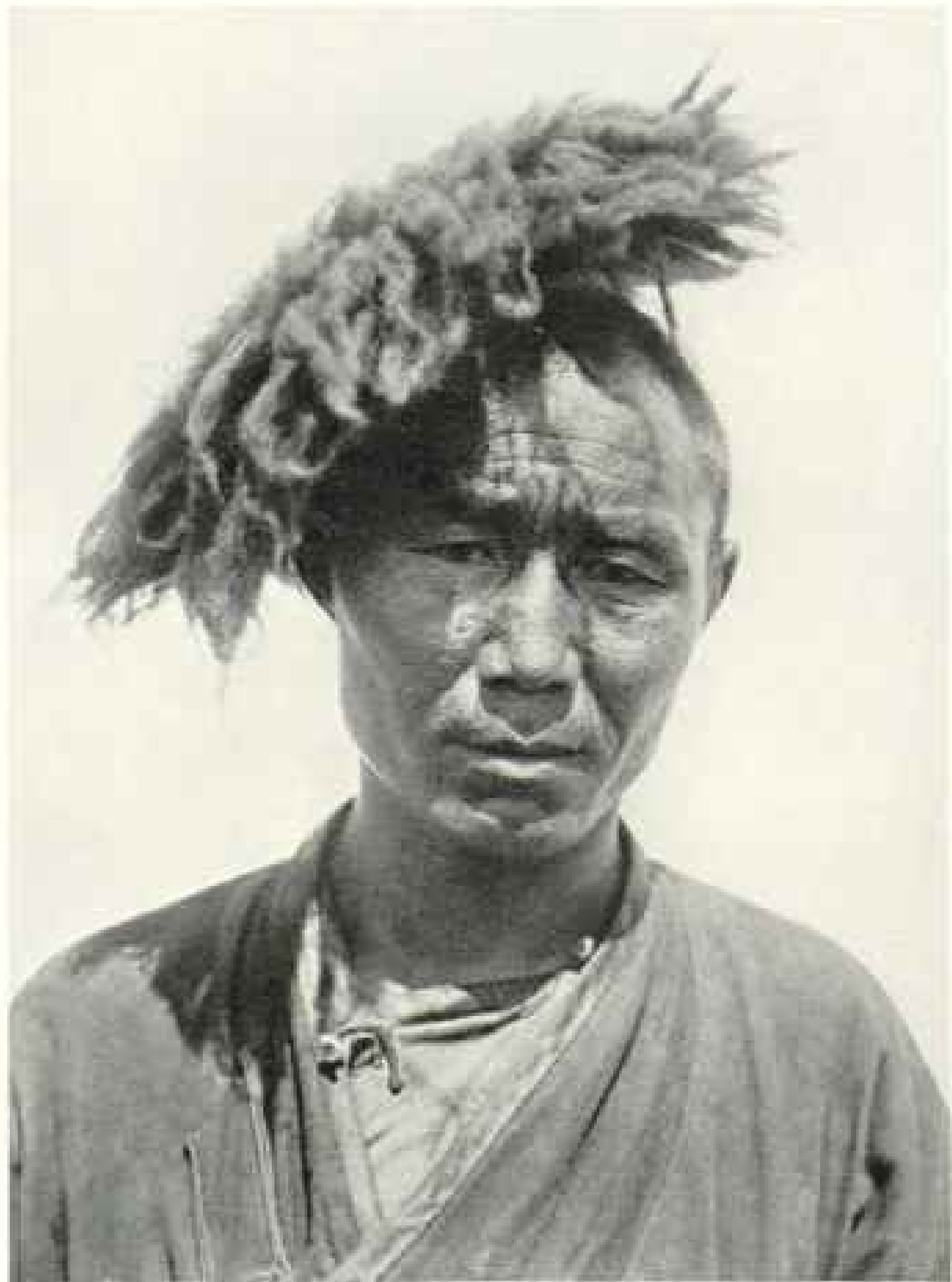
Tuerin, a temple some 115 miles from Urga, was the scene of a massacre of Chinese soldiers during the terrible winter of 1921, when Baron Ungern-Sternberg assisted the Mongols in driving out the Chinese. Everywhere we saw heaps of empty rifle shells, cartridge clips, and parts of uniforms. Four thousand Chinese soldiers were almost annihilated by 300 Mongols under the lead of a famous Mongol general whom I met several times in Urga.

Baron Ungern had sent Cossacks to attack the Chinese, but the Mongol general wanted the fun himself. By doing miles of hard riding across the plains, they

reached Tuerin at daylight, before the Russians arrived. With only a few minutes to rest their ponies, they attacked. The general himself told me the story of the fight: "We rode at full speed through the camp, killing everyone we saw. Then we rode back again. The Chinese ran like sheep and we butchered them by hundreds."

After the first few rushes the Mongols did not waste ammunition, but clubbed the frenzied Chinese with their rifles or sabered them as they ran. Those who escaped the first onslaught fled, half clothed, into the desert. The Mongols hunted most of them down, but virtually all whom they missed froze to death within a few hours, for the temperature was 40° below zero. As I heard the story from the barbaric-looking general, who sat between two attendants with peacock plumes streaming from their hats, I thought of how like the ancient Mongol warfare was this episode of the 20th century. Except for the modern weapons, the tale might have been a thousand years old. In this way had the Mongols conquered all of Asia and half of Europe.

Wild hordes, they were, unhampered by a commissary, making almost superhuman marches. If there was no mare's milk or meat, they tightened their belts and laughed at hunger. Thirst was their daily portion; he was not a man who could not go 36 hours without water and fight at the end. It was their heritage from Genghis Khan, an awakening of the old fighting spirit which is only dormant in the Mongol of to-day.



A SAINTLY LAMA WEARS A RAKISH HAT

This is the customary headdress of the Yellow Lamas (see text, page 708). It is made of camel's wool dyed yellow.

The Mongols barter with the Chinese for those simple necessities of life which they themselves do not produce. Sheep and goats give them almost all they need. In the winter they dress entirely in sheepskins, but summer garments are of cloth.

From the Chinese they buy cloth, boots, tea, and tobacco. The only thing that I have seen them manufacture is felt.\*

#### MONGOL LIFE ALMOST THE SAME AS IN GENGHIS KHAN'S DAY

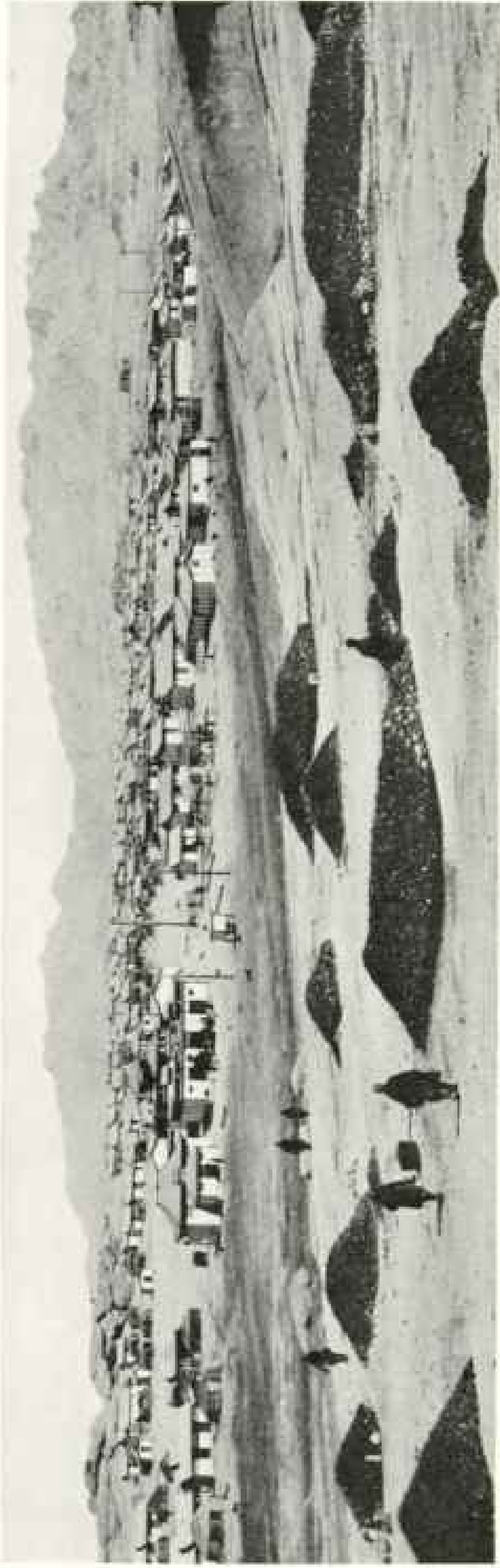
The abrupt way in which Mongols enter a tent or yurt is disconcerting at first. There is no preliminary knocking or asking

\* See "First Over the Roof of the World by Motor," by Maynard Owen Williams, in the NATIONAL GEOGRAPHIC MAGAZINE, March, 1932.



A "SHIP OF THE DESERT," AS THE CAMEL IS CALLED, MUST RIDE SUCH WAVES OF SAND

Sand dunes stretch along the northern base of the eastern Altai Mountains for about 100 miles. They assume the characteristic semicircular form. Composed of finest sand, they shift and change with the wind like waves of the sea, and during a heavy storm the Expedition saw sand blown from the crests of these dunes like ocean spray. This photograph is an exceptional portrayal of the sand ripples.



SOMETIMES A LAMASERY LOOKS LIKE A MINING TOWN

The Tuotun monastery has huge piles of dried dung in the foreground to be used as fuel (see text, page 700).



THE CAMP AND CAMEL BOXES AT URTYN OIO

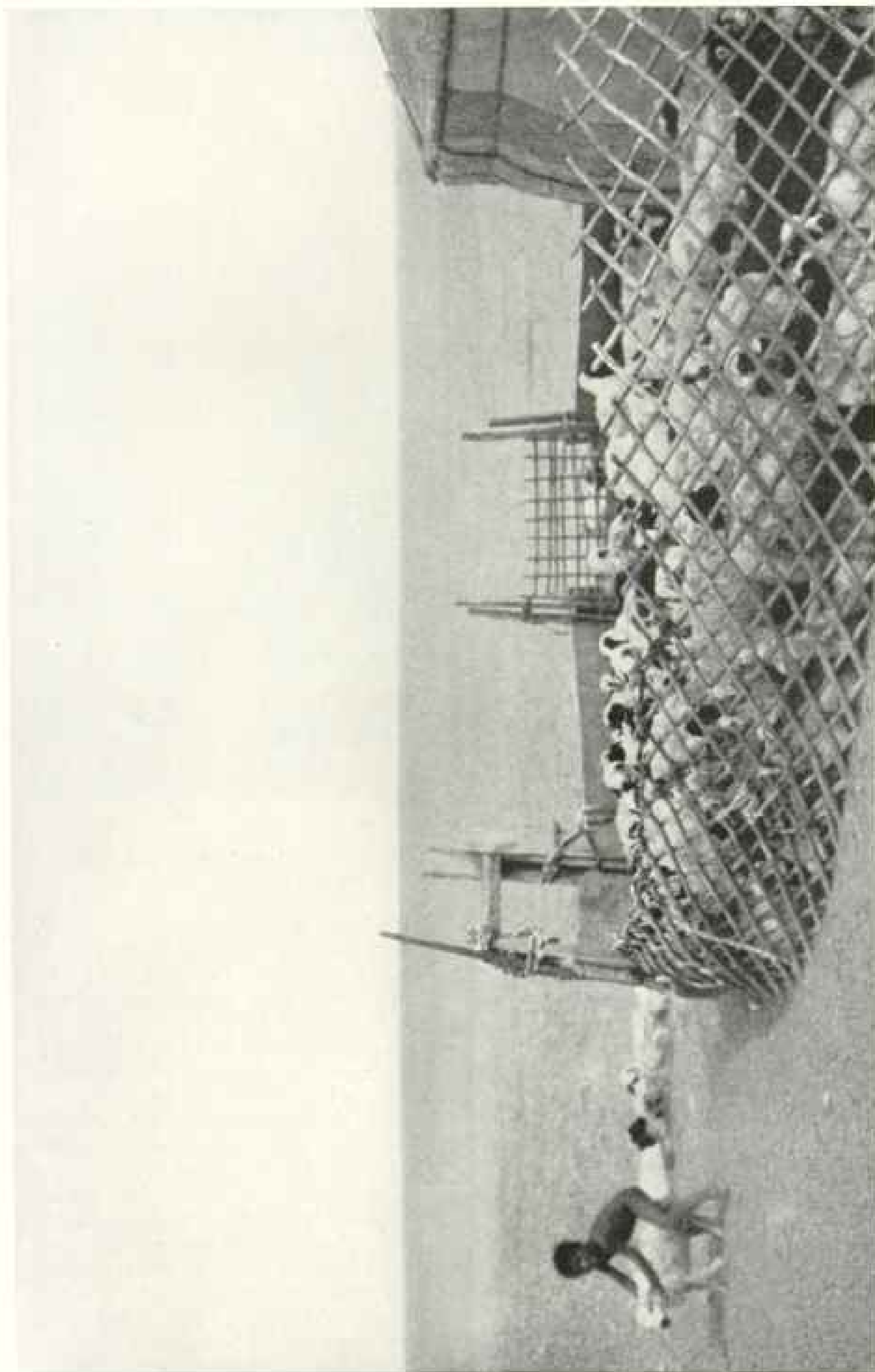
Each camel is loaded with about 400 pounds. These boxes carry in food, supplies, and gasoline, and are packed with fossils on the return trip. No wood is obtainable in the desert, so that every stick must be carefully conserved.



STALWART "COWBOYS" OF THE DESERT

These Gobi shepherds are herding their sheep and camels at a well. They carry their peculiar lassos—birch poles with a sliding loop at the end. The herder throws the loop over a pony's neck and, as it pulls tight, the animal is choked and halted.





A MOBILE BANNARD OF THE GOBI

A wicker framework is hastily thrown up by the desert tribesmen to corral their sheep and goats by night. It is as easily taken down and transported as the yurt around which it is constructed. Children brave the cold weather without clothing to tend the sheep (see text, page 622).



THE EXPEDITION LEADER CAPTURES AN EAGLE

The birds were kept as pets during an entire summer, along with animals and other kinds of birds that became favorites with the men (see text, pages 677 and 688).

of permission: they simply come in and sit down. But they invariably leave with the owner if he goes out. In Urga it was always difficult for foreign women to accustom themselves to this habit. A Mongol will enter a house as unceremoniously as though it were a yurt on the plains, and make his way even into the bedroom without a word of warning.

Even though under Genghis and Kublai Khan Mongols had conquered half the then-known world, they left nothing constructive behind them; made no impression upon the civilization of the countries which they controlled. They were only destructive. They had nothing to give.

At that time they led the same pastoral existence that they do to-day. Culture, art, architecture did not enter into their lives. These refinements could not be developed in a nomadic people living a

wild, restless life on the plain and desert.

If a Mongol of Genghis Khan's time should suddenly drop into the middle of Mongolia to-day he would be perfectly at home. He would find that the everyday business of life, except in a few minor particulars, is carried on almost the same as it was seven hundred years ago.

The only thing that has altered radically is the spirit of the people and their religion. He would find them no longer a race of warriors. He would find that at least two-thirds of the male population have donned the yellow and red robes of lamas and become dissolute human parasites. It would be difficult for him to adjust his mental perspective to such a state, so totally incongruous in a people who live upon the plains and deserts combatting the forces of Nature for their very existence.



THEY WENT SOME 500 MILES BEFORE SEEING A TREE

This was one of the few trees seen in the Gobi, and sighting it seemed like meeting a long-lost friend. The members had a luncheon under its shade.

There were several contributing causes to the decay of the Mongol race, but the primal factor was the introduction of lamaism. Before this they had been shamanists, worshipping the spirits of Nature that lived in rocks and trees and mountains. Lamaism became the official religion about 1204. Its teachings are against war, learning, enterprise, ambition. Fostered by the Chinese, who realized its value in subjugating a warlike race, it obtained such a powerful hold over the superstitious nomads that it became the paramount factor in their lives. Monasteries sprung up as if by magic.

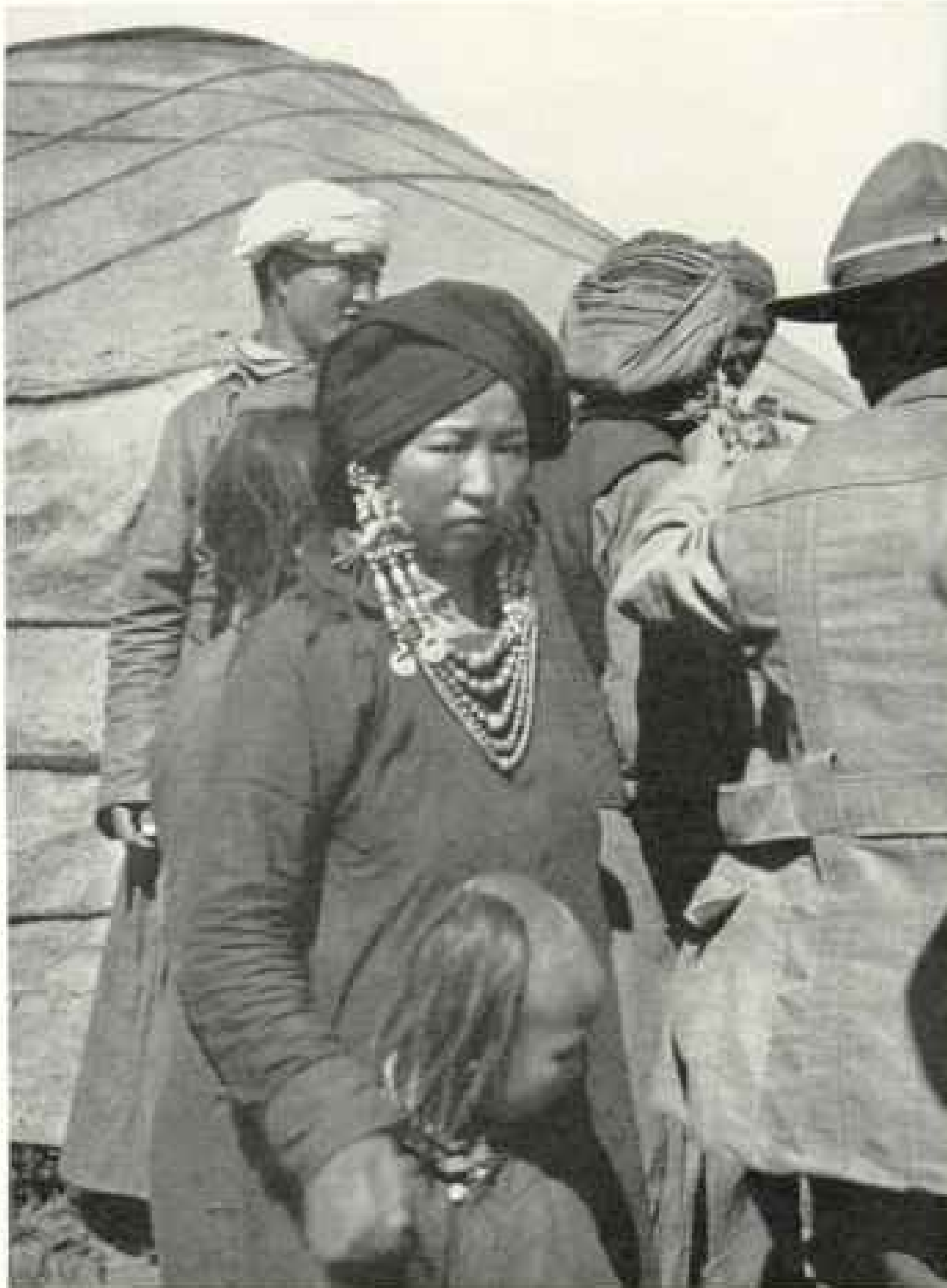
My first sight of the Tuerin monastery left me with the impression that it was the most remarkable group of human habitations that I had ever seen. Coming upon them suddenly from the empty vastness of the rolling plains enhances the atmos-

phere of medieval strangeness and mystery.

Three temples lie in a bowl-shaped hollow among the granite outcrops, surrounded by hundreds upon hundreds of tiny, narrow houses painted white with red trimmings. To the east rise ragged granite peaks; on the other three sides the "city" is encircled by huge piles of dried dung collected by the priests or bestowed as votive offerings by devout travelers (see illustration, page 705).

Vast as the supply is, it would require many more tons to warm the houses of the lamas during the bitter months of winter. The dwellings and temples are built of sawn boards brought from forests north of Urga.

More than a thousand lamas live in the monastery. They have a well-organized system of church rule, but are pretty di-



A YOUNG MATRON OF INNER MONGOLIA

This Chahar tribeswoman was the wife of Bato, trusted member of the Expedition. Her headdress is typical of her tribe. Sometimes, not always, the children's heads are shaved like that in the foreground.

rectly controlled from Urga, some 115 miles away. Lamaism is a complicated religion. Most of the lamas themselves have only the vaguest impression of what it is all about and are chiefly concerned with material things.

The Mongols are fanatically superstitious but not deeply religious. Their chief concern is to pay sufficient respect to the gods and the forms of their religion to insure themselves against the wrath of the deities. The majority of the lamas are human parasites, mentally and morally degraded, who exist by contributions from the lay population. To insure such maintenance they must keep superstition

active in the minds of the populace, not a difficult matter with such simple, uneducated people as the Mongols.

During my years in Mongolia I have often cured various forms of illness or injury, but the lama doctor of the district never failed to require payment for his prayers. Usually the patients would admit that it was my medicine that had given them relief, but were convinced that the priest would call down curses on their sheep and ponies if they did not meet his demands.

"BALUCH" WAS  
EARTH'S  
LARGEST MAMMAL

The discovery of fossils which show that the Central Asian plateau was one of the great centers of the origin and distribution of world life is perhaps the most important achievement of the Expedition.

After the dinosaur eggs the giant *Baluchitherium* must certainly take next rank among our discoveries. It is the largest mammal that ever lived upon the earth.

The "Baluch," as we call it for brevity, was first known from foot and neck bones discovered in Baluchistan, India, in 1911, by C. Forster Cooper, of Cambridge University. He suspected that it might be a rhinoceros, but he really didn't know what it was. He named it *Baluchitherium*, the "Beast of Baluchistan."

In 1922 we found the skull of a Baluch in the Gobi and were able to show the scientific world that the animal was an aberrant browsing rhinoceros of gigantic proportions. It stood about 17 feet high at the shoulders, was 24 feet long, and

weighed many tons. It was a veritable mountain of flesh, much larger than the biggest elephant (see p. 715).

About thirty million years ago, when the Baluch lived, the vegetation upon which it fed must have been very abundant. The animal grew and grew without check. But the climate gradually changed and its food became less easy to obtain. An Indian elephant eats six hundred pounds of grass every day. One can imagine, therefore, what a vast quantity a Baluch must have consumed.

As the vegetation disappeared the animal was faced with a serious problem. It must revise its entire mode of life, leave the country for better feeding grounds, or die. It was too highly specialized to adapt itself to changed conditions or to migrate. Thus the Baluchitheres completely disappeared at the end of the Oligocene without ever having left Asia.

I had the good fortune to find the first Baluch skull myself. Since then we have discovered a good many parts of the skeleton in different localities, but the largest bones were found by Shackelford.

Shack announced one day at luncheon that he had found a bone as big as his body. We all laughed at that, but Granger, Thomson, and I went with him to a gray slope which dropped off abruptly into a deep ravine.

Ten feet down the side lay a great white ball. Until I examined it I would not believe that it was bone, for it actually was as thick as Shackelford's body. A little brushing off of yellow sand showed it to



NIGHT AND DAY THEY ARE ON A SILVER STANDARD

The heavy cases, studded with turquoise and red coral, inclose the braid on each side of the head. Cumbersome as the ornaments are, these women of Outer Mongolia never remove them.

be the head of a humerus, or upper arm-bone. More brushing exposed its entire length and brought to light the end of another massive shaft which ran deep into the hillside (see page 712).

#### HILLSIDE REMOVED TO GET BALUCH SKELETON

The humerus was as thick as a man's body and three and a half feet long. The second giant shaft proved to be the radius. It was nearly five feet in length and so heavy that two of us could hardly lift it. In order thoroughly to prospect the deposit, the side of the hill must be removed; it might reveal an entire skeleton.





#### THIS QUARRY YIELDED THE GIANT OF ALL LAND MAMMALS

Here the huge bones of the *Baluchitherium* were unearthed (see illustration, page 715). Visible are the ribs, lower jaw, humerus, femur, and toe bone of the massive animal. Technically, it was an aberrant rhinoceros, that must have looked like a grounded blimp—24 feet long, 17 feet high at the shoulders, 25 feet tall at its head (see text, page 710).

Before the massive radius lay bare for its entire length Granger discovered another from the opposite side; also two enormous ribs. Just behind them, farther in the hillside, I located the corner of a flat bone; then a huge tooth, nearly as large as an apple, came into view.

Then we paused to have a look at things. The shoveling squad had removed 15 feet of hillside, leaving a flat bench where the bones lay exposed. They were all on the same level, close together, and the ends pointed in the same direction.

It was obvious that the deposition had taken place in the bed of a swift stream flowing north. Cross-bedding of the yellow gravel and the position of the bones told the story.

The animal had died in the stream, the flesh decomposed and the skeleton disarticulated. The smaller parts had been carried on by the water; doubtless many had been broken by pounding against

rocks. The massive limb bones had been left where the beast died. They were too heavy even for a torrent to move more than a few feet.

#### "BUCKSHOT" FINDS THE SKULL OF A GIANT FLESH-EATER

Since we had found the largest vegetable-feeding land mammal that the world has known, it was proper that we should also discover the biggest flesh-eater. That is just what did happen. Buckshot (see text, page 688) found the skull of a gigantic carnivore which has since been named *Andrewsarchus*.

Although very much larger, it is related to an American type known as *Mesonyx*. Basing his estimates upon the skeletal restorations of that animal, Professor Osborn says that from the snout to the back of the pelvis *Andrewsarchus* was 12 feet 6½ inches long and 6 feet 2 inches high at the shoulder.



THE MONGOLS BECAME ARDENT RADIO FANS

Often programs were picked up from Vladivostok and Khabarovsk, Siberia, but the desert dwellers much preferred listening in to time signals. The primary use of the radio was to pick up the time signals, from the United States Naval Station at Cavite, Philippine Islands, so that chronometers might be checked to obtain accurate longitude observations.

Allowing 3 feet for the tail, we would have a great hyenalike beast more than 15 feet in length. The teeth, although of distinctly flesh-eating type, are blunt and adapted for crushing. There is evidence to show that the animal lived much upon carrion, as do present-day hyenas.

Strangely enough, we have found only this single skull in all of our explorations in Mongolia. This would indicate that *Andrewsarchus* was by no means a common mammal, even in those far, dim days, sixty million years ago.

In a vast bad-land basin near Urtyn Obo we discovered an animal which belongs to a group called titanotheres. They were gigantic beasts which were supposed to have existed only in America until we found them in Mongolia. Superficially they somewhat resemble rhinoceroses.

All titanotheres are strange creatures, but the new one, *Embolotherium*, is the strangest of all. Professor Osborn named

it the "battering-ram beast" because the front of the skull turns directly upward like a great post two feet high. This projection, expanded at the summit, is not a horn; it is composed of the nasal bones of the skull.

We shall never know what his face really looked like. It was all flesh and as, anatomically, the beast is unlike any other mammal, living or fossil, we have no guide for a restoration.

Through the entire length of the vertical postlike projection run the nasal tubes. Did they make a hairpin turn at the summit and curve down again in the fleshy part to open near the mouth? Professor Osborn thinks so. He argues quite properly that every animal likes to smell the food it eats. Still, it does seem to be much wasted effort on Nature's part to create such an arrangement.

Three distinguished paleontologists independently have made the same sugges-



ITS JAW WAS SHAPED LIKE A COAL SCOOP

The model shows the head of the shovel-tusked mastodon found by the Expedition. The animal roamed the Central Asia plains about two million years ago.

tion, which I give because it is at least amusing.

Perhaps, they say, the nostrils opened at the very summit of the projection. The beast fed on vegetation which grew just under the surface of lakes or rivers. It could browse on the aquatic plants while its nostrils were still out of water. They visualize a sort of periscope.

I think an animal with a periscope nose is a wonderful idea, and I shall cling to it tenaciously until some better explanation of the *Embolotherium's* remarkable proboscis is forthcoming.

At the end of the fourth expedition, in 1928, we made one of our most interesting discoveries. We were camped on the

edge of what had been an enormous lake in Pliocene times, two or three million years ago. The shore line is beautifully delineated by a layer of fresh-water clamshells, in which most of the fossils occur.

MASTODON USED ITS  
LOWER JAW AS  
DREDGE

Shortly after our arrival Captain Hill, the topographer, brought in an extraordinary flat plate. It was about 10 inches long, 8 inches wide, and three-quarters of an inch thick. It was enamel-covered and obviously a tooth. But what sort of a beast could have used a tooth of that type we did not know.

Other plates were found, but not until the day before we left for Peiping was the mystery solved. Granger then found that the flat plates were the two tusks in the lower jaw of an extraordinary mastodon.

The spoon-shaped front of the jaw can

only be described as resembling a great coal shovel. The teeth lie side by side and are 16 inches across. The jaw itself was more than 5 feet long.

The fact that we found many mastodon remains on the very shores of the inland lake makes us believe that the animal fed upon the succulent aquatic vegetation. His expanded lower jaw was used as a dredge. It certainly is one of the most remarkable adaptations in the animal kingdom.

On our fifth expedition, in 1930, our paleontologists recovered a dozen or fifteen jaws of baby mastodons in this same region, representing almost every age in size and development. The crowning spec-

imen was the jaw and part of the skull of an unborn baby. It lay in the pelvic bones of an adult female, the only adult which we found in the deposit.

Albert Thomson delivered the child, with Granger as consulting physician, while the rest of us in the clinic amused ourselves by calling them such insulting names as "paleontological midwives."

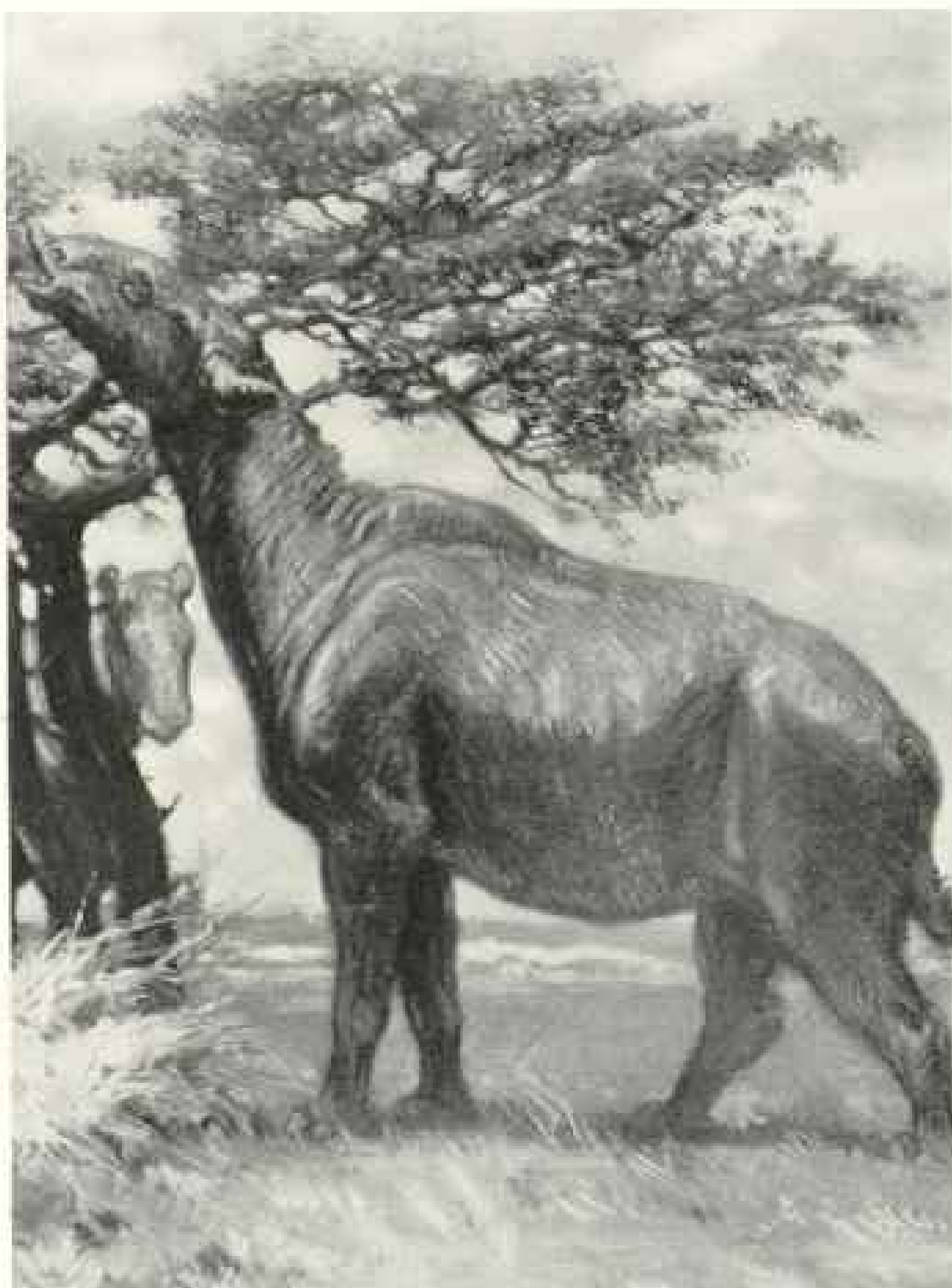
#### ANCIENT LAKE BECAME MASTODON DEATH TRAP

The most spectacular discovery of that year was made six miles to the south of Wolf Camp, by Père Teilhard de Chardin. In an amphitheater marked by a shining dome of pure-white marl, hundreds of fossils were exposed upon the surface, but all in a restricted locality.

Granger and Thomson, with their assistants, opened the deposit, and found large numbers of shovel-tusked mastodon jaws, skulls, and bones lying in a heterogeneous mass like a heap of giant jackstraws.

The enormous flat jaws were sometimes horizontal, sometimes standing straight on end or entwined with other parts of the skeleton. For six weeks the men worked in this one spot, taking out priceless specimens day after day.

I used to sit on the edge of the escarpment above them and drift in imagination back to those days when the waters of a beautiful lake filled the enormous basin. Where we worked had been a bay, on the edge of which was a deep well of soft, sticky mud. Probably it was covered by three or four feet of water, on which floated a luxuriant mass of tubers and



THE LAND MAMMAL KING OF ALL TIME

This restoration of the *Baluchitherium* was made by Charles R. Knight, for the American Museum of Natural History, under the direction of Henry Fairfield Osborn (see illustration, page 712).

succulent aquatic plants—the favorite food of the shovel-tusked mastodon.

One of these gigantic beasts plowed its way slowly along the shore of the bay, dredging up masses of trailing vegetation in its spoon-shaped jaw. Then with its trunk or mobile lips the beast selected choice bits and pushed them far back into its mouth to be masticated by the molar teeth.

The plants floating over the death trap of mud enticed the mastodon farther and farther into the water. Suddenly it found that it could not withdraw its feet. Struggling madly in the grip of the clinging mud, it sank lower and lower until the water covered its head and the last struggles were those of a drowning beast.

The trap remained baited and still other mastodons were lured into the well of death. Their huge bodies sank upon those that had gone before, until the pit was choked with masses of decomposing flesh. Eventually the lake dried up, but the bones remained entombed until we came to open the grave on that brilliant day in 1930.

#### SEVEN TINY SKULLS EXPEDITION'S MOST IMPORTANT DISCOVERY

I have often been asked what is the most important specimen the Expedition has discovered in all its work. The answer is easy, but it will disappoint the layman. The majority will expect me to say, "The dinosaur eggs." Far from it.

Scientifically, the most important things are seven tiny skulls, no larger than those of rats. They belonged to the most ancient known mammals, which lived at the end of the Age of Reptiles (see p. 666).

At that time, when the dinosaurs were dying out, Nature was trying to establish the warm-blooded mammals which now dominate the earth. These little skulls belong to mammals which represent her first attempts. They were found in an interesting way, while we were camped at the Flaming Cliffs which had given us the dinosaur eggs. Mac Young and I had just returned from Urga.

One of the letters which I had brought for Granger was from the late Dr. W. D. Matthew. Matthew was one of the least excitable men I know, but he was really stirred when he wrote that letter. He said that a tiny skull in a nodule of sandstone discovered on the second Expedition and labeled by Granger "an unidentified reptile" was, in reality, one of the oldest known mammals. It had been found in the Cretaceous formation which yielded the *Protoceratops* and dinosaur eggs.

In a hundred years of science only one skull of a mammal from the Age of Reptiles ever had been discovered. Named *Tritylodon*, from the Triassic of South Africa, it is in the British Museum and is one of the world's greatest paleontological treasures. But it belongs to the group known as the multituberculata, which died out in the Eocene, sixty million years ago, and had no very direct relationship to living mammals.

In his letter Dr. Matthew wrote: "Do your utmost to get some other skulls." Granger and I discussed it for half an

hour; then he said, "Well, I guess that's an order. I'd better get busy."

He walked out to the base of the Flaming Cliffs and an hour later was back with another mammal skull! It was an experience parallel to that of Professor Osborn at Irdin Manba, when he told me that he was going to find the tooth of a *Coryphodon* and two minutes later picked up the second one ever known in Asia. Such things do not sound possible, I will admit, but they do happen, and frequently at that.

We had to leave for the West the next day, but when we returned, in August, Granger and Olsen, Buckshot and Liu did some intensive searching. It was close and trying work, for the skulls were in little nodules of sandstone that had broken out as the cliffs weathered away.

There are literally millions of such concretions on the basin floor, so it was simply a matter of examining as many as possible during the day. When one has inspected a thousand or more with no result, and in the scorching sun, the job loses interest and becomes decidedly discouraging. Nevertheless Granger and his assistants stuck to it and in a week they had a total of seven skulls.

It was possibly the most valuable seven days of work in the whole history of paleontology.

#### FLAMING CLIFFS A TREASURE HOUSE

We left the Flaming Cliffs for the last time with much regret. This single spot had given us more than we had dared to hope from the entire Gobi. When the Expedition took the field in 1922, Mongolia was virtually an unknown country from the standpoint of natural science. We had been told that it was barren paleontologically and geologically as well as physically.

Yet the first dinosaur eggs known to man, a hundred skulls and skeletons of unknown dinosaurs, the oldest-known mammals, and the primitive human culture of the Dune Dwellers all had come from a few square miles in this lovely basin.

Is it surprising that a wave of sadness swept over me as I looked for the last time at the Flaming Cliffs, gorgeous in the morning sunshine of that brilliant August day? I knew that I never would see them again. "Never" is a long time, but the active years of an explorer's life are short and new fields are calling for those that remain to me.



# HAMBURG SPEAKS WITH STEAM SIRENS

BY FREDERICK SIMPICH

AUTHOR OF "MEN AND GOLD," "ONTARIO, NEXT DOOR," "THIS GIANT THAT IS NEW YORK," ETC., ETC., IN THE NATIONAL GEOGRAPHIC MAGAZINE

LIKE roars from the brass throats of giant mechanical animals, steam whistles echo hoarsely over Hamburg. They are the city's voice, symbolic of its power.

Railroad engines whistle, hauling trains here from all over Europe. Steamers whistle, for all ocean lanes lead to Hamburg. Factories whistle, for here industry is prodigious and builds some of the largest ships that plow the seas.

Fly over it and look down on the smoking Elbe, its slips and havens crowded with ships and boats of every size; look down on the armies of beaverlike men, moving trucks and barges of cargo, and you see that here *is*, actually, a colossal warehouse for all Germany.

Sail in from the North Sea, and there is more proof that a mighty world port is near. You can sense that, as you approach the Elbe's muddy mouth, by long lines of ships moving in and out. Steer past Cuxhaven, where the Elbe empties; follow the beacons and buoys some 65 miles up an S-shaped channel, and there is the astonishing skyline of Hamburg itself. Seen from the harbor, it suggests a jig-saw jumble of medieval and modernistic works of man. That sense of confusion fades, once ashore. You still see a new city imposed on an old; but there is genius and bold beauty in this architectural transfiguration.

HERE HIGH BUILDINGS ARE "CLOUD-SCRATCHERS"

Yet in all Europe there is nothing built since the World War quite like these bizarre structures which amaze every Hamburg visitor. They are so conspicuous, in contrast with the old city about them. You easily imagine that some giant builder took a big broom and swept away enough old town to make room for these monsters.

Consider, for example, the amazing Chile House. Its high front runs to a thin edge, like the sharp bows of some fantastic ship plowing through Hamburg. Its top floor even has side galleries like promenade decks. No other modern structure anywhere resembles this enormous pile; it suggests an ancient civilization Assyrian in spirit (see page 726).

Look up at that overwhelming geometric cube, the Kontorhaus Sprinkenhof, rising in sheer arrogance above its neighbors. You do not expect such *Wolkenkratzer*, or "cloud-scratchers," in Europe; but here they are. Some with elevators that run like buckets on a chain—no doors, no elevator men! During business hours they never stop. You hop nimbly on or off as the bucket passes your floor. Stay on for a whole round trip and you see bucketfuls of human beings riding on an endless belt—the effect of a Ferris wheel.

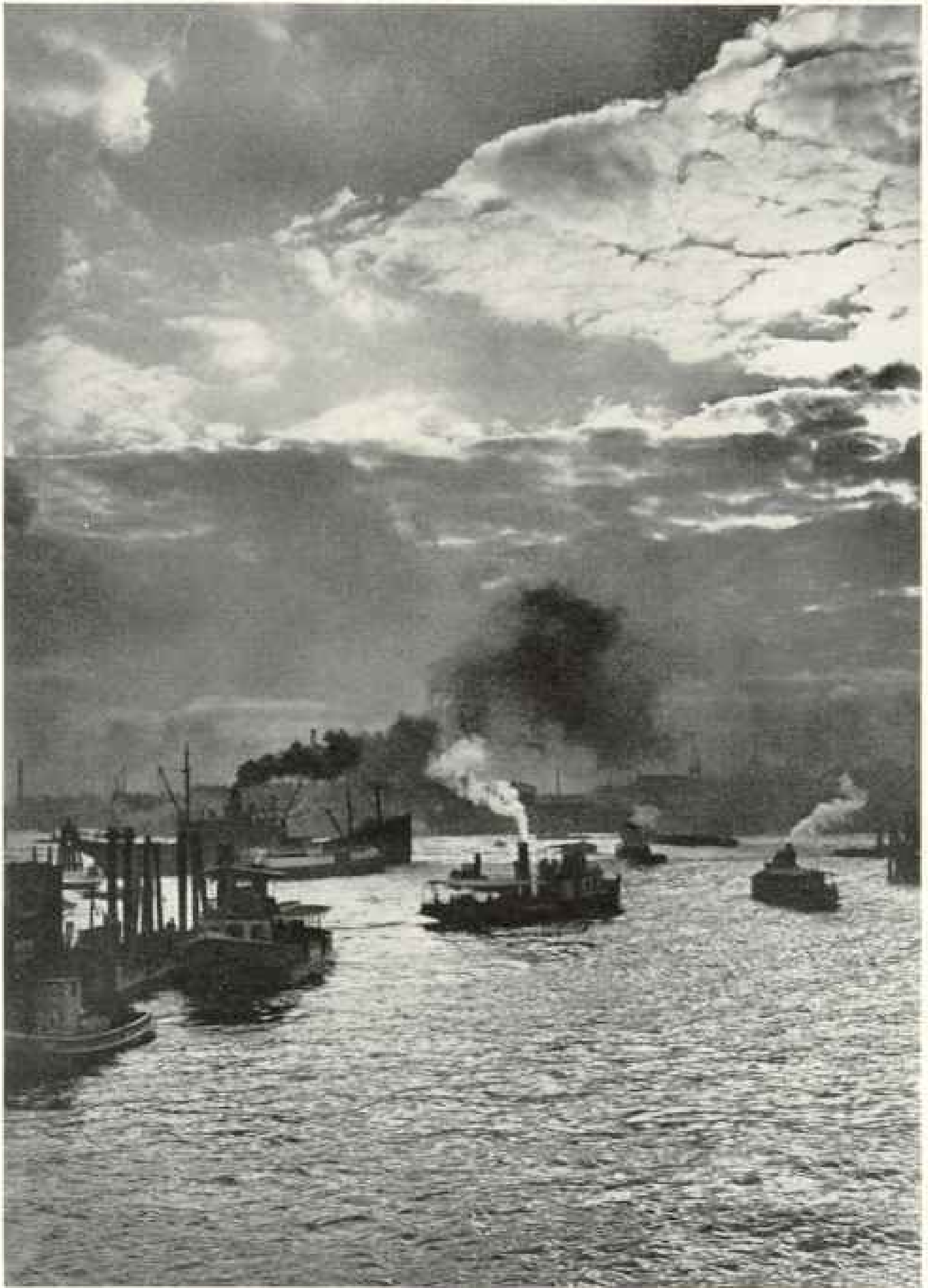
EXOTIC ODORS ATTEST TRADE IN PRODUCTS OF TROPICS

These huge trade temples in themselves add nothing to Hamburg's power as chief seaport of Europe. It is not their size that counts, but what goes on in them. The 6,000 tenants in Chile House, like workers on the narrow, cobbled side streets, do their part in Hamburg's enormous labors. Yet how unbelievably diversified those labors are! Among all her infinite activities, none amazes the visitor more than Hamburg's ingenious alliance with the Tropics. Some nooks here, where tropic nuts, fruits, oils, or wax are handled, actually smell more like Penang or Pará than a cold city on the North Sea.

Facetiously, you might say, Hamburg has imported everything from the Tropics but the Equator and the climate. Away up in this northern latitude, she even boasts the world's largest wild-animal mart. When you visit Hagenbeck's cageless zoo, where growling tigers seemingly roam free in striking reproductions of their jungle habitats, you can close your eyes and imagine that even Noah's Ark came up the Elbe ahead of all the whistling steamers and landed its animals here!

The more you explore Hamburg, especially afoot or by steam launch, the more you realize what an international meeting place it is; how the ships and shops serve each other and help all Germany to barter with the world.

Like rickshas parked before hotels in Japan, rows of for-hire launches lie along Hamburg's harbor front. Raise a hand and a score of seagoing taximen leap to



HAMBURG'S VOICE IS THE SOUND OF STEAMERS WHISTLING

Ocean lanes from all the world lead into the North Sea and up the Elbe to this foremost seaport of continental Europe. More than 200 different lines use this port; 91 trade with Europe, 56 with the Americas, 31 with Africa, 26 with Asia, and 5 with Australasia. Evening in Hamburg harbor.

life, offering you a fascinating adventure, a cruise around this harbor (see p. 726).

Ignore the boatman's chatter. What if there *are* 36 miles of wharves and quays, and cranes that will lift 250 tons, and 60,000 harbor workers. Get all that later from the consul, if you must have your figures! Just now, look at that fleet of obsolete windjammers, their paintless sticks long naked of sail; and that elephantine fireboat squirting hissing streams on a burning coal barge.

There's a big liner, too, backing into the channel, off for Buenos Aires. On deck a brass band of waiter-musicians is playing "Over the Waves," labeled "Sobre las Olas" for the Spanish-speaking passengers who crowd the rail to wave and shout shrill "Adiós!" to wet-eyed Argentine exiles on the pier.

"Those left behind always do the crying," says your boatman, "not those who go." But the liner's farewell blast drowns his voice. Gulls scream and flock after an English collier, whose cook has just dumped his scraps. The collier blends with mist and fog like a movie fade-out. And yet another ship looms in her place, linked to a queer floating elevator, whose long curved spouts are pumping wheat from her hold.

Here in the channel now are miles of "dolphins," or clumps of piles, to which boats tie up to save wharf charges. They are mostly tramps and freighters. Alongside one sluggish tub we drift, as she unloads hemp and rice. At her rail stands a steward, a slant-eyed Manila boy, gazing stoically over the strange harbor—how different from his familiar Manila Bay!

Groping in memory for Tagalog words from Philippine newspaper days, I shout a greeting. "But I spik English," grins the boy, showing that gold tooth so prized by town Malays.

Close by rusty, weather-beaten ships we pass, ships from tropic ports, manned by lascars and other dark-skinned men. Exotic smells from their open cargo hatches hint at strange straw-baled goods from heathen markets on the China coast; of Brazil-nut sheds along the Amazon, or nipa shacks on sun-drenched Malay beaches, where copper-skinned girls comb long black hair, fragrant with coconut oil, or shirtless men squat about their fighting roosters.

A giant seaplane roars low overhead, but a Chinaman, peeling potatoes outside his galley door, doesn't even look up. We turn and start back to the quays, wharves, warehouses, the forest of cranes, and the whistling tugs.

Through four or five centuries Germany wrestled to deepen this tidal Elbe, digging more and more berths for boats along its banks and deepening them as boats grew bigger. To-day, no other port anywhere has more clever labor-saving devices for the swift handling of ships, and the juggling, sorting, weighing, and dispatching of goods—endless miles of bulk, boxes, barrels, bags, and bales. Stupefying as the figures are to the casual visitor, they mean a lot to Germany; for this world trade-gate, with all its smoke and whistles, is the barometer that points out fat or lean years for the whole Republic. "Our destiny is on the water," is an old German saying.

#### THE FREE PORT IS A STOREHOUSE FOR BAL TIC AND OTHER MARKETS

That phrase, "the Free Port of Hamburg," means what? Only this:

Away back in 1189 Frederick Barbarossa (the Red Beard) gave Hamburg its "free charter." Though a State now in the German Republic, it still enjoys a peculiar degree of independence. Its ancient Senate still functions in traditional Spanish dress. While Hamburg joined the German Customs Union in 1888, the Senate cannily maintained its free-trade rights by holding back a part of its harbor area as a Free Port. Shut off by a high iron fence, this section is a city within itself, free from the plague of duties and customs inspectors.

Here are mammoth warehouses piled high with China silk, frozen meats from Argentina, coffee from Brazil, farm machines from the United States, many waiting reshipment to strange-named Baltic ports, none to pay a cent of customs duty to Germany. Here many of the world's huge ships are built; here are foundries and machine shops. Here, too, flocks of factories profit by the free use of imported raw material and easy shipping facilities.

One man I know got rich making tablecloths and napkins for German liners. Other profits come from salt fish and sea biscuits; some groups make oil cake, soap



Photograph from Hamburger Luftbild.

#### PARTS OF HAMBURG RESEMBLE A MUSEUM OF MODERN ARCHITECTURE

The dark, boat-shaped edifice in the center is the Chile House, an office building. Seen from the plaza at the right, its high, sharp prow rises above the street crowds like the bow of a ship running right through Hamburg (see text, page 717).

and margarine, or chocolate bars. Others roast coffee, refine sugar, or make fertilizers and trade in guano from tropic bird islands. Thus this astonishing Free Port functions.

Hamburg, as a German State, has tariff protections, but this part of it enjoys free trade in all its enormous transit commerce. This benefit is shared by American firms who have warehouses here.

Like Manhattan Island, crowded Hamburg uses tunnels. Between St. Pauli and the Steinwärder side of the Elbe, in the harbor section, a double tube leads under the river. It is similar to the Hudson tunnels at New York, except for approaches. So crowded are the river banks that no space could be spared for inclines; hence, at each end, men and vehicles use elevators, which lift and lower them 77 feet

below street level. Domed templelike structures house these elevators, whose high windows pour daylight down to the bottom of each shaft (see pages 736, 740).

Pig-iron weights hold the tubes from shifting. The tunnels, their walls faced with glazed tiles and decorated with sculptured reliefs, are brilliantly illuminated. On bad days, when fog or ice slows down the Elbe ferries or crowds the bridges, pedestrians and cyclists all prefer the dry, warm tubes.

#### HAMBURG'S LONG TRADE ARM REACHES TO WORLD'S END

Here is a different Germany. It thinks in terms of ships, of fish, and trade with far-flung places.

Overseas news, especially news that affects trade for better or worse, means





Photograph by Carl Schütze

#### CANOES, MUSIC, LUNCHEES, AND COQUETRY—ON THE ALSTER

Flowing through the heart of Hamburg, the river spreads into a lake in the midst of the hotel and shopping districts. It is fringed by cafés and restaurants overlooking shaded walks, and its blue waters are flecked with swans, gulls, and variegated water craft (see pages 727, 729).

more to it than all the politico-social twaddle of Berlin or Munich.

Since the days of sail, its sons have scoured every nook of the world to barter, buy, and sell. Many now extensive German colonies in South America and the Orient began as small groups of traders and clerks, first sent from here. Some marry foreign women, retire well-to-do, and bring their families back here to educate the children.

This close tie with distant lands accounts for Hamburg's well-known study of tropic economics and diseases, its researches into new uses for imported raw materials, the world-wide work of its trade groups, and the desire of its young people to learn foreign languages and to travel abroad. Visit in any Hamburg home, or any industrial museum where

foreign products are seen, and at once you are struck with youth's eager interest in men, events, and things overseas.

During the years when endless shiploads of immigrants left Germany for the New World, Hamburg was the port from which millions of them sailed, including those from middle and eastern Europe.

"I first wanted to migrate to America," an old Hamburger now settled in "the States" told me, "when my grandfather took me on his knee, in our big wooden house beside a canal in Alt Hamburg, and told me of his adventures in the gold rush to California. He sang me that Forty-niner song, 'Oh, Susannah!' His ancestors had scores of sailing ships in foreign trade. Once, he said, they captured some pirates. Brought to Hamburg for trial, the leader tried to buy freedom by offering





IT'S ORNATE CITY HALL HOUSES HAMBURG'S HISTORIC SENATE

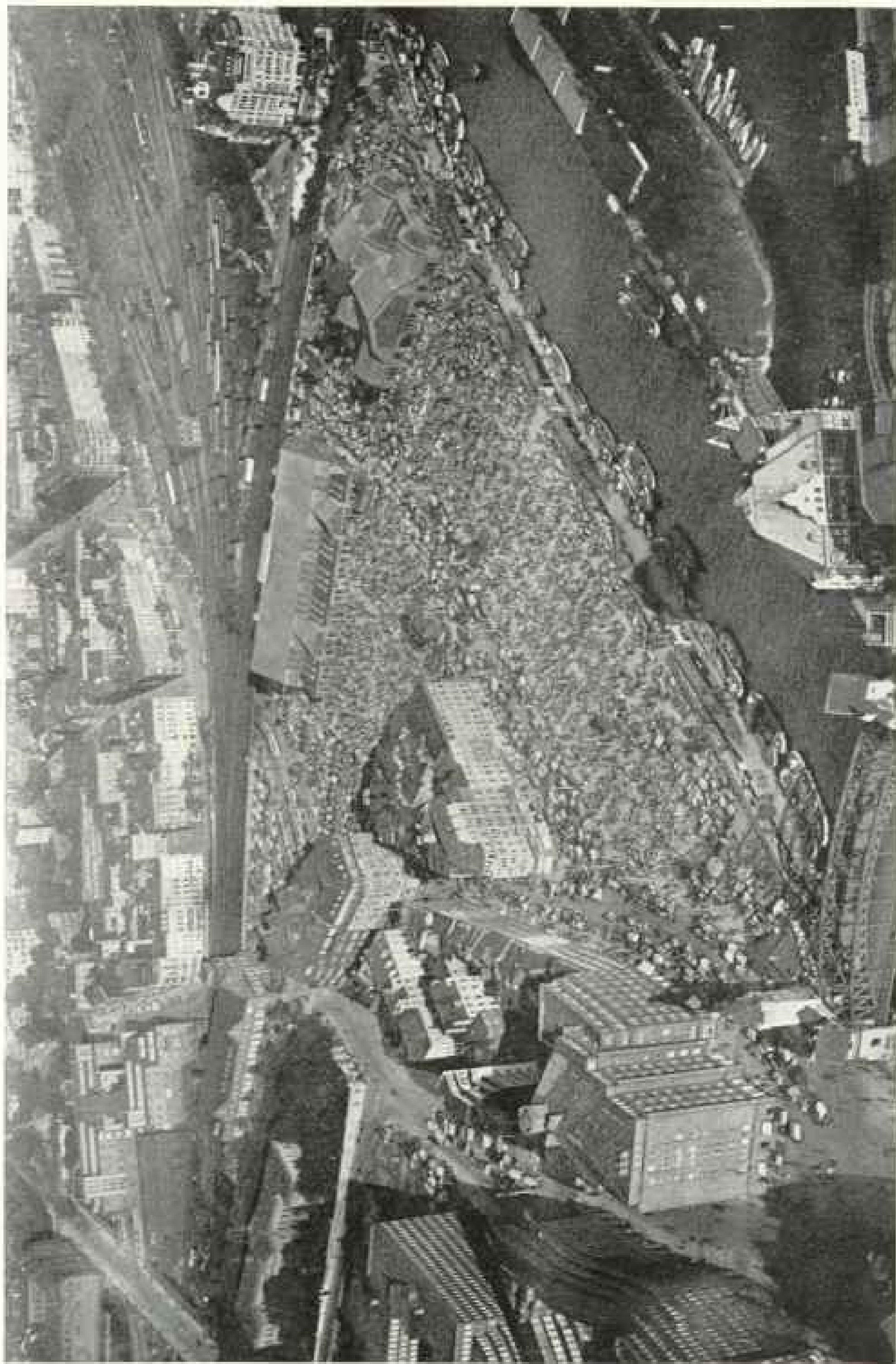
Bronze statues of German emperors, various saints and figures representing crafts and industries adorn the facade. Beneath the chambers for the Senators and the House of Burghesses is a famous wine cellar. Its lobby displays a stone figure of Bacchus, and on its stained-glass windows are figures of the city's naval heroes. In the water (lower right) is the Hamburg War Memorial.



Photograph from Hamburger Luftbild

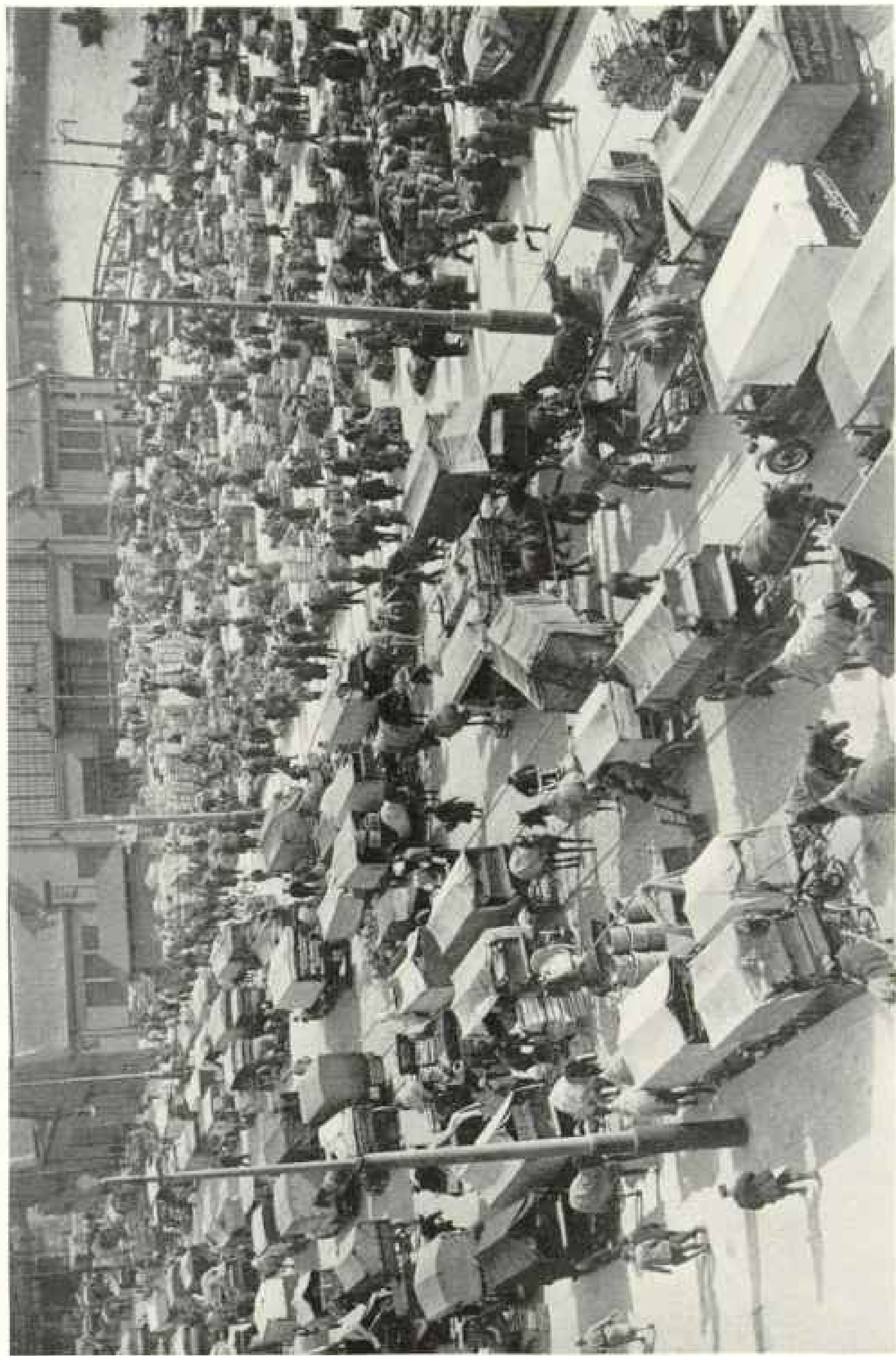
FROM THE BLOHM AND VOSS SHIPYARDS HAVE COME SOME OF THE WORLD'S MOST FAMOUS OCEAN LINERS

At the right, with two funnels, is the *Europa*; at left center, high out of water in a drydock, is a freighter laid up for repairs. In the background are the shipyards, with the skeleton of a new ship on the ways.



Photograph from Hans Berger Luftbild

BOATS BRING FOOD TO MANY OPEN-AIR MARKETS



Photograph by Carl Schützer.

THE "COVERED WAGONS" OF HAMBURG ARE MARKET TRUCKS

Fish from Cuxhaven; poultry and dairy products from north Prussia; berries, vegetables, fruits, and flowers from tiny farms along the lower Elbe pour into Hamburg. They feed the city and neighboring Altona and supply the many ships that provision at its docks.



Photograph by Carl Schröder

MOTORBOATS SERVE HAMBURG HARBOR LIKE TAXIS IN CITY STREETS

Winter and summer, day and night, the sound of their shrill whistles and sputtering motors never ceases. This view shows a winter day along the water front.

enough gold 'to make a chain around all Hamburg.' But they took him out and swung him on the gibbet. As a child, I remember how sailors were always bringing us monkeys and parrots, or trick puzzles from Japan."

To this day, many a Hamburg sitting room is cluttered with curios and quaint mementos brought back from distant voyages by father, uncle, or brother. Always, Hamburg shares its sons with the sea—many never to return.

GLIMPSSES OF WATER-FRONT LIFE

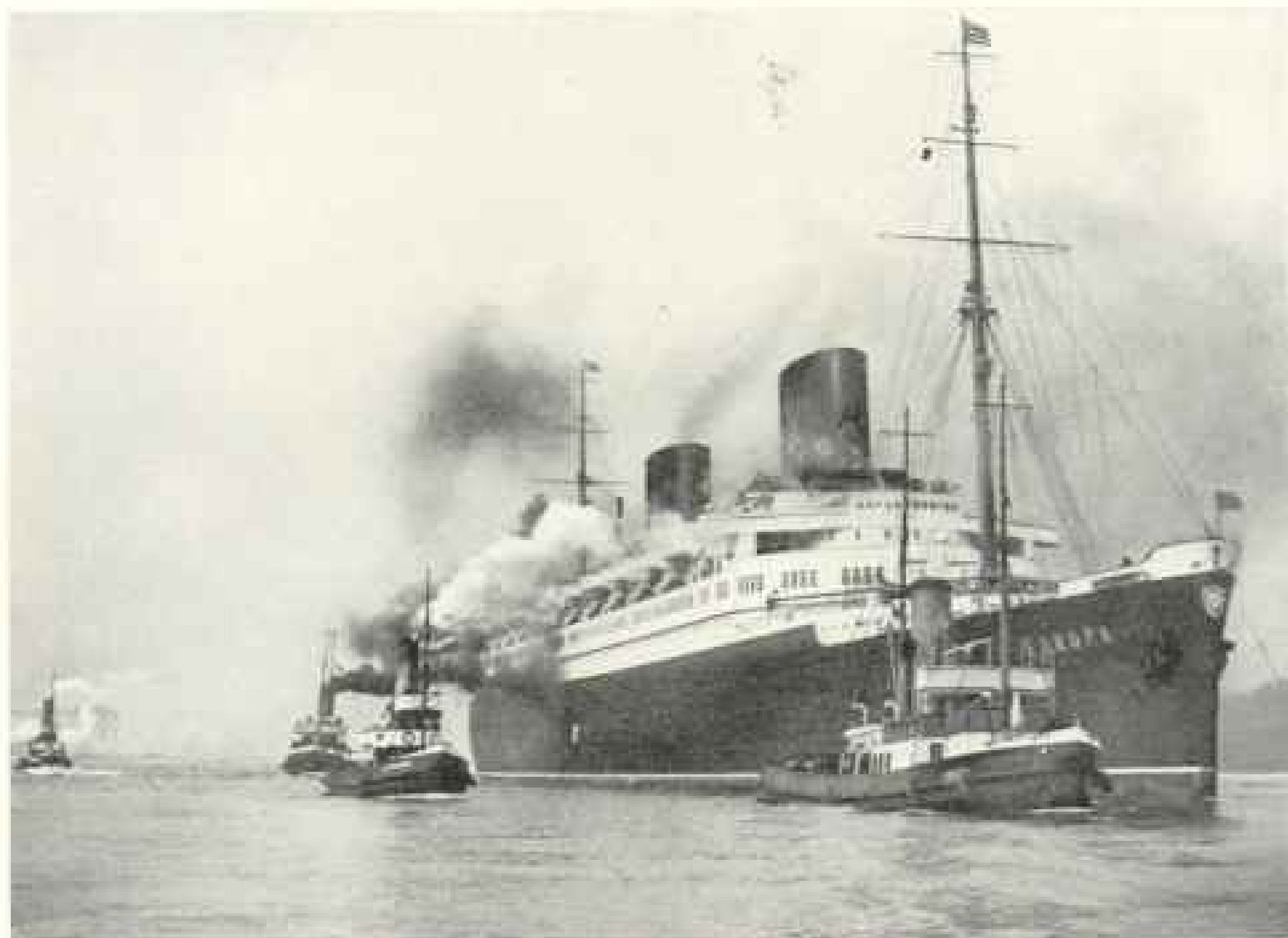
From here red-faced crews in smelly oilskins and high boots sail each season to fish the wind-swept North Sea, working as far away as Iceland. The loss of life, ships, and nets in this trade is recorded in many a North Sea ballad. Herrings they harvest in countless millions, herrings being to the North Sea what bananas are to Central America. Special fish-cars, gaudily painted like circus trains, run at high speed from North Sea fish ports to fish-hungry cities as far away as Vienna.

Walk along the Elbe late some Sunday afternoon in summer, when Hamburg is at play. Start, say, from the bathing beaches below Altona. When the bath-houses are overcrowded, many bathers dress in the bushes, with that "freedom of the seas" characteristic of European bathing resorts, where shorts and lingerie also serve as swimming suits.

Altona, with coal and fish wharves, neat cottages, grape arbors, and beer gardens, is an ideal home town for sailors. Dine anywhere, by the St. Pauli wharf, for example, and you see many deep-water men and their families celebrating papa's home-coming. Ships lie so near some St. Pauli cafés you can read the names on their sterns. Traders, banking men, and factory chiefs gather here, too, each group at its favorite *stamm tisch*, to eat goose and other favorite Hamburg foods.

When the lights are on and street scenes animated, explore the shop windows. Miniature boats, stuffed birds, snake and wild animal skins, foreign coins, rare stamps, strange weapons from many





Photograph by L. and A. Schind

#### SNORTING TUGS HELP THE GIANT "EUROPA" TO DOCK

In this crowded harbor, rigid rules control moving ships. Some are: If it's foggy, whistle every minute; don't drift crosswise of the current; extra slow when passing diving bells, dredges, or vessels in trouble.

lands, second-hand jewelry, ivory carvings, idols from far-away pagodas, every musical thing from accordion to zither, fascinating curiosities gathered by sailors from Penang to Pernambuco, can be seen.

At the head of one hilarious, brightly lit street, where sailors mix in a congress of nations, a big sign shows a laughing man riding a galloping goat in Gambrian abandon, holding high his foaming glass. Other signs read "The New China," "Tattersalls," "North Star," "Rheingold Ball Hats."

More smelly streets lined with beer halls, pawnshops, sailor lairs, ship-chandler stores piled with paint, rope, and iron-work; mission homes, petty officers' clubs, lodging houses for longshoreman, fisherman, bargeman, beggarman, and thief. No better, no worse, than water-front streets in Liverpool or San Francisco. Just the pageant of life in any great seaport.

Still more whistles echo against arched roofs, as you stroll through the great

Union Depot, with what would seem enough police, printed signs, and painted arrows to guide even the dumbest to all the trains in Europe. Despite this, many seem confused, lost, or late. You see them rushing for this or that platform, where trains leave for Bremen, Breslau, Köln (Cologne), Hannover, Berlin, running to catch them, excitedly shoving their bags into open windows, from whence those already crowded aboard reach impatient yet efficient arms to aid the panting laggards.

Hard by may stand that strange airship-like Diesel electric train that can run the 178 miles to Berlin in 141 minutes, beating the fastest steam.

#### OUTDOOR LIFE AROUND ALSTER LAKE

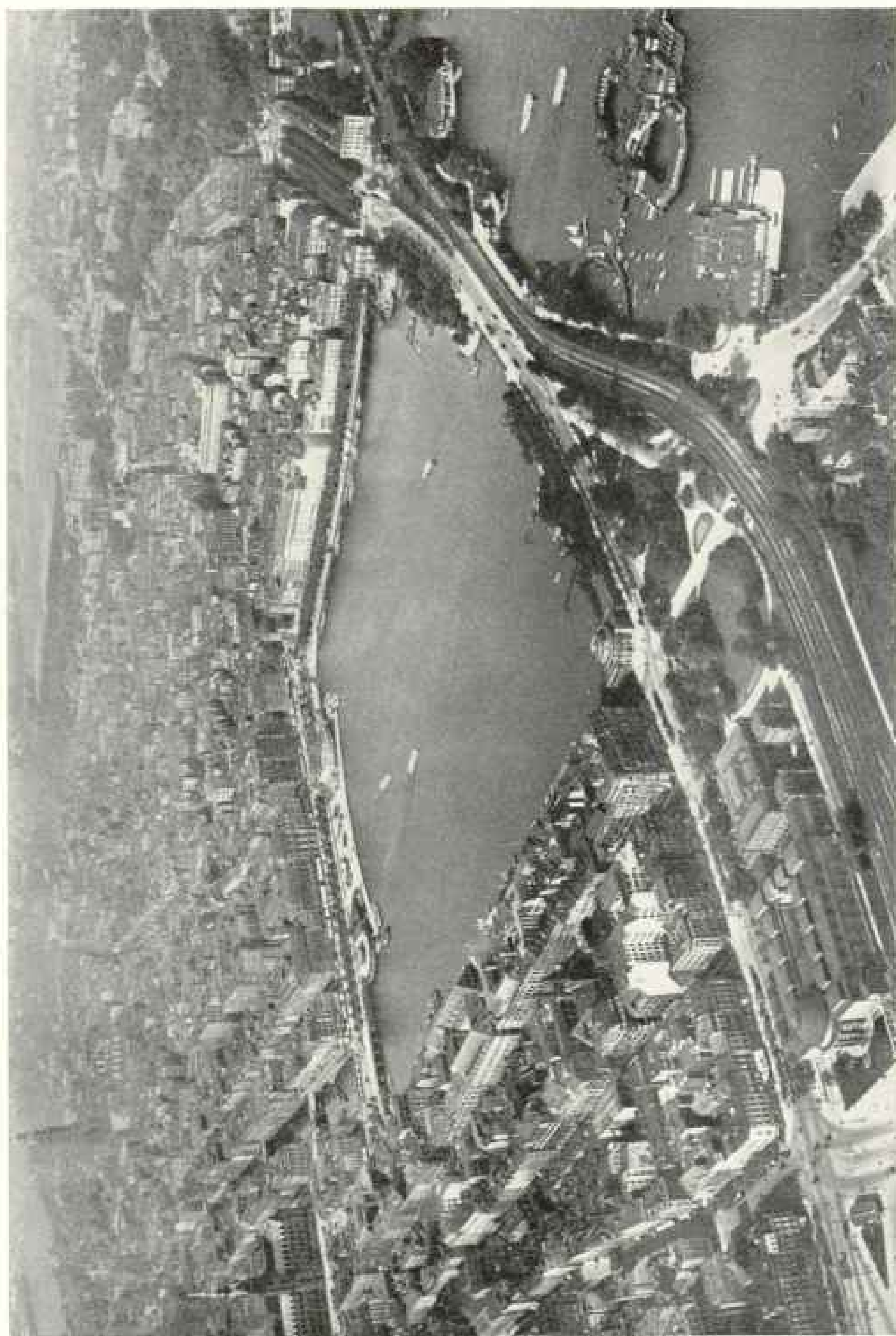
But let them go. Hamburg traded with the world long before railways came. Let's take one more walk, around that beauty spot, the Alster Lake, set in Hamburg like a reflection pool in some ornate exposition grounds (see pages 721, 729).



Photograph from Hamburger Luftbild

FLOATING GRAIN ELEVATORS UNLOAD SHIPS IN HAMBURG HARBOR

Transversely across this picture runs a row of "dolphins," or groups of piles, to some of which the grain ship *Steuersich* is moored. Alongside are four elevators, their curving spouts plainly visible, pumping wheat into long, covered barges.



ALSTER LAKE, LIKE A BUILT-IN CITY SWIMMING POOL, IS SET IN THE VERY HEART OF HAMBURG



HAMBURG'S TOWERING MONUMENT TO BISMARCK

This gigantic figure, erected by Lederer and Schaudt, stands high on a massive pedestal adorned with enormous reliefs. The historic Chancellor is a hero of Hamburg because it was under his patronage that his country embarked upon a colonial policy, sought world trade, and began the search for overseas markets and raw materials.

Imagine Times Square, in New York City, as a tree-bordered lake, alive with toy ferryboats, rafts, pleasure craft, floats, and swans. Hamburg's Alster Lake is like that, only larger. A river, the Alster, on its way to the Elbe splays wide as it reaches the city. A dam divides the lake, cutting off one end, the Inner Alster, in Hamburg's busiest quarter; so that hotel guests, department-store and office-building workers can look down on cafés and canoes and watch huge flocks of swans fed at troughs like pigs (see page 743). Gulls are tame; they fly past and peck bread from your extended hand.

Neat white cafés, with glassed-in verandas, fragrant with potted plants and window flower boxes, stand along the promenade that runs about the lake. Crowds gather here to sit and sip, and sup, and listen to the band or watch boat races, but are politely blind to open-air love-making in cozily cushioned canoes that drift by, often with gramophone playing.

Around this lake-front promenade early any morning you see that dog parade common at dawn in all German cities.

Hamburg goes to work early. By 8 o'clock crowds swarm the streets. Few talk, but myriad feet scraping pavements raise a sibilance like a soft wind in wintry tree tops. Dignified fat men, with canes hooked in the top of their vests; blonde red-cheeked office girls, who smile at the foreigner; thousands of male clerks in ill-fitting ready-made clothes, carrying brief-cases, hiding a lunch

to be eaten about midforenoon, during the ten-minute traditional pause. Many ride bicycles or crowd the trams. Mixed with office workers come whole armies of factory and harbor hands in caps, collarless striped shirts, and heavy tunics. Dull plumage this, beside the blue-clad firemen, whose brass helmets glisten like those of Roman soldiers who helped Charlemagne found Hamburg!

Scissors-grinders mix with peddlers, fruit and fish-cart pushers, maybe a dog pulling a milk wagon, and washermen with long-handled mops, off to clean windows or the stone faces of monuments.



Architects, H. and O. Gerson

Photograph by L. and A. Schul

SUCH GIANT CUBES MARK THE NEW BUSINESS DISTRICT



Photograph by Carl Schütze

"AND YOU REMEMBER THAT SQUALL OFF CUXHAVEN!"

The collarless striped shirt, the pipe and visored cap, are symbols of the older Hamburg fishermen. Every season the dread North Sea storms take heavy toll of men, boats, and nets.





THE FAMOUS NIKOLAI-KIRCHE, WHOSE TOWER IS ONE OF EUROPE'S HIGHEST

Architect Sir Gilbert Scott designed this edifice, whose 482-foot tower rises high over Hamburg's open-air Hopfenmarkt square. Visitors flock to see the stained-glass windows of this church and the inlaid work of the sacristy door. The use of the open square before the church as a market place is an ancient practice, commonly followed also in the Philippines and Latin America.



#### WHEN SAILING SHIPS CLUTTERED THE HARBOR OF HAMBURG

Taken in 1886, before the city joined the Customs Union, this old picture shows the extent to which Hamburg shipping had developed half a century ago. To-day strangely different craft, many of monster size, crowd this haven in the Elbe.



Photographs from Hamburger Luftbild

#### LINERS FROM THE SEVEN SEAS BRING MEN AND GOODS TO HAMBURG

Photographed from about the same point as were the sailing ships in the picture just above, this view shows the progress of 50 years. Set in the corner where Atlantic trade routes converge to penetrate northern Europe, Hamburg's location is one of singular advantage in sea trade.



Photograph from Hamburger Luftbild

#### FLYING OVER GERMAN PARKS IS A LESSON IN GEOMETRY

This Hamburg Municipal Park has beaches of imported sand, trees set in neat rows, and its flowers are planted in precise patterns. In spite of Germany's fiscal difficulties, many cities throughout the country have expended large sums on building athletic fields, parks, and bathing beaches.

The *Fleete*, or canal streets of old Hamburg, also come to life early. Tiny ferries, piping their toy whistles, run on schedule through many water lanes, letting passengers off or on at regular stops. From the harbor boatmen pole their loaded craft up these Venetian water alleys to unload goods at the back doors of store-rooms that open on the canal. At low tide these passages are mere streaks of flat mud on which helpless boats lie as if abandoned; but from Cuxhaven, when the tide starts in, a warning telegram is flashed, and three shots are fired in Hamburg to tell those who use the canals that high water is coming.

#### HERE IS ONE OF THE WORLD'S FIRST STOCK EXCHANGES

Toward lunch time you see merchants, bankers, and traders by the hundreds

flocking to the vast wine restaurant in the ornate Rathaus (City Hall). Adjacent is the Stock Exchange. It differs from those in other lands; it buys and sells goods as well as bonds and shares and it dates from medieval times. It is so old, some say, that the words "trading post" were first used here, when each dealer piled his particular wares about a certain post under a rude shed that covered the market place.

To this day, each dealer has his "post," an actual post with his name on it and a bench around it. Buyers go from one post to another, whispering about prices.

Centuries ago, when the guilds flourished, Hamburg merchants used to go on long voyages to foreign lands, there personally to do their bartering. Slowly, as credit systems grew and drafts and shipping papers came into use, the guilds de-



Photograph from *Hamburger Luftbild*

WHERE RAIL MEETS SAIL TO HANDLE HAMBURG'S FAR-FLUNG OCEAN COMMERCE

Yards in the foreground accommodate freight cars from all over central Europe. Parallel with the tracks is a row of new concrete quay sheds at Südwesthafen, flanked by electric cranes for handling cargo. In the background are ships and more warehouses.

clined and an "exchange" grew up, used by traders, shipowners, and bankers, as well as by stock and bond dealers. So to-day hemp, hides, honey, and herring, rubber, copper, or coffee, are bought and sold under the same roof with bonds and shares.

CAFÉS, CANALS, STREET SCENES, AND FOREIGN TONGUES

"How do you say 'permanent wave' in German?" you hear an American miss ask at a café table next yours.

"Don't worry; all the barbers here know English."

This is a polyglot port. Shopping street window cards read "English Spoken," "Se Habla Español," "On Parle Français," Syrian cafés display sidewalk dinner signs in "fish-worm" writing. The hoariest newspaper joke tells of one store whose sign read, "German Spoken Here."

English words and phrases—"5-o'clock tea," "sport," "morning coat," "gentleman," even "boule dogue" for bulldog—are often sandwiched in German speech and news text. "Jazz" is pronounced "yotz." At the Thalia Theater I heard the phrase "Echt Amerikanische Yotz Bandt," meaning "real American jazz band!" In one immense café, with balconies like ship's decks, bands blare first at one end, then the other, while a show goes on in a center stage.

In a vast St. Pauli pleasure palace you see dinner dancers suddenly scurry from the floor when uniformed attendants rush in, as if raiding the place, dragging mats, rugs, poles, wires, and all the gear of aerial acrobats. In a jiffy this is set up, and girls in tights are flying through the smoke or swinging out over the tables by trapeze. Just as magically, all this spectacle vanishes; again the jazz band plays, and back



Photograph by Carl Schütze

THE SCISSORS-GRINDER'S CART CARRIES HIS "COAT OF ARMS"

With knife and scissors couchant and a razor rampant, his heraldry is a familiar sight in German city streets. His mobile establishment is equipped with a hood that serves as an awning on rainy days.



THE ENTRANCE TO HAMBURG'S "HOLLAND TUNNELS"

This tube's mouth is far below the city's congested streets; passengers and vehicles must reach it by enormous elevators. The sign above the arrow says, "Go through here. Drive slowly." Electric lights glisten against the tile walls.





© Publishers' Photo Service

SOME HAMBURG DAIRYMEN DELIVER MILK BY PUSHCART

Glass bottles, so familiar to American milk consumers, are not widely used in Germany. Milk is distributed from the cans hanging on the cart shafts. Sometimes in north Germany dogs are used to draw milk carts.



Photograph by Carl Schütze

A HAMBURG AIRPORT GUARD INSPECTS THE PILOT'S PAPERS

Besides its air tie-up with all Germany by the Deutsche Luft Hansa lines, Hamburg is also served by air lines reaching to England, France, the Netherlands, Denmark, and Sweden. Mail planes are catapulted from the *Bremen* and *Europa* as they approach Germany.



Photograph by Carl Schütze

## A NARROW STREET OF OLDER HAMBURG

In contrast to the strange new architecture on spacious avenues are quarters which date back to medieval times. They are crowded, sometimes squalid, often turbulent. The city has model apartments, and apartments with playgrounds, but many natives cling to these alleylike thoroughfares. Though these narrow passages are closed to vehicles, pedestrians swarm through them and small shops do a brisk trade.



Photograph by Franz Stuedtner

THIS ELBE BRIDGE RESEMBLES A ROLLER-COASTER AT LUNA PARK

The curious blend of steel girders and towers of mediæval style was opened for pedestrians and vehicles in 1888. Modern bridge builders do not favor this type of construction, so that it is one of the few of its kind. Two other bridges cross the river at Hamburg.



Photograph from Hamburger Luftbild

HAMBURG'S HARBOR FOR CANAL AND RIVER CRAFT

The Elbe, navigable for 456 miles, with its canals and tributaries, gives Hamburg easy, cheap water communication with regions as distant as Czechoslovakia, eastern Poland, and the Baltic countries. At the right new barges are being launched sidewise,



Photograph from Hamburger Luftbild

A MUNICIPAL SAND PILE FOR HAMBURG CHILDREN

This city playground has an artificial lake, bordered by sand imported from the seaside, and shaded by trees that the ocean front never knew. It was cleared and developed from waste land, as is East Potomac Park, in Washington, D. C.



Photograph by L. and A. Schmal

THROUGH THIS DOMED PAVILION TRAFFIC DESCENDS TO THE ELBE TUNNEL

Steep hills and surface congestion leave scant space for inclines. So huge elevators take vehicles and men to and from the tube's entrance, 77 feet below street level. Stairways also serve pedestrians who pour in and out of this magnified subway station.

to the floor the diners rush to dance again. In smaller, more intimate cafés and night clubs, poets sometimes get up and recite rhymes improvised on questions of the day.

Hamburgers, like the English, walk for pleasure. So do the dogs. Get up early any morning and go to walk; then you meet the solemn housemaids, stolid, white-aproned, unsmiling, leading poodle, spitz, or waddling, banana-shaped dachshund on matutinal marches under the trees.

#### HAMBURG GREGARIOUS YET FORMAL

Germans take their pleasures seriously. Sport is highly organized so that fun-making may function smoothly, like electric cargo cranes in the harbor! Hamburg crowds leaving for winter sports take every conventional article advertised in fashion journals.

Watch the Luft Hansa planes, whose pilots can't start till uniformed air policemen come with orders; or observe the race crowds on Derby Day, where many wear monocles and London sport clothes, and see with what clocklike precision all events are clicked off. In busy cafés waiters keep count of beers served by the number of paper coasters stacked under each guest's glass.

Go out in Mecklenburg to shoot, and servants carry your coat, lunch, gun, shells, even a stool to sit on, while others drive the game past you, in easy shooting range. "Wait! Don't shoot that deer!" a guide whispered to me. "It belongs to the neighbors. I know it by its broken horns."



Photograph by Carl Schütze

#### SPRINGTIME ALONG THE DIKES OF THE LOWER ELBE

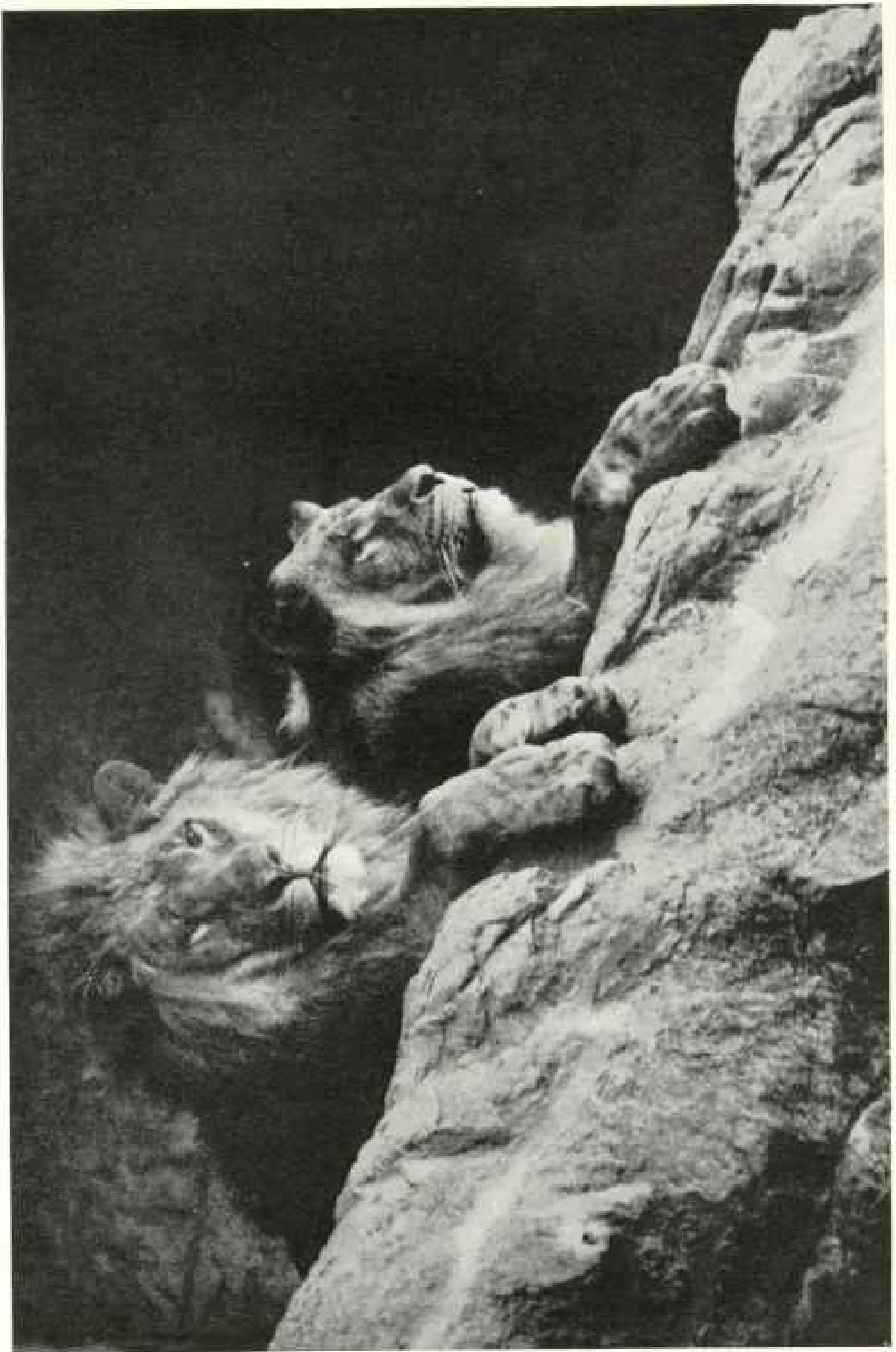
In the fertile lands behind the dikes, fruits, flowers, and vegetables flourish. Peasant farmers here are known by their distinctive dress and mannerisms. Walking across the wet lowlands, they often carry a long pole for vaulting over ditches.

Riding back to Hamburg in a third-class coach affords a quick flash of life among the masses. Through snatches of salty dialogue overheard run the themes about which working people think. Jobs, wages, the price of food and clothes, what the Government ought to do, politics in its many variations—the same here as everywhere. Also, you hear many poor are leaving the city to save rents and try to live on the land. Some men in the coach, returning from visits with country kin, carry a goose, a sack of fruit or potatoes.

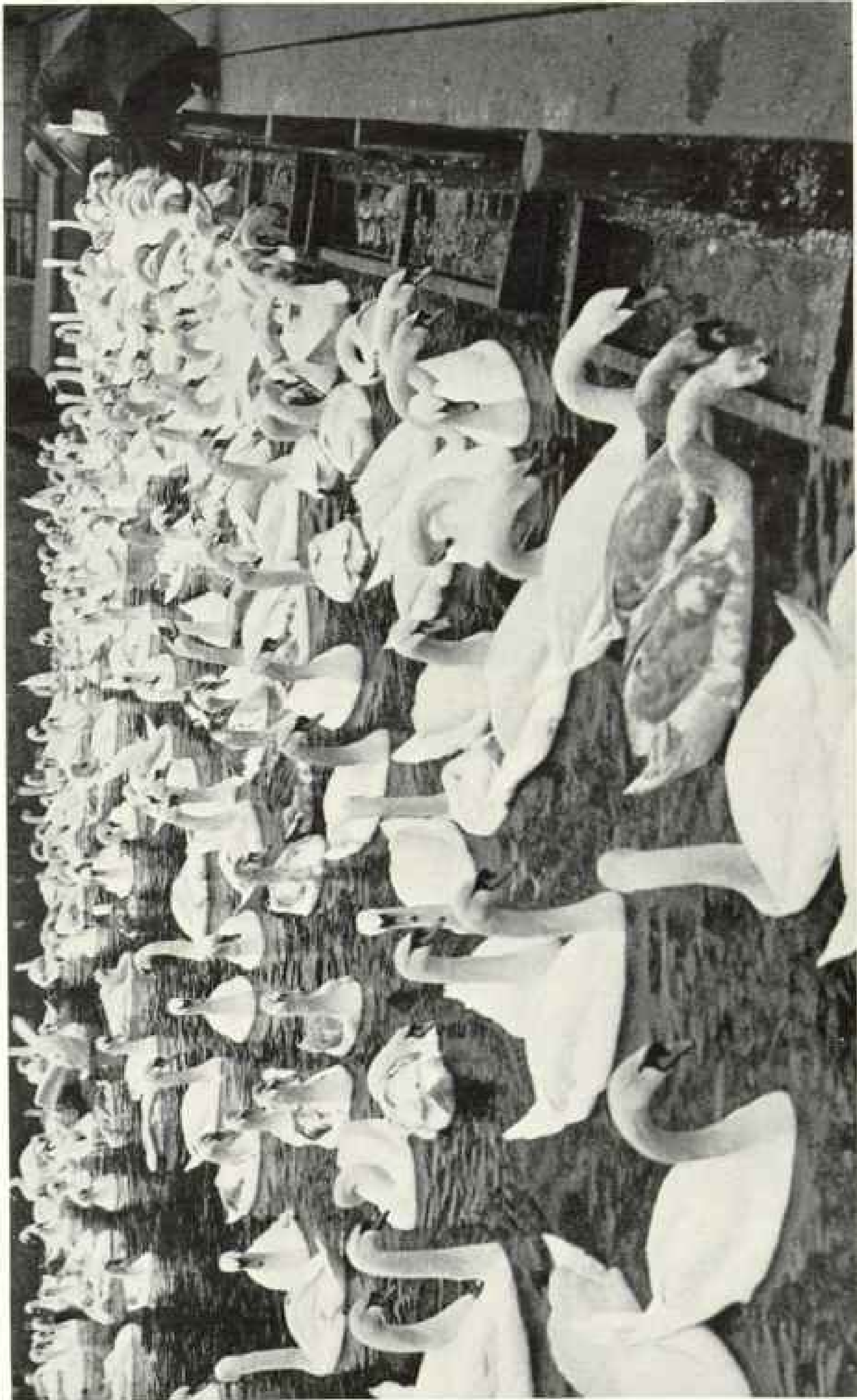
"It was better before the war."

"Ach, ya, the good old peace times!"





HAGENBUCK'S ANIMAL PARK, NEAR HAMBURG, SUPPLIES WILD BEASTS TO THE ZOOS OF THE WORLD



Photograph by Carl Schütze

#### TAME SWANS FEED FROM TROUGHS IN HAMBURG'S INNER ALSTER LAKE

This sheet of water, about a mile in circumference, is one of the city's liveliest charms. Quays planted with trees bound it on three sides; the fourth side, where it joins the Outer Alster, is laid out in promenades along the Lombard Bridge. Besides swans and the many launches, sailboats, and canoes which dot its sparkling waters, tame gulls also haunt the lake. Some are so gentle that they will fly up and take bread from your hand. Many young swans, hatched on the Alster, have been sent to other parts of the world.



Photograph by Carl Schütze

#### SWING HIGH, STEAM CHARIOT!

Lifting a giant engine from rail to deck is all in the day's work for a busy Hamburg crane. The locomotive was made in Czechoslovakia, is destined for service in the Far East, and already on its cab are painted oriental characters.

Peace, war; fires, floods, and cholera—Hamburg has known them all since Charlemagne first laid out the place as a fort from which to fight the Wends, the Swedes, and other half-wild pagans hereabout, whose descendants later helped people England, Danes, French, Russians—all have struck their blows at Hamburg. But, from the day that Roman soldiers built the first hut and sounded their bugle blasts over the swampy Elbe

lands down to the steam-siren chorus of to-day, Hamburg has slowly grown in power and influence, till now she is the greatest seaport in continental Europe. Heiress of the Hanseatic League, Germans call her.

As in olden days her sailing ships pioneered the Seven Seas, so now her liners, freighters, and tankers follow every ocean lane and her voice is the sound of steamers whistling.

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# THE GLORY THAT WAS IMPERIAL PEKING

By W. ROBERT MOORE

AUTHOR OF "ALONG THE OLD MANDARIN ROAD IN TIBET-CHINA," "COSMOPOLITAN SHANGHAI, KEY SEAPORT OF CHINA," "MOTOR TRAILS IN JAPAN," ETC., IN THE NATIONAL GEOGRAPHIC MAGAZINE

**D**UST hovers over Peiping.\* When a dust storm is on, half of the Gobi seems to hang over the city. Great clouds of it come rolling up from the west, the blue sky becomes jaundiced, and, as the pall thickens, the sunlight fades and is lost. Dust comes sifting through every crack and crevice and even mounds up on the sills inside tightly closed windows and doors.

Resting coolies turn their backs to the wind, people ride with scarfs over their faces, and everyone who returns from outdoor errands is heavily powdered with the wind-driven yellow-gray loess. With luck it blows over or settles in a few hours or—a couple of days.

Ordinarily, however, Peiping's dust is but that thick layer of gray earth of the street, powdered to infinite fineness by plodding camel trains, loaded "Peking carts," and the tread of countless thousands of feet. It is whisked thither by the winds that sweep along the broad avenues and eddy up and down between the walls that bracket the labyrinth of narrow, twisting residential thoroughfares.

More striking than these outward physical aspects is that perpetual dust layer of spent grandeur which haunts one of the glory that was Imperial Peking.

## CAPITAL SITE FOR FORTY CENTURIES

Long before the hard-riding, conquering Mongol, Kublai Khan, with his victorious followers established Khanbaligh (Cambaluc, also Taitu) as winter capital here, the site had already supported earlier capitals.

Ancient Chi, Yu Chou, Yenching (also called Nanching), and Chung Tu had been built, expanded, and razed—piles of dust. Chinese chronicles record a span of nearly forty centuries. But who knows? Perhaps when the famous "Peking man" (whose skull I saw being studied in the Peking Union Medical College) was roaming these lands, some sort of communal center existed here.

\* The name of the former capital of China was officially changed in 1928 to Peiping.

Drama has continued to march in cycles since Marco Polo visited the capital of the Khans and brought back to unbelieving Venice tales of its incredible magnificence.

The city recently gave way again to Nanking's predominance as China's political center, and has reassumed the name Peiping, which it possessed in the sad days before the later Mings and Manchus ruled from the Dragon Throne.

But Peking (or Pei Ching, if one takes the northern pronunciation), meaning "Northern Capital," it will continue long to be called, even though the turn of political events has robbed it of that rank and has reduced it to the City of the Northern Plains.

## CITIES WITHIN A CITY

To see the city best is to gain first a view of its entirety. An excellent vantage point is one of the high towers of the massive city wall, or "Coal Hill," a mound back of the Forbidden City—a panorama once denied lest one happen to peep at the Imperial palaces (see Plate VI). Better yet, see it from the air.

After a bumpy and dust-choking motor ride out to the airdrome one afternoon, we are soon skimming northward toward the city on the wings of a Junkers plane. Away to the west and north stretch the faint purple ridges of the Western Hills. Within a few moments Peiping begins to resolve itself from the ground-dust haze and to take on rare symmetry.

First emerged two mighty rectangles in juxtaposition to each other and inclosed in heavy fortifying walls, rectangles splashed with blues, greens, reds, yellows, and grays. Then other divisions became visible.

A city beside a city and cities within a city—such is Peiping. As one approaches from the south, the Chinese section is in the foreground, and stretching back from it is the old Manchu or Tatar district, within the center of which is the Imperial City. Pinkish-red walls, yellow tiled on top, in turn set apart the yellow-roofed "Purple Forbidden City" in the heart of the moated Imperial inclosure.

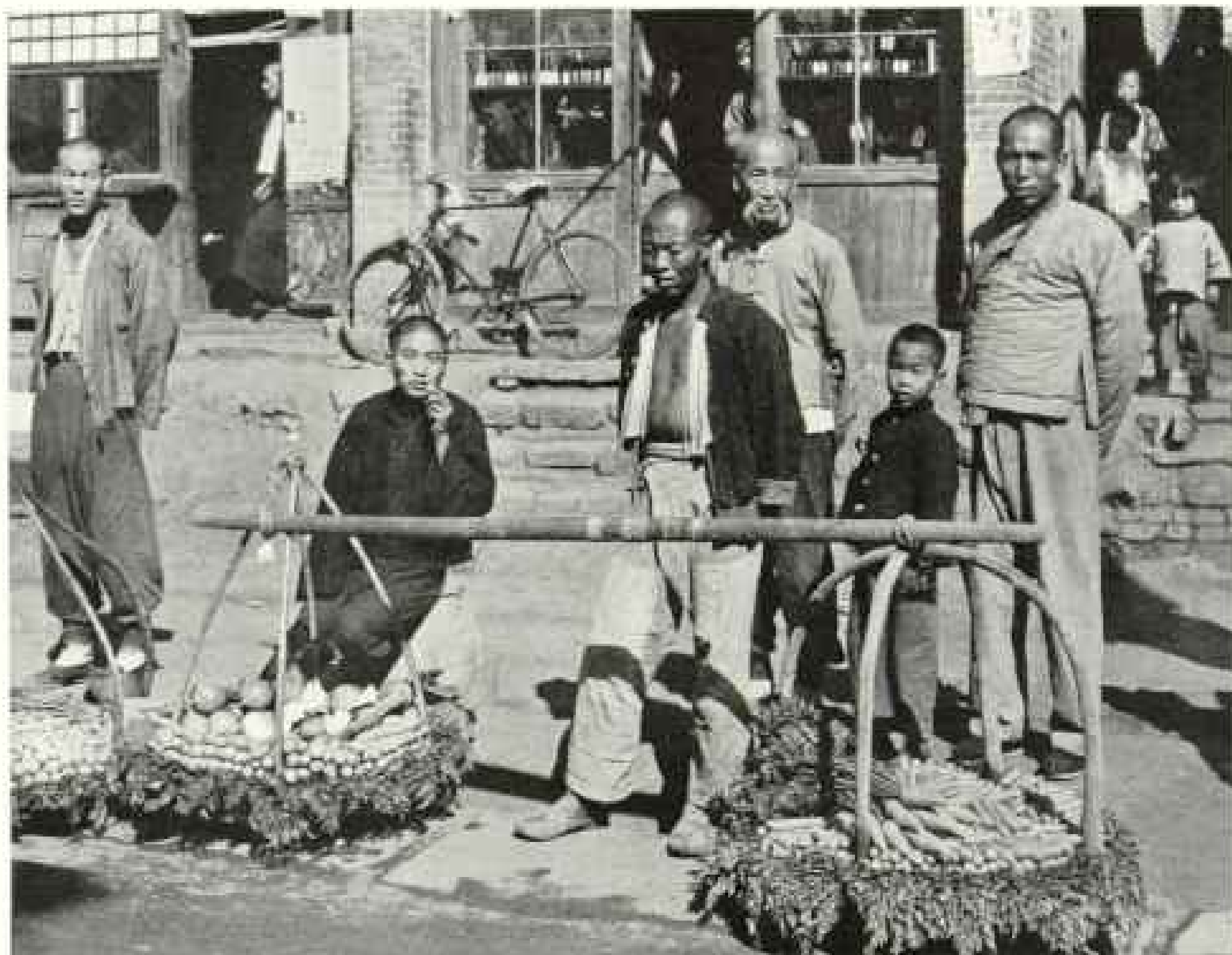


Photograph by W. Robert Moore

## THE "CAPITOL PLAZA" OF IMPERIAL PEKING NOW IS DESERTED

In this Hall of Exalted Ceremony, official positions were conferred, the Empire's policies formulated, and frequent receptions were held for vassal princes, diplomats, and scholars applying for high literary degrees. This is one of three throne halls in the Reserved City of the Emperors, more commonly known as the Forbidden City.





Photograph by W. Robert Moore

## A CURB MARKET FOR CARROTS AND RADISHES

Street merchants peddle fruits, candies, and vegetables heaped in baskets suspended from the ends of carrying poles. They congregate in open markets, and call their wares from house to house, with a variety of raucous cries. Some use horns and various other musical instruments to attract attention.

"Down there's the Altar and Temple of Heaven," the pilot shouted in my ear, as he indicated the massive circular marble platform and adjacent round, blue-roofed temple below us in the center of a large park at the southern part of the Chinese City.

The old emperors believed that the center of that altar was the center of the whole universe.

Why not? Considering the extensiveness of the domain over which those monarchs ruled, there seems pardonable justification for their egotism.

We bank sharply and hang edgewise, filling the air with exhausted gasoline fumes over that three-tiered disk of pure-white marble from which once ascended annually the smoke of burnt offering—"a bull calf of unmixed color and without flaw," while the "Son of Heaven" knelt in reverence and prayed for a blessing to descend

on his people. Nature worship under the dome of sky, old as time.

Americans learn with pride that the triple roofs of azure tile which crown the impressive Temple of Heaven are supported on mighty columns of Oregon pine, supplied at considerable expense of transportation when local wood of sufficient size could not be obtained, at the time the temple was rebuilt (see Plate II).

This "Temple of the Happy Year," as it is better known to the Chinese, was second only to the Imperial palaces in sacredness and in the beauty of its design. From the air, with its top of Mediterranean blue, it looks like a giant Mongol yurt.

As we swing again toward the Tatar City, we skirt the Temple of Agriculture. The grounds around the decaying buildings and the square altars have reverted to grass and weeds; a flock of sheep or goats feeds calmly in the neglected courtyards.

The walls around the Chinese City embrace only about one-half as much area as is included within the Tatar fortifications; the shops and homes of the Chinese district are crowded near the communicating gates. In 1644, when the Ming dynasty fell, all of the Chinese were forced to live in this southern suburb, and the invading Manchus appropriated the whole of the original city.

Roaring over the Chien Men, massive central gate through which a large part of the traffic between these two sections passes, people and carts coursing through its arches look like a milling army of ants, and the tramcars and autos like darting cockroaches.

Abreast, and off our right wing, is the walled-in Legation Quarter, with the American Legation and the buildings of the Marine Corps guard, marked by tall radio towers, standing closest to the gate.

#### "PURPLE FORBIDDEN CITY," COURTS OF GOD-EMPERORS

Almost immediately the Forbidden City is beneath us.

Only from such air perspective can come the full appreciation of the symmetry and expansiveness of Yung Lo's building operations.\*

Boldly planned and executed, even surpassing the courts of Kublai Khan, were the palaces and the capital of the mighty Ming emperor. The whole plan, history says, was conceived in detail by a Taoist monk, a close friend of the haughty Yung Lo.

Below us lie rectangles of courtyards, some cut by curving marble-bridged streams, and a patchwork of red gates, halls, reception rooms, and living quarters of the emperor and his countless retainers, under roofs of shimmering Imperial yellow.

Each was built according to all the regulations of astronomic and geomantic influences. The palaces stand to-day essentially as their construction was commanded more than five centuries ago.

"What a pity I can't get that in color!" I complained at the top of my voice.

"Yes, too bad photography's forbidden. Pretty, those golden roofs."

We circle the three lakes—Nan Hai, Chung Hai, and Pei Hai (the South, Cen-

tral, and North Seas)—that cut down through the Imperial City, to the west of the inner palaces. Lotus-mottled blue waters and irregular banks of green, studded here and there with yellow and green roofs, are marvels of landscape gardening, large even from the air. Yung Lo gets credit for those, too.

"Kublai Khan's palaces stood near where that white *dagoba*, shaped like a peppermint bottle, rises on that little hill," I hear above the noise of the exhaust.

"Old Buddha," as the inscrutable Dowager Empress, Tzu Hsi, was called, used to go boating on these lakes in summer and was pushed about on a sled over the ice in winter—that is, when she wasn't in residence at her Summer Palace.

Tradition says she commanded a cessation of the bombardment on the foreign legations one day during the Boxer Rebellion so that she could enjoy a boating picnic without the confusion of gunfire.

"That island, amid the lotus"—we nose sharply down toward it, beyond a thread-like marble bridge—"was where 'Old Buddha' kept Emperor Kwang Hsu prisoner while she and a eunuch ran the show."

#### MARCO POLO SAW DRUM TOWER

The Drum and Bell towers soon slide under us as we zoom and head north again. Marco Polo heard the watches of night boom from this same Drum Tower. The drumheads were strong then, having served but three years when he arrived.

To-day the tower has become an educational library and a propaganda center, and is plastered with Kuomintang posters, health suggestions, anti-communistic displays, and other notices.

Two slender camel caravans, in from the desert, sludge along a street; a toy motorcar buries them in a cloud of dust.

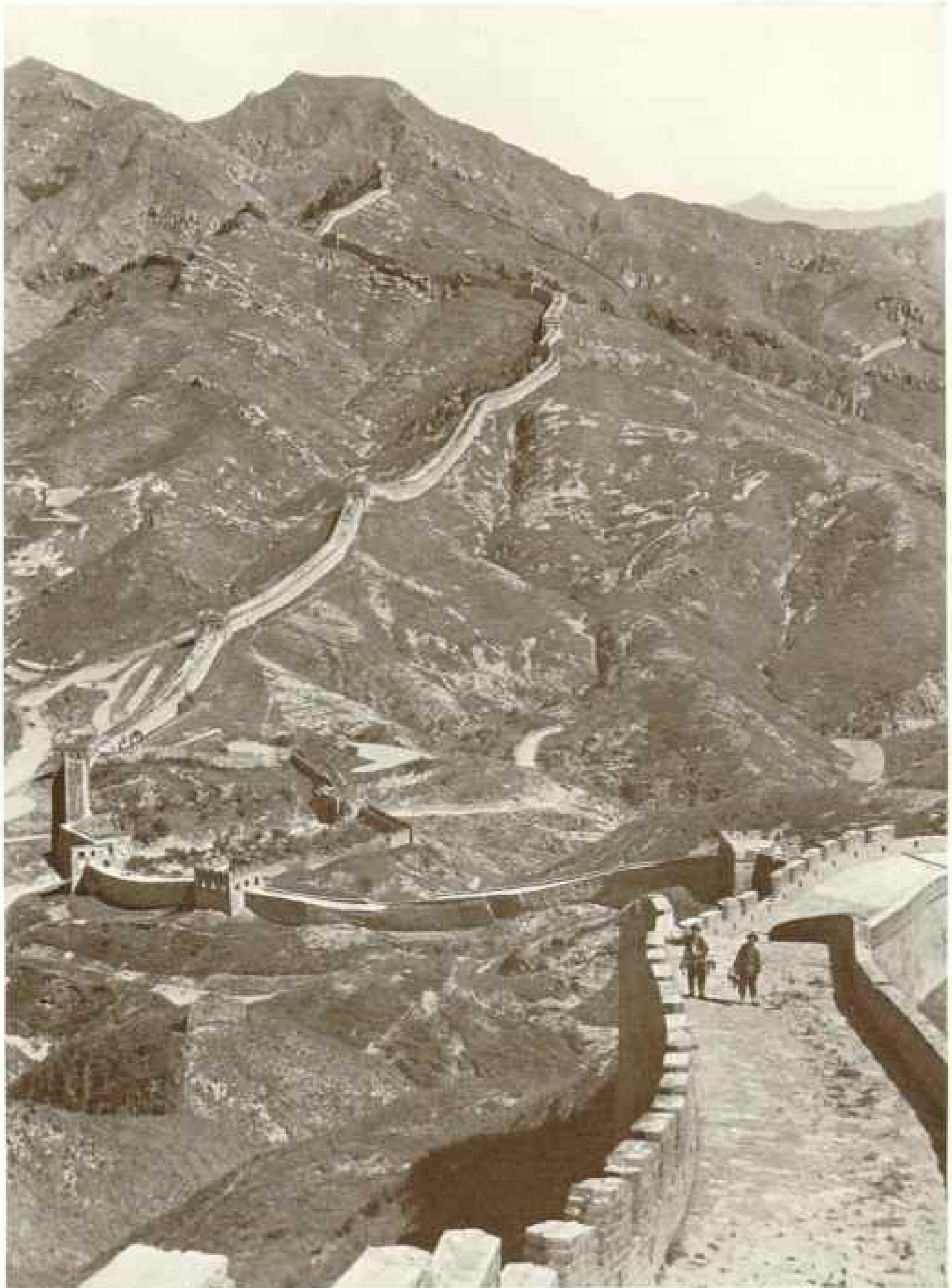
The ridge of earth off to the north of the present city wall, and running parallel to it, was the old north wall of Khanbaligh.

Swinging over the Confucian and Lama temples, their golden tile roofs still bravely flashing up the fact that they once had royal support, and then back over the Forbidden City, we catch a glimpse of green roofs far off beyond either wing tip.

The group near the lakes is the new National Library; the other, off Hata Men Street, is the Peking Union Medical College. Both are attempts to preserve the beauty of Chinese architecture in modern building construction.

\*See "Peking, the City of the Unexpected," by James A. Muller, in the NATIONAL GEOGRAPHIC MAGAZINE for November, 1929.

CAPITAL AND COUNTRY OF OLD CATHAY

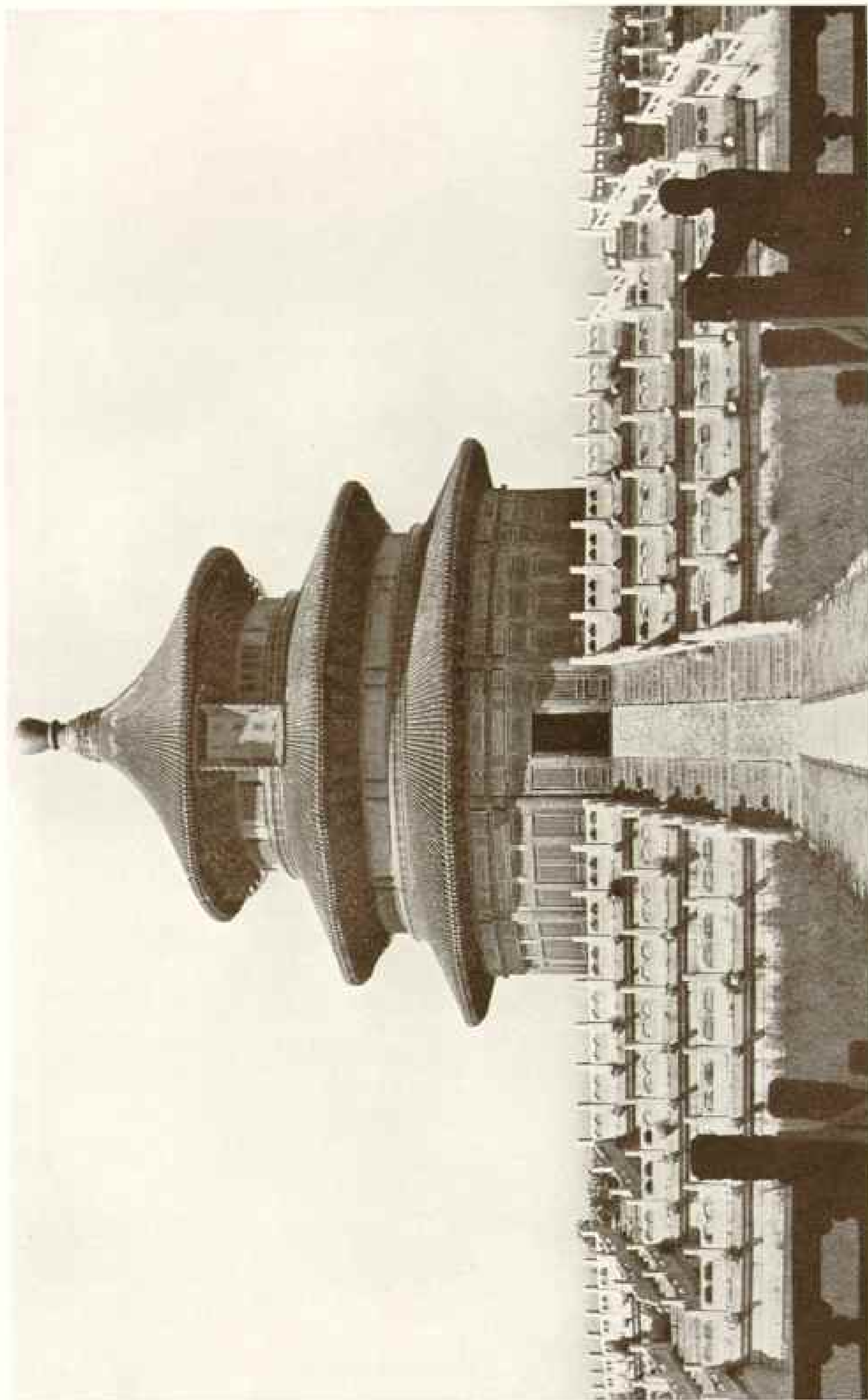


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Photograph by W. Robert Moore

LIKE A SINUOUS SERPENT, CHINA'S GREAT WALL WRITHES OVER THE HILLS AT NANKOW PASS

This most massive construction ever made by man was begun about 22 centuries ago. Were it built west from Philadelphia, the wall and its spurs would reach into ten States and extend beyond Topeka, Kansas.

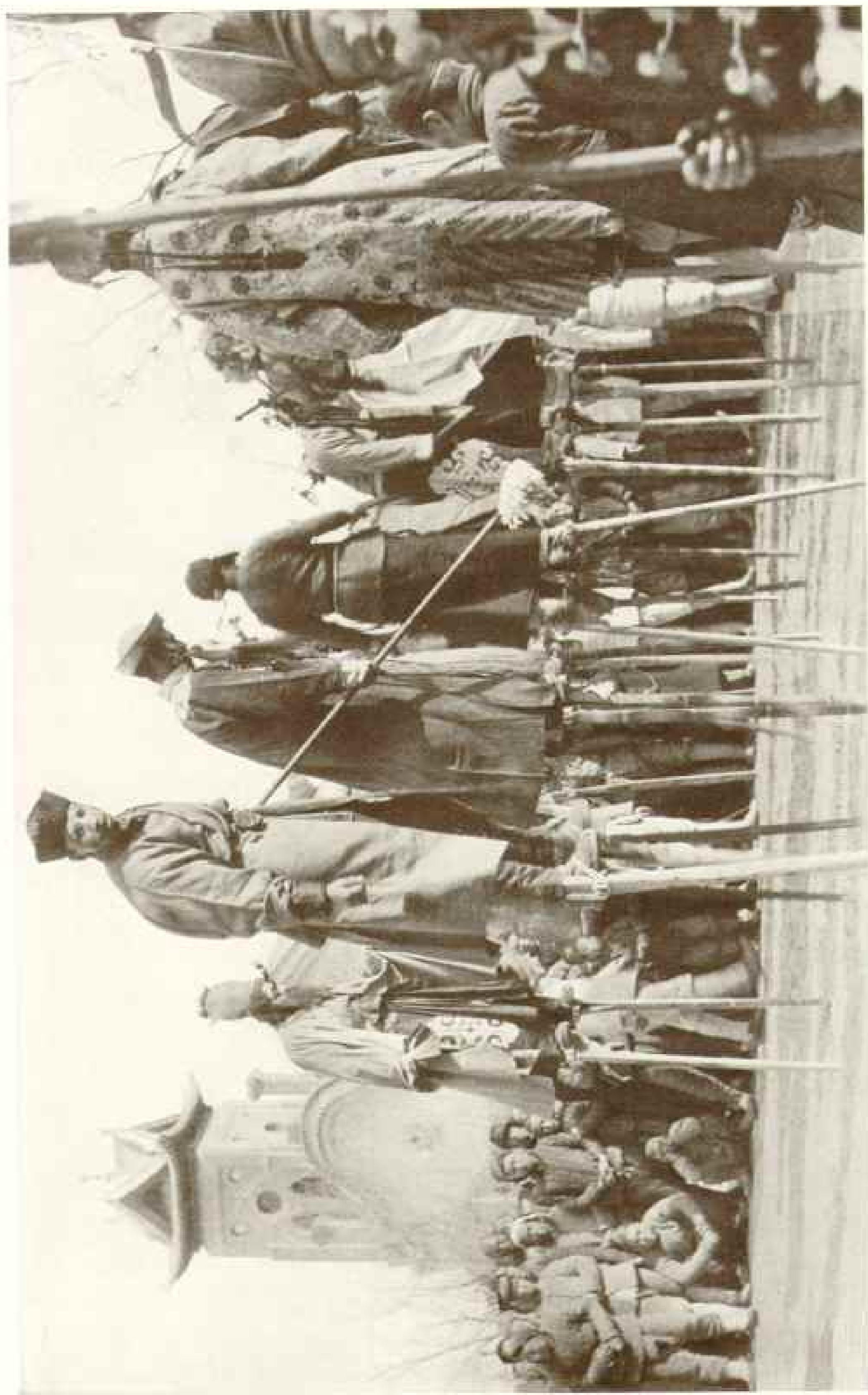


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THE TEMPLE OF HEAVEN WAS THE MOST SACRED RELIGIOUS EDIFICE OF IMPERIAL CHINA

This building, literally the Temple of the Happy Year, rises 99 feet; its triple roofs are azure-tiled and capped with a gilded ball. Here and at the adjoining Altar of Heaven the emperors, as Sons of Heaven, offered their annual sacrifices and prayers to the supreme Ruler of the Universe. The pillars holding the roofs, built after the destruction of the original structure by fire in 1889, are Oregon pine.

Photograph by W. Robert Moore



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SHANSI SOLDIERS ENJOY A STILT-WALKING FROLIC

The Chinese New Year's festival, which comes about a month later than ours, brings out a considerable amount of fun-making. Men and boys often dress in theatrical costumes and women's clothes, paint their faces in grotesque patterns, and clown around on tall stilts, much to the enjoyment of the onlookers.





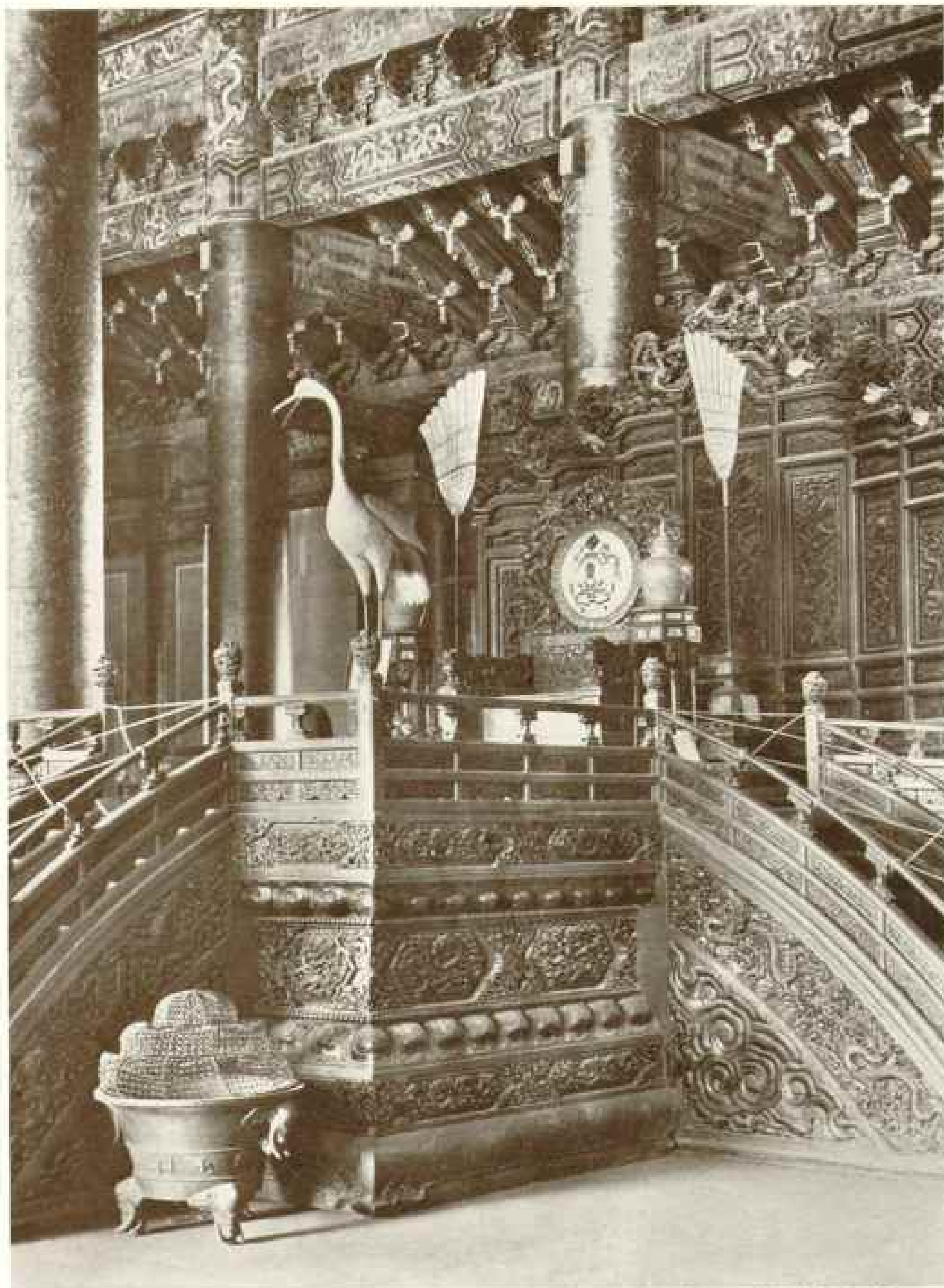
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Photograph by W. Robert Mouer

KITES ARE ONE OF THE FAVORITE SPORTS OF CHINESE MEN

Chinese grown-ups, as well as youngsters, delight in flying kites which represent people, butterflies, fish, and birds. Battling with large kites, by seeking to entangle and pull down an opponent's kite, is a favorite pastime and game for wagering. This dealer is one of many Moslems living in Peiping.

CAPITAL AND COUNTRY OF OLD CATHAY

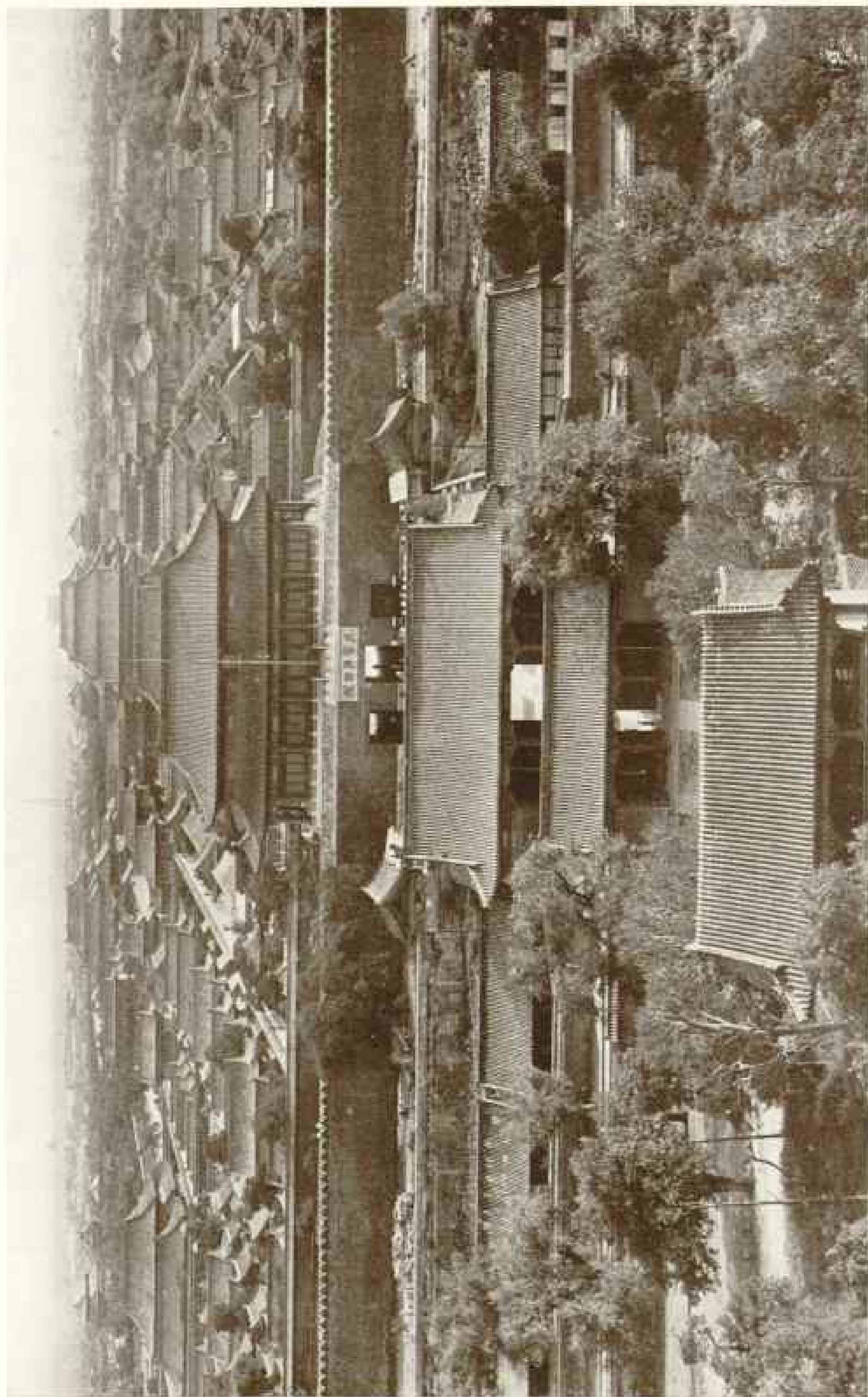


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Photograph by W. Robert Moore

THE DRAGON THRONE, SEAT OF CHINA'S GOD-EMPERORS

Except for a dramatic monarchist coup in 1917, which lasted for only a few days, the throne has been unoccupied for 21 years. The crossbeams and raftered ceiling of the spacious hall are as elaborately carved and decorated as is the throne itself.

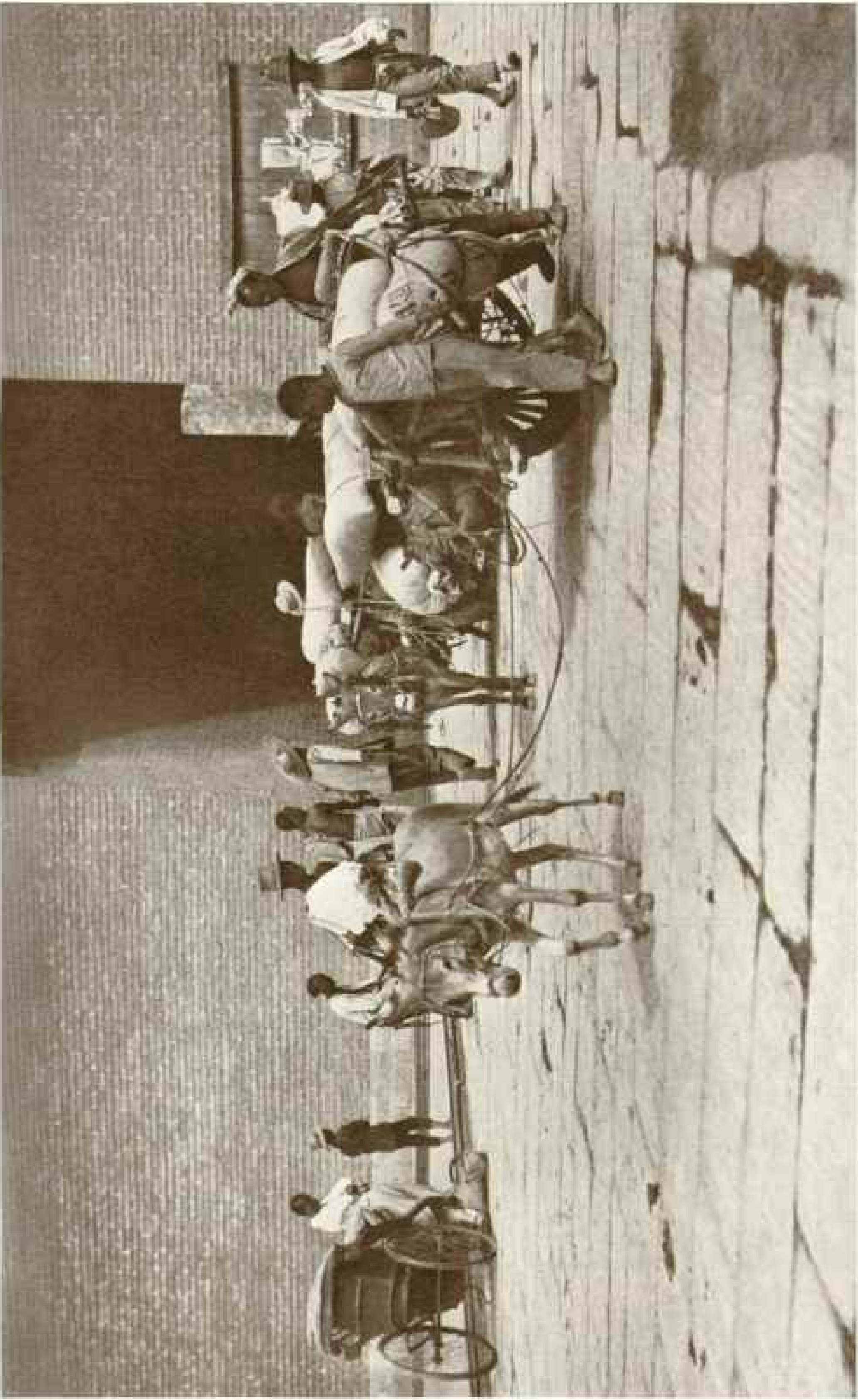


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OVERLOOKING THE IMPERIAL FORBIDDEN CITY FROM "COAL HILL."

Enclosed within pink walls and roofed with shimmering Imperial-yellow tiles, the palaces and halls of the "Emperors' City" present a panorama of striking beauty. The central group of larger buildings consists of audience and throne halls and elaborate gateways. The living quarters once occupied by the god-emperors, their families and servants, are on either side. The tall building seen far in the left background is the Temple of Heaven (see Plate II). The radio tower in the background is that of the American Legation.

Photograph by W. Robert Moore



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CHINA'S ANCIENT "RAPID TRANSIT" STILL FUNCTIONS IN A MOTOR AGE

Roads accessible to motorcars are being constantly extended, and these man-and-donkey-propelled wheelbarrows are being slowly replaced by trucks and buses. This traffic is passing through one of the gateways of Peiping.

Photograph by J. T. McCarvey





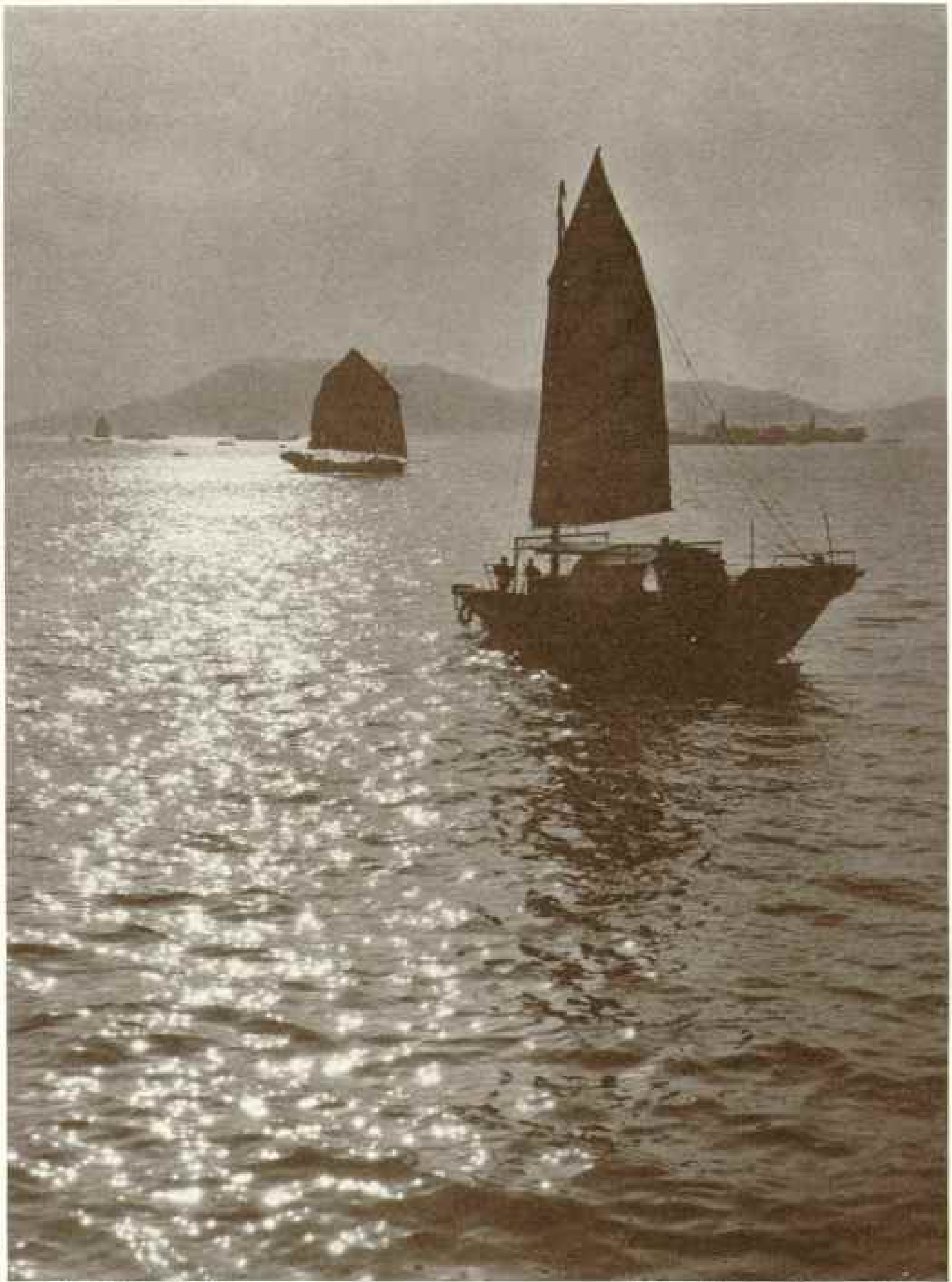
Photograph courtesy Admiral Mark L. Bristol

A "TWISTER" LICKS UP THE WATERS OF THE YANGTZE RIVER

This photograph was taken by C. A. Stahl, chief yeoman, United States Navy, from the forecastle of the U. S. S. *Pittsburgh*, entering Shanghai, when the waterspout passed within 100 yards of the ship. The cloud around the base of the waterspout is spray churned up from the surface of the water.



CAPITAL AND COUNTRY OF OLD CATHAY

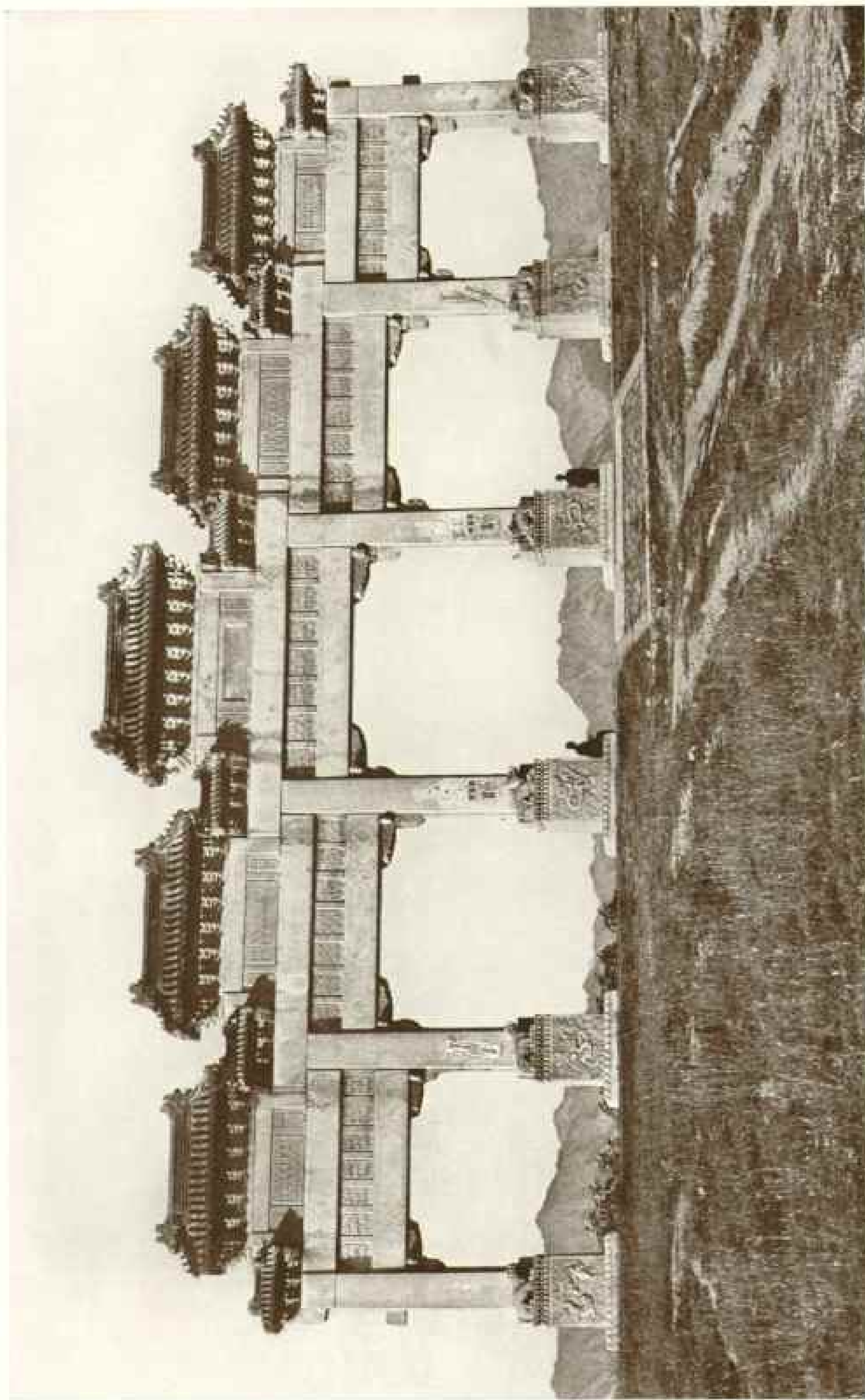


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Photograph by Maynard Owen Williams

SUNSET IN HONG KONG HARBOR

From early morning until late at night the harbor is active with Chinese junks of ancient design, modern ocean liners, tramp freighters, and British and other naval vessels. Some 70,000 people live on such junks as these and on smaller craft.

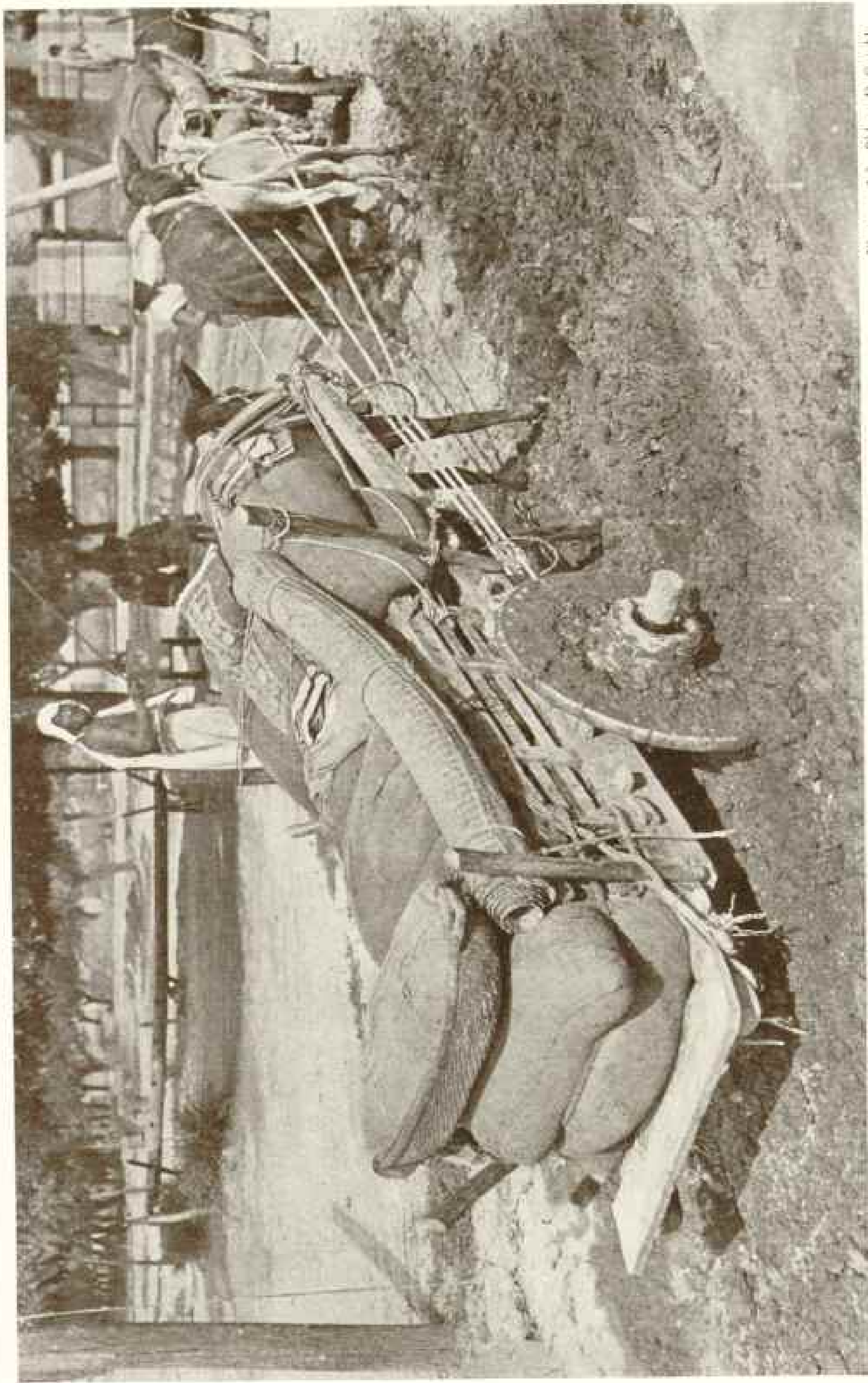


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Photograph by W. Robert Moore

THE FIVE-ARCHED MARBLE GATEWAY AFFORDS A MAGNIFICENT APPROACH TO THE MING TOMBS

Its archways reveal a panorama of the long, sacred avenue (see Plate XII) and the rugged hills within whose shadows sleep 13 of the 16 Ming emperors who ruled over China. Emperor Yung Lo, who established his capital at Peking (Peiping) in 1409, selected this site for the tombs. The memorial gateway, or *tsi-tou*, dates from 1541.

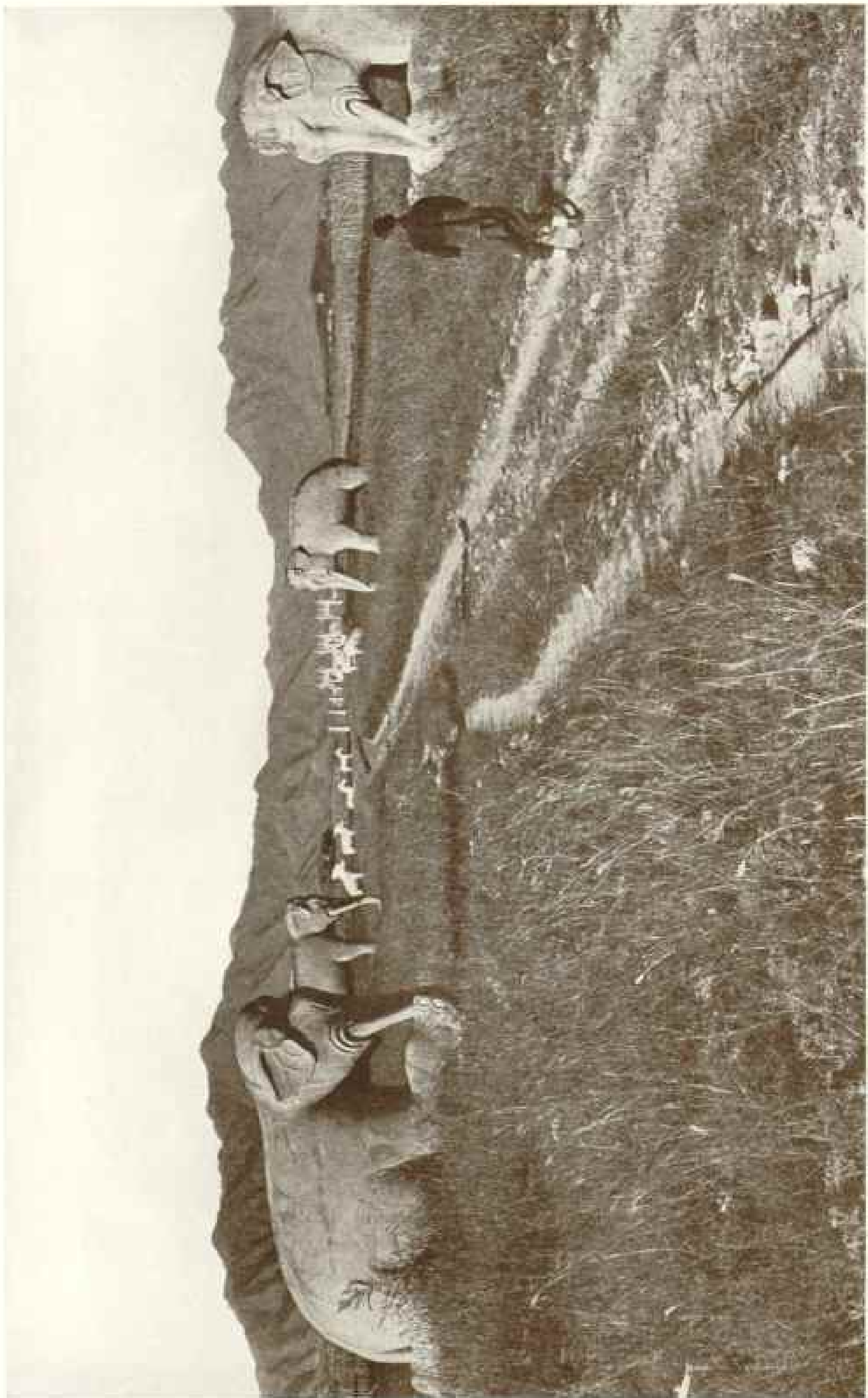


Photograph by Sidney D. Gamble

**IN WET WEATHER, AXLE-DEEP MUD; IN DRY WEATHER, DUST!**

Most of north China's roads are unpaved tracks across the country where the soil is fine-grained and, when wet, exceedingly sticky. The cart wheels are made with narrow tires so they will not gather heavy loads of mud. As a consequence, the roads are soon badly cut up with many "chuck holes" passable only with the almost indestructible "Peking cart."

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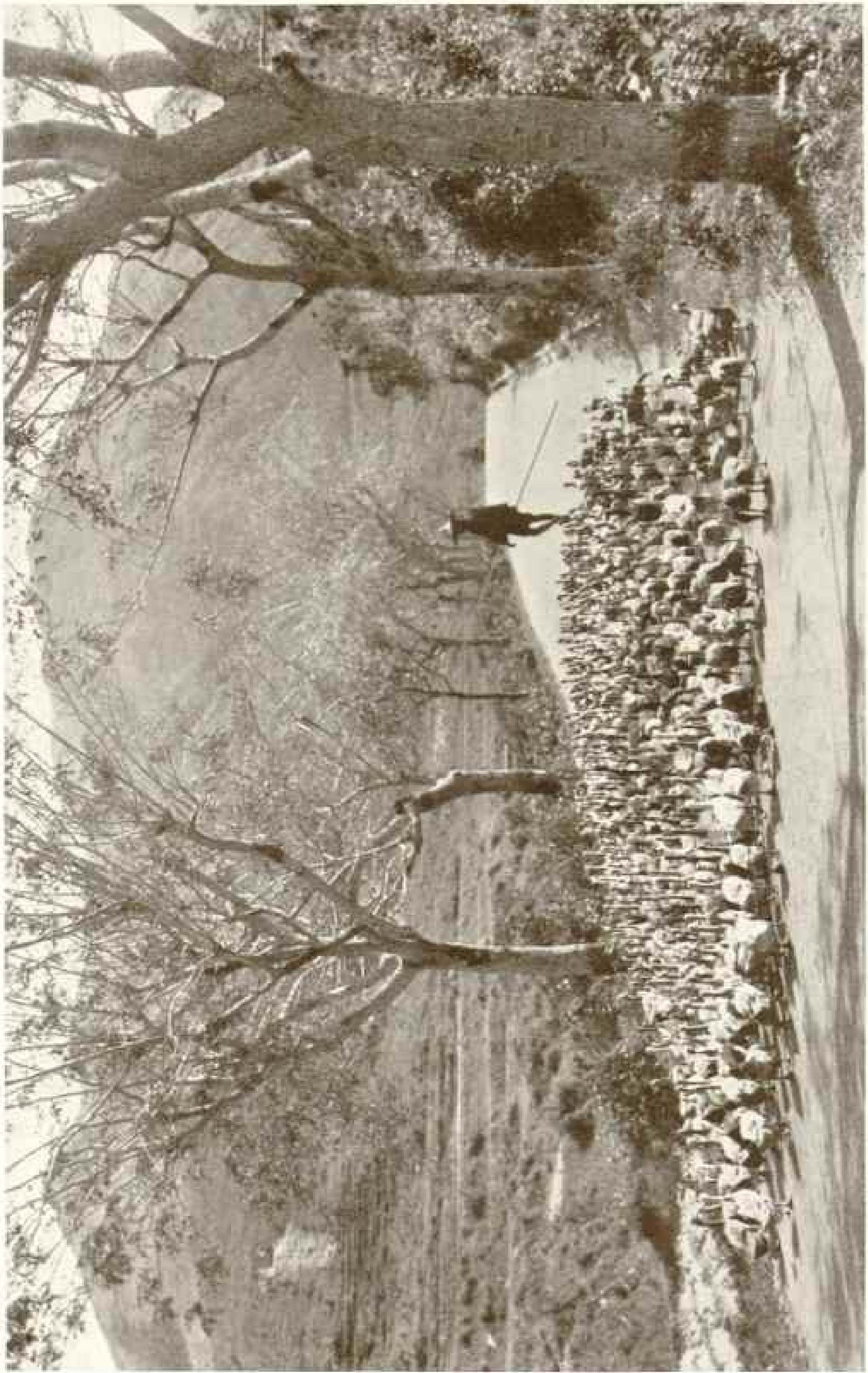
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MARBLE FIGURES LINE THE "TRIUMPHAL WAY" TO THE MING TOMBS

Photograph by W. Robert Moore

The 18 pairs of statues represent men, camels, elephants, lions, horses, unicorns and other mythical monsters. Two of the 13 tombs can be seen in the midst of wooded gardens at the base of these hills, which are some 30 miles north of Peiping.





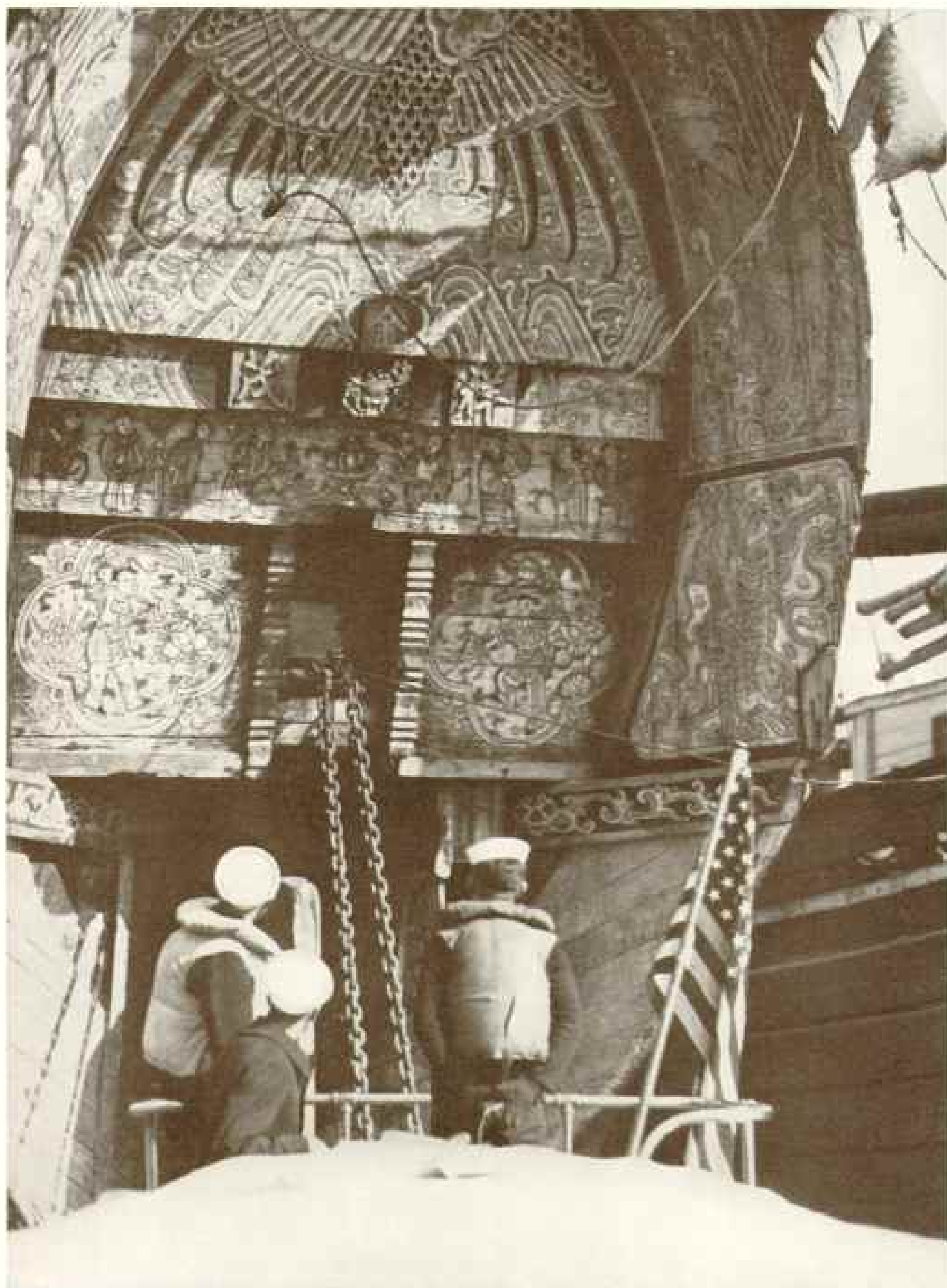
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THIS CHINESE LEADS HIS DUCKS TO PASTURE

In the performance of many other daily tasks, the oriental uses methods which are directly opposite to those of the West. In south China the duck eggs are often hatched in primitive incubators, the sun frequently being used to provide heat. In such cases, trays of eggs are placed outdoors for a few hours until thoroughly heated, and are then taken inside and covered over to retain their warmth.

Photograph by W. Robert Moore

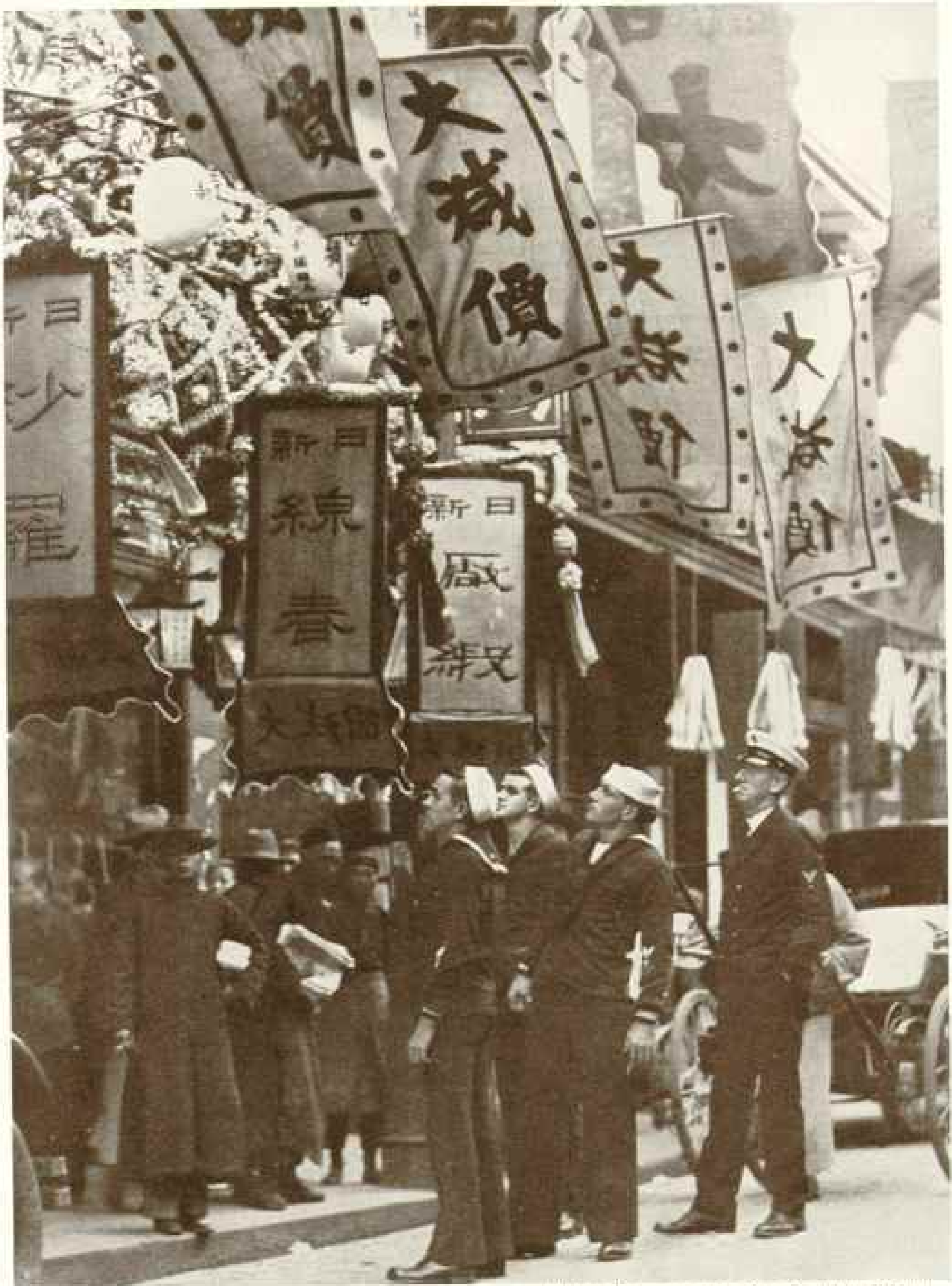




Photograph courtesy U. S. Navy Recruiting Bureau

AMERICAN BLUEJACKETS STUDY CHINESE "MARINE" ART

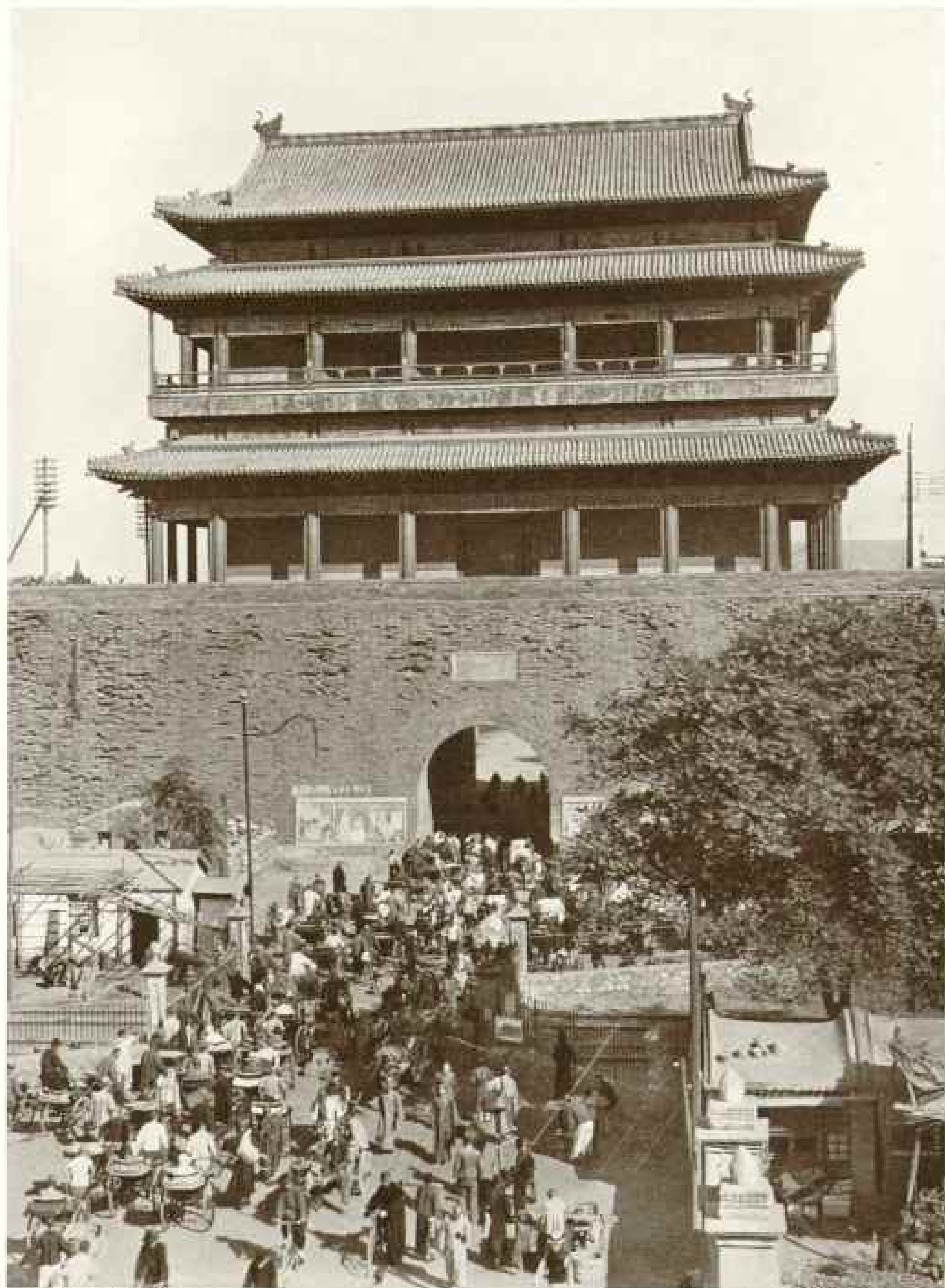
They are examining the series of paintings and emblems on the high stern of a junk anchored at Shanghai. The blending of colors of some of these paintings is remarkable when one considers the crude "canvas" and cruder tools with which the artists had to work.



Photograph courtesy U. S. Navy Recruiting Bureau

BARGAIN DAY IN SHANGHAI

A group of sailors from one of the ships of the United States Asiatic Fleet enjoy an afternoon tour of souvenir shopping in the maze of Chinese shops along the busy thoroughfares of Shanghai. The signs proclaim a variety of "Great Sales," "Bankruptcy Sales," and outstanding bargains.



© National Geographic Society

Photograph by W. Robert Moore

TRAFFIC THROUGHS THE HATA MEN, SOUTHEAST GATEWAY OF PEIPING'S TATAR CITY

The heavily walled Tatar city was provided with nine gates, two on each side except the south, which had three, the central one reserved for the emperor. Each of these gates was faced with a massive guard tower. The fortification at Hata Men has been removed to allow traffic free access and the entrance of a railway, the guard gates of which can be seen in the foreground.

Under the roof of the former is housed a fine collection of rare Chinese books and other facilities for scholarly Peiping, and within the walls of the latter foreign doctors and Chinese trained abroad are teaching new students how to help the blind to see, the lame to walk, and the sick to become whole.

#### HOME OF PREHISTORIC MAN

There, too, my friend, Dr. Davidson Black, indefatigably labors over the remains of the *Sinanthropus pekinensis*, to use the scientific name of the aforementioned Peking man; and through his scholarly examination, after months spent in extracting the skull from the travertine in which it was embedded, much light has been shed on this and other illuminating relics of early man in Pleistocene times, perhaps a million years ago.

Other highly valuable fossils have been unearthed from the caves near Chou Kou Tien, at the edge of the Western Hills, 37 miles from Peiping, where the geologist, W. C. Pei, made this rare discovery.

Through the mosaic of roofs, courtyards, and palace inclosures run "long wide roads through which horsemen can gallop nine abreast!" What a contrast Peiping, with its liberal use of space, presents to most cities in China! That Peiping was more Mongol than Chinese is the answer.

Roads run straight and true, cutting big and little squares and rectangles; nothing is pinched or tortured together, except in the Chinese and residential districts. A sky view even there, however, shows many wide courtyards in private homes which high mud walls along the streets conceal from pedestrian eyes.

And the trees! Until you look down from the air and see the masses of trees within the walled-in gardens, you do not suspect that the city has such an abundance of greenery.

We bank sharply over the Reserved City of Emperors to get yet another look at its symphony of color and plan—mathematics blended with esthetic beauty—then turn toward the several flags that wave over the foreign legations. Finally we dart over the Chinese City, which from our height appears like a jumble of nursery building blocks. The sun-gilded dust mantle follows fast in our wake, as we return to the landing field.

From the ground, detail and size are added to our sky-map perspective.

"Fourteen miles in circumference, fifty cubits in height and fifty in breadth, the whole circuit having battlements and embrasures"—that was the completed task of the brick and stone masons more than 500 years ago.

"There's your city wall—finished!" they must have felt like telling the emperor when they looked at bruised fingers and felt pains shooting through tired, bent backs. And yet they must have felt some thrill of pride as they stood off and looked at those massive fortifications and at the double towers that rose majestically above the long crenelated lines that encircled the Tatar City.

The city wall remains much the same today as when it was piled together. Wars, time, and prying tree roots, however, have caused it to crumble and bulge in places; spots show where repairs have been made. Few of the nine gates are intact, and all but two of the corner towers have been destroyed.

The Government railway has tunneled through the wall to the destruction of the barbican of the Hata Men, so that engines smudge the outside of the south Tatar wall (see Plate XVI).

#### DAILY PAGEANT OF TRAFFIC AND PEOPLE AT CITY GATES

"The gates are the mouths of the city; they are the openings through which this huge walled-in body of a million or so organisms breathes and speaks"; thus have the nine passageways been described.

One can learn much of Peiping's daily business by standing at the gates and watching the traffic that passes.

In the early morning a steadily increasing flow of traffic begins to move through the gates. Peasants push heavily laden wheelbarrows, with small jingling bells strung in the spokes of the wheels. Others carry baskets of produce on shoulder poles. Donkeys jostle rickshas, and now and then hurrying automobiles honk raucously to clear the way of pedestrians going to their various tasks.

And camels! Long caravans come shuffling in from Kalgan or far Mongolia, or are returning from the Western Hills with heavy bags of coal slung between their two great humps (see page 770).





Photograph by W. Robert Moore

#### THE LITTLE MAIDS FROM SCHOOL, AND A "MOON GATE"

The Chinese have achieved artistic effects with doorways and rock gardens in the courtyards of their homes and palaces. Entrances also are fashioned in the forms of vases, lutes, and various other bizarre patterns.

Camels, I'm a child about them; there's something about their air of supercilious disdain, as they stalk through the streets or along the trails, that ever fascinates me. If anything, the camels of Peiping are even more impressive than the caravans I have watched moving at night across arid plateaus of Persia.

Hopes and sorrows, too, march through the gates, for through some pass the brilliant red and gilt palanquins of weddings and the catafalques of death. The most westerly of the south Tatar gates is known as the "Gate of the Dead," because numerous funeral processions may be seen moving on their slow way out through it.

The tempo of traffic at the gates increases at the height of day and dies down again after twilight fades, finally becoming almost stilled at night. At one time curfew was rigidly enforced, and the ponderous doors creaked shut on their grating hinges. Movement then ceased until they swung open to a new day.

Now curfew is neglected except when, as happened several times while I was there, martial law is declared because of anticipated political disturbance. On such occasions theater-goers hurry from the darkened halls at 10 o'clock, and, together with other groups, make rapid moves to get on their home sides of the wall before the rusty closing gates deny further passage.

Known by several names, the official, literary, and popular, the gates are symbolical of understanding, brightness, abundance, peace, victory.

#### FORBIDDEN CITY NOW OPEN TO VISITORS

The Chien Men, the central one of the south wall and largest of them all, was officially the Cheng Yang Men, "Straight to the Sun," and was once the emperor's because he alone was allowed to pass through the central archway. But China has become a people's country and the gate is often referred to as the "Nation's Gate."





Photograph by Ewing Galloway

"NOW THIS MAY HURT A LITTLE!"

Native dentistry in China is far from painless. This practitioner, working in the streets of Peiping, uses no anesthetics. He jerks out the tooth, washes the wound with an antiseptic, collects his fee, and then hunts up another patient!

Back from it stretches the royal avenue which leads to the Imperial palaces—the Purple Forbidden City.

The entrances to this sacred royal precinct also have swung open to even the humblest who have the few coppers necessary to buy a ticket at the "Gate of Military Prowess." This paper allows them to walk where the god-emperors once abode!

Sad they are now, but still rescued from the ignominious fate of extensive plundering. A committee preserved as much as possible of the glorious palaces and converted them into a museum (page 768).

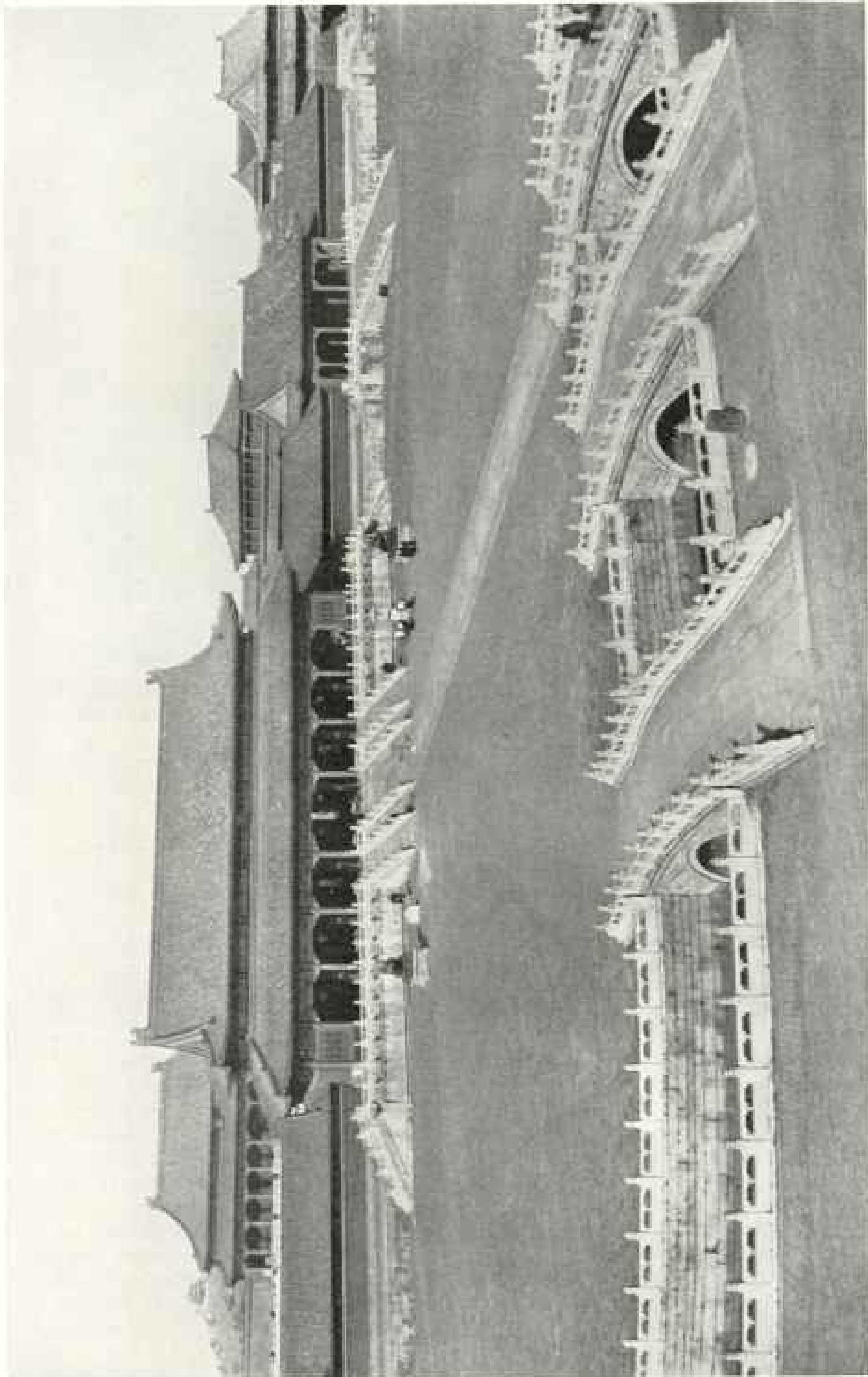
To-day anyone may stand in front of the Imperial throne on which the Son of Heaven sat, surrounded by his court. Here, in the sacrosanct Supreme Harmony Hall, some 200 feet long and 100 feet wide, deer-horn curios and other gewgaws from the Jehol summer palaces now lie in front of the barren, roped-off dais where emperors have been seated in glory (see Plate V).

The last was the pitiful Pu-Yi, who, weeping and wailing, was hastened from his bed one night when he was but two years old, clothed in the royal robes of state, and placed on the tottering Manchu throne as Hsuan Tung.

That he was forced to sign his abdication in 1912 in favor of the Republican movement, but still permitted to live in the palaces on a grant of money which was never paid, and was finally forced to flee for his life twelve years later, is history. And that his exit was rapid, a faded flower in a vase and books strewn about the royal apartments, now sealed, still bear mute witness.

During the first part of those twelve years the Monarchist-Republican Yuan Shih-kai served as President and, attracted by the glittering monarchy and by royalist palaver, made an unsuccessful gesture towards mounting the Dragon Throne.

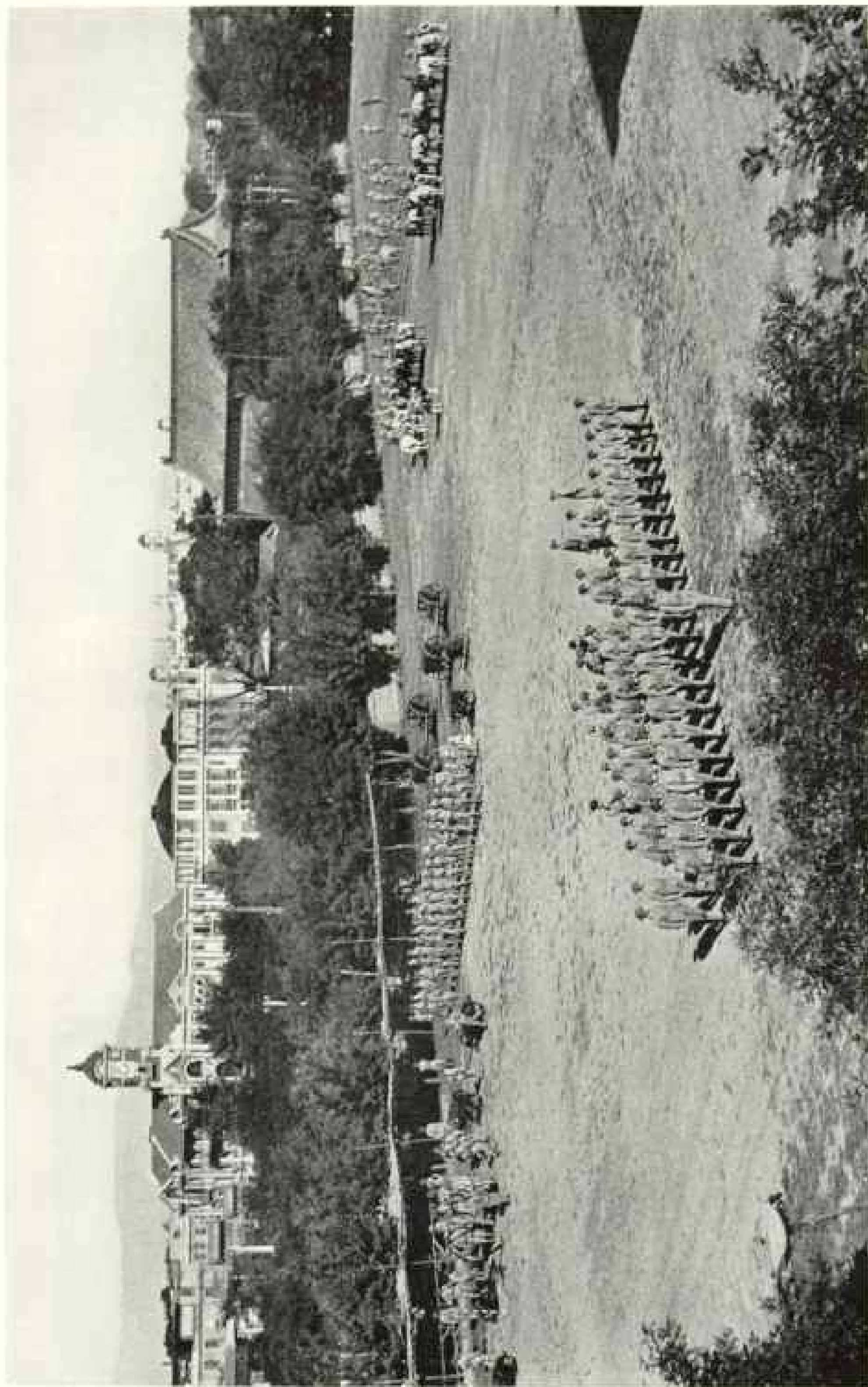
In 1917, too, tragic Pu-Yi made a dramatic return to the throne for a few days.



Photograph by W. Robert Moore.

**PALACES AND COURTS RESEMBLE A SILENT CITY OF THE DEAD**

This view across an area where emperors once ruled in opulent splendor looks from the Meridian Gate toward the Supreme Harmony Gateway, beyond the marble bridges. Back of this elaborate entrance rises Supreme Harmony Hall, in which was located the Dragon Throne (see Plate V). To the extreme left, in the background, is a pavilion on "Coal Hill," from which the view in Plate VI was taken.



Photograph by W. Robert Moore

#### INSPECTION DAY FOR THE UNITED STATES MARINES IN PEIPING

Since the Boxer uprising in 1900, garrisons have been maintained in Peiping by the American, British, French, Italian, and Japanese legations. The United States Fifteenth Infantry is also stationed at Tientsin, 80 miles distant. Although Peiping is no longer capital of China, the foreign legations remain in that city.



PERHAPS MARCO POLO HALTED FOR SUCH A CAMEL CARAVAN

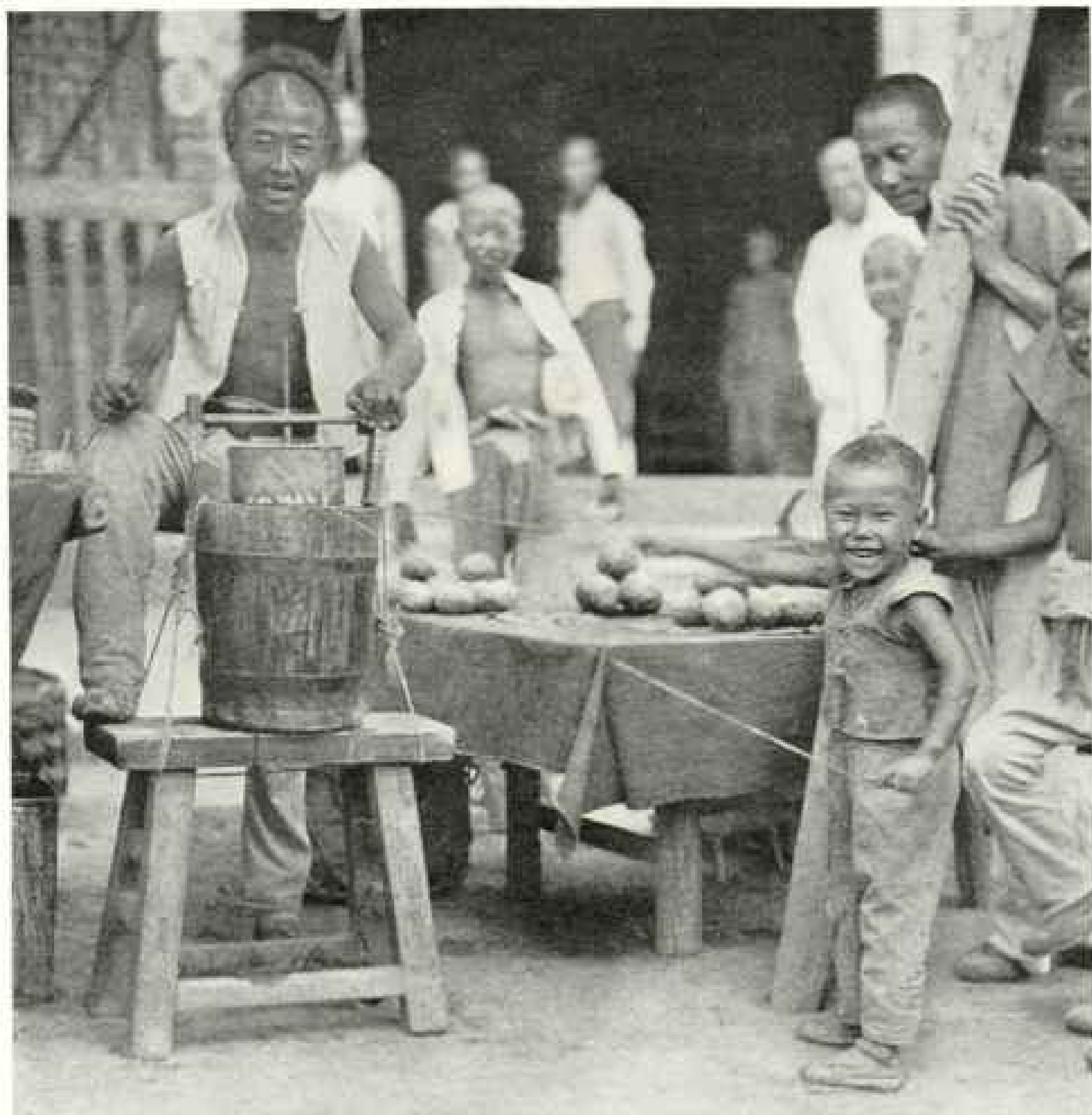
The famous bridge near Peiping was described by the Venetian explorer. It was built in the twelfth century, and was partially destroyed and restored several times. To the world at large it is the Marco Polo Bridge, though correctly it is the Lu Kou Chiao.



Photographs by W. Robert Moore

FOR 750 YEARS CHINESE ASTRONOMERS HAVE STUDIED THE STARS

This observatory on the east walls of Peiping was founded by Kublai Khan, and in 1685 was modernized by Father Verbiest, a Jesuit priest chosen as Court Astronomer. He designed the bronze star globe, the skeleton celestial globe (right), and the partially concealed instrument (left) to get altitudes and angles, in relation to a meridian, of heavenly bodies.



Photograph by Sidney D. Gamble

#### A "HOKEY-POKEY" MAN OF PEIPING

During the stifling heat of summer, perambulating "ice cream parlors" dispense half-frozen ices with a little flavoring. This youngster is turning the freezing can by means of a seesaw action on the cord he has looped around it.

Now he has come into the limelight again, this time as the puppet head of an equally uncertain State, that of Manchukuo (Manchuria), the ancestral land of his fathers.

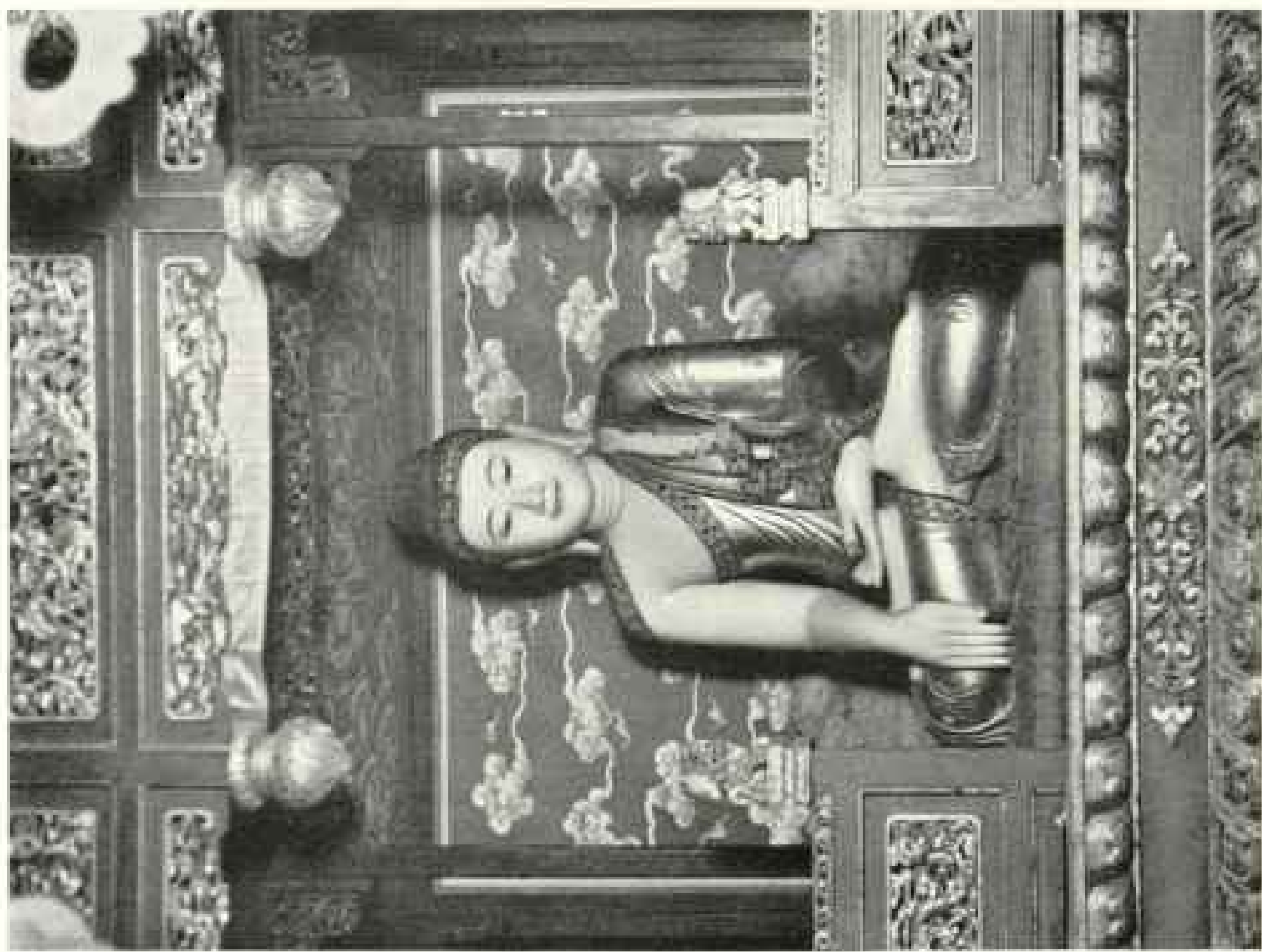
Ghosts of god-emperors stalk through the halls; hints of intrigues ride on the echoes in the empty courts and corridors; the stage is there, but the actors have gone. It is a revelation to see the mass of jades, porcelains, brocades and paintings which were the "props" of those successive royal players who held leading rôles as political and spiritual heads of one-fourth of the human race. The Republic, having Yuan Shih-kai as an example, prefers to keep

aloof from too close association with the trappings of royalty.

The lake palaces were less formal, and frequently much more popular with many of the monarchs. Especially is the Empress Dowager's name associated in one way or another with most of them.

In the whole group nothing else is so outstanding as the magnificent Nine Dragon spirit screen, whose chromatic dragons writhe and squirm in a most vivacious manner, as if they were about to leap off at anyone attempting to trespass in the temple courtyards to the rear. Even their sprightly contortions, however, have not





Photograph by W. Robert Moore

**THE FAMOUS "JADE BUDDHA" WITH THE "MONA LISA" SMILE**

The image is not made of white jade, but of alabaster, and is beautifully appared in gold and gems. It rests behind sealed doors in a building on the site of the Mongol "Round City," a palace praised by Marco Polo.



**FOR CENTURIES CHINA HAS HAD SUCH "MOVIES"**

In some "peep shows" tiny figures are moved across the plane of vision; in others the operator pushes the illustrations along a track. The woman at the right has bound feet, a practice that is becoming rarer.



Photograph by Ewing Galloway

CHINESE ARTISANS HAVE A CENTURIES-OLD RECORD FOR FINE PORCELAIN AND POTTERY

Chinaware, along with silks and spices, was a lodestar that attracted early explorers to Cathay. The zenith of the ceramic industry was attained, under royal patronage, in the century Jamestown and Plymouth were settled. In that period Ching-teh-chen (K'ing-teh-chen), about 200 miles from Shanghai, surrounded by deposits of kaolin and fine clays, had some 3,000 kilns and a population of nearly a million supported by the industry.



Photograph by W. Robert Moore

#### THE CIRCUS AND THE DRAMA SHARE THE STAGE

An acrobat ranks as an artist in China, and his exhibitions alternate with plays. Both are accompanied by the monotone music of the 5-note scale. Shakespeare lightened his tragedies by buffoonery; the Greeks, by the chorus; the Chinese, by such acrobatic "shorts."

successfully guarded the temples from the smother of dust and decay, though their unrelaxed vigilance may have frightened away the less tangible lurking evil spirits. Other examples of glazed tilework may equal this colorful masterpiece, but few, I am sure, will surpass it.

#### PEIPING DRAWS VARIED POPULATION

At numerous intersections of the streets throughout the city stand ornamental *pailous*, or decorative archways of the Mings, some of which are badly battered, but others are as colorful as the peoples and processions that pass underneath them.

Mongol, Manchu, Turki, and Chinese—Peiping shows a cross-section of the far-flung areas over which it ruled. Many of its polyglot dwellers have come to enjoy the sophisticated life of the city and others have sought within its friendly walls refuge from districts where they are no longer welcome. Like China itself, Peiping has that power to assimilate and remold its citizenry.

Through a warm friend and writer for the NATIONAL GEOGRAPHIC MAGAZINE, Mr. Owen Lattimore,\* I met a fine young Mongol prince from one of the Banners of eastern Mongolia. For the greater part of the year the prince spends his time in Peiping with his Manchu wife and two charming youngsters, but makes a visit each summer to his native Mongolia.

It is an appreciable span from the portion of their home, furnished in foreign manner, back to a felt *yurt*, or to the time-old

shrine at the edge of their courtyard where they worship. The wheel of his American automobile has become more familiar to the prince's hand than the reins of a spirited Mongolian pony. Besides dressing her lustrous black hair in a permanently waved long bob, the princess has had a rich old court robe "modernized" into a stunning fur-collared coat to wear over her semiforeign gowns.

\* See "The Desert Road to Turkestan" and "Byroads and Backwoods of Manchuria," by Owen Lattimore, in the NATIONAL GEOGRAPHIC MAGAZINE for June, 1929, and January, 1932, respectively.

When I had finished making several photographs, we were invited to share "pot-luck" luncheon with them. They sent out to a Chinese restaurant for the food—a convenient and not unusual procedure in China when guests come. It was a thoroughly enjoyable meal throughout. But at the end—shades of the mighty khans and their strong bow-pulling followers—came glasses of *crème de menthe* instead of hardy mare's milk!

#### A ROYAL MANCHU FUNERAL

A couple of days later occurred what will probably be the last of its kind in Peiping, a royal Manchu funeral, the rites in honor of one of the ladies of late Emperor Tung Chih's court. Because of the outside stress of political activity, and perhaps to show a shadow of favor toward those whose ancestors came from the land that was then slipping from their grasp, the officials allowed the ceremony. Indeed, so much time had elapsed since the last such funeral that there was considerable debate among the Manchus as to the correct procedure to follow.

It was a happy day for the beggars' guild, because some two hundred of their tattereddemalion group were assured of a good meal, and were also able to dress up in misfit grandeur of green cloaks and battered, plumed hats of thick felt. To them falls the task of carrying the brocaded parasols, the lions and phoenixes of evergreen, paper effigies, banners, and other trappings. About a hundred of the



Photograph by L. W. Chamberlain

#### ONE STREET ACROBAT WITH A "STEADY" JOB

Balancing 12 china bowls on his head and supporting his entire weight on his hands, placed on two legs of an upturned stool, is just one act in the day's work of this youth, who belongs to a troupe of wandering minstrels and acrobats.

weathered men carried on their shoulders the huge catafalque, which was draped in Imperial yellow silk.

The carrying supports emphasized that such funerals are now rare, because they showed every indication of having received a hasty coating of yellow paint over the usual red color that is common for other than royalty.

Another group teased mournful wails out of big round drums, shaped like Gargantuan yellow Chinese horns, and from gilded hose-like horns, the weird dirge being punctuated by the discordant clashing of cymbals.



Photograph by W. Robert Moore

STALKS OF KAOLIANG ATTAIN THE SIZE OF BAMBOO POLES

This tall millet (*sorghum vulgare*) is grown extensively in north China, Manchuria, and Chosen. The stalks are used for making side walls to houses, over which mud is plastered, and for fences and windbreaks.



Photograph by Sidney D. Gamble

THE "FIVE NATIONS POORHOUSE" TEACHES USEFUL CRAFTS

Named for five races or groups in China—Chinese, Manchus, Mongols, Tibetans, and Mohammedans—it is a home for 70 boys and 20 poor men. They weave suitcases, baskets, and water dippers from coarse reeds or willows to help pay the cost of maintaining the home.





Photograph by Sidney D. Gamble

#### TRANSPORTATION FOR THE HEREAFTER

The funeral horse and carriage, made of paper and kaoliang stalks (see opposite page), are burned at the grave so the departed may enjoy a similar conveyance in the spirit world. Servants, furniture, and now automobiles, all made of paper, also are constructed as a delicate hint to the gods of the style of living to which the dead would like to become accustomed.

Manchu priests in yellow silk robes marched in the cortège, which, with mourners and others, was several city blocks in length.

The young beggars, rascals all, made life miserable for those who attempted photography; none was averse to leaving the line of march and begging for coppers along the way.

Taking their cue from these imps, all the rowdy youngsters of the locality entered heartily into the pleasure (to them only) of jumping up and down in front of cameras and grimacing in lenses. I saw several having hilarious enjoyment pulling a French cameraman backward by his coat tails every time he tried to get a picture.

Grown-ups smiled tolerantly; children can do no wrong. They're just playful, that's all!

We had climbed to a roof to get a better vantage point and at the same time avoided the rowdyism. Our princely Mongol friend spied us and climbed the roof to join us. He then volunteered to go ahead to find a good position at the temple where the coffin was to be placed temporarily.

When we arrived, a few minutes later, there stood the prince's car with crumpled fender and bumper and a burst tire, the victim of a traffic accident. But, knowing full well the tactics of the police if he were caught, the prince had vanished. To the Chinese arm of the law, an offender in hand is worth several in the bush on which to show authority. Later the prince's chauffeur, who had been with us, repaired the tire and drove the car away; lengthy explanations had been avoided.

#### BEGGARS EMPLOYED AT FUNERALS

Patterning after the elaborate model set by the royal Manchu funerals, other funeral processions make as brilliant display as possible and use the same green-clad beggars. The catafalque, however, is draped in red brocaded silks instead of Imperial yellow.

The number of bearers and the length of the processions depend upon the rank and wealth of the deceased, but filial piety directs that it be as impressive as the family purse will allow.

Geomancy decides the favorable days

for funerals and for weddings, so it is not unusual to see a score or more funeral and wedding processions in the course of one auspicious day. As the same beggars and musicians are called upon for each occasion, the similarity is such that one hardly knows whether a funeral or wedding is in progress until the coffin or bridal palanquin comes into sight.

While we were watching the last sacrificial rites of the day being performed before the royal coffin we met an old friend of Mr. Lattimore, the Dilowa Hutukhtu of Nariwanchin. Although ranking as the highest living Buddha of Outer Mongolia, he is now a refugee in Peiping because of the active campaign against the lama church by the Soviet.

At his invitation we visited his small, unpretentious quarters at the near-by lama temple. There we drank tea, chewed on rock-hard pieces of dried cheese, and listened to his rich guttural conversation.

#### LAMA TEMPLE FALLEN ON EVIL DAYS

What a contrast, the quietness of his small room, to the main portion of the decadent lama temple, which caters largely to the Mongol and Tibetan Buddhists! There the impecunious priests and acolytes, when they are not kneeling in prayer on the dirty mats before the Buddha, are trying to harvest coins from their almost sole source of support, the tourist, now that the golden assistance no longer comes from the Dragon Throne.

With a few coppers here and a few more there that are charged for opening locked doors, together with other limited funds and gratuities, they eke out a living. The fat, greasy countenances of some of the priests, however, belie the fact that the temple has fallen on lean years. But the cloisters are far sadder and dustier than when they were transferred to religious uses by Emperor Yung Cheng, whose palaces they were before his accession, in 1722, or when rich tribute came from the Mongol Banner Corps in Peiping.

It is a relief to visit the adjacent Hall of Confucius, where all is restful and secluded amid hoary cypresses. Like some of the proverbs of the great sage, simplicity speaks vividly. Only a slender tablet in the vast hall emphasizes the reverence for that deep-thinking propounder of China's 24-century-old philosophy. A little mound of burned-out incense ash lay before the

red lacquer plaque. Lesser tablets to his four great disciples share the room with the master.

Many other temples and palaces are getting shabbier and dustier through neglect and decay in these days. Peiping is no longer an Imperial City and there is little authority for the preservation of its precious monuments, save where some committee has taken charge, or where the places have been "sublet" as tea shops or to local cameramen for exclusive picture rights, in exchange for an irreducible minimum of weed cleaning. But weeds fall usually only when they begin to encroach upon the keeper's activities.

In Peiping the visitor touches one of the world's richest treasure-troves of curios and antiques. Porcelain, jades, embroideries, brocades, mandarin coats, paintings—the quantity and variety are confusing. Much, of course, is cheap and spurious imitation. Yet I have also seen articles from an extensive collection of some of the most treasured pieces that at one time were in the Imperial Forbidden City, but had systematically been looted by grandfather, father, and son when they were high officials in the emperor's court.

One by one as well, valuable jades and other treasures are being regretfully parted with by one-time Manchu courtiers to supply funds for their depleted family coffers. Still other pieces, "crackleware" and "antiques," are hardly cool, and yesterday's smearing of earth is still heavy.

The range of curios is large. You can buy from the pile of curb litter, the second-hand junkman, and dealers that perpetually clutter your doorstep; from dignified curio "shoppes," or from priceless private collections.

#### DELIGHTS OF A PEKING DUCK DINNER

Gastronomically speaking, Peiping probably still rules supreme, unless Canton's famous dishes claim part of the honors; for the visitor who has not gone to one of the city's 6,000 restaurants and enjoyed Peking duck has missed one of the interesting treats that the old capital has to offer.

Our party, which included several Americans and foreign-educated Chinese, rickshaed one evening out through Chien Men (see text, page 766), around through the twisted, narrow Chinese thoroughfares, and came at last to one of the oldest of the city's restaurants. While some nib-



Photograph by W. Robert Moore

#### IN CHINA THE TRAIN HALTS FOR MEALS

Every one rushes to get a quick lunch, and many return to the cars carrying fruit, roast chicken, and rice cakes. The porter has his identification numeral on his back. This photograph was made in winter, along the railroad that runs from Peiping to Inner Mongolia.

bled at dried watermelon seeds, the more curious of us went down to see the plump ducks thrust in the glowing ovens and soon come out sizzling and roasted to a rich golden brown.

Practically every part of the duck is served—pieces of savory roasted skin, sauced bits of rich flesh, soups of other parts. These are eaten with the helpings of rice and washed down, if one desires it, with rice wine or *kaoliang*.

The wine is usually too highly scented and insipid for most foreign tastes, and the *kaoliang*, brr-rh! *Gambel*, or "bottoms up," a few cups of it and one's esophagus is completely scarified. Made from the *kaoliang*, a grain from a species of sorghum that is one of the most extensively cultivated cereals in north China and Manchuria (see page 776), this powerful drink of the same name has reached an uncompetitive position in fiery action.

"It's just the thing to remove the duck fat from one's throat," remarked one of the party in choking bravery.

But it is heroic treatment, indeed, for that or for anything else.

After many courses of food the bill was presented—the duck's bill, I mean! By this unique token the Chinese waiter indicates that the duck dinner is at an end.

People and palaces, the concourse of camels and donkey carts, temples and art treasures do not exhaust the many phases of Peiping's charm. Numerous other temples and historic monuments also are scattered over the plain outside the city walls.

#### "A FIFTY-MILLION-DOLLAR WHIM"

The outlying Summer Palace of the old Empress Dowager attracts much attention. One traveler has said that if he were allowed to visit but three places in the world, one of them would be this beautiful array of pleasure pavilions, mile-long corridors, and religious domes that overlook the lotus-strewn lakes. Resting on the sloping hillside, this "woman's \$50,000,000 whim" is a symphonic splashing of reds, blues, greens, and Imperial yellow.

In walking through its halls and courts one's admiration for its beauty almost causes one to overlook the fact, as did Old Buddha herself, that the 24,000,000 taels which she diverted from naval appropriations for its building was a factor in the country's weakened defense during the Sino-Japanese conflict in 1894.

Since the royal barges have ceased to move over the lake, reeds grow high around its edges and choke the canals under the high-arched camel-back marble bridges; paths are smothered in weeds. The temples and monasteries in the Western Hills also show touching evidences that moth and dust have corrupted. A number are used as summer homes for Peiping residents.

#### GREAT WALL OF CHINA RESEMBLES A WRITHING DRAGON

"See the Great Wall and Ming Tombs from the Air," advertises an airplane company!

The world has shrunk indeed when the mighty Long Rampart of stone and earth and the secluded resting places of the Mings echo to the roar of circling planes, so that pleasure-tripping visitors may gaze earthward at the height-dwarfed structures in "a two-hour flight arranged at any time!"

From the air this stupendous barrier, monument to China's absolute faith in the efficacy of walls, looks like a twisting thread thrown at random over the hills and ravines. Impotent, so it seems now, to have stemmed the tide of warriors that swept down from the north and northwest. Emperor Chin Shih Huang Ti thought otherwise when he "sacrificed one generation to save many," nearly twenty-two centuries ago.\*

Insignificant it appears at first sight. But try your legs on it.

Long before I had reached my goal at the top of one of the highest parapets at Nankow Pass on a morning climb, I had gained great respect for the wall. My overfed-looking guide wheezed and stopped exhausted where the first leaping slope was stairstepped to the next guard tower, and there he stayed until my return.

Legend says that the wandering course of a white horse was followed in its build-

ing. To me, the barrier resembles one of China's writhing dragons, his body scaled with brick and stone.

I saw it first at Shanhaikwan, where it rises from the sea and takes to the hills. Here, at Nankow Pass, its tenuous body comes squirming over the rough peaks, dips and rises again and again. Back and forth, leaping and twisting, it extends over the ridges, out of sight (see Plate I).

Later it was my opportunity to see it again near Kalgan, where its parapet-knobbed back silhouetted the uneven skyline atop the mountains. Farther beyond, on the road to Mongolia, I glimpsed loops of its sinuous body. On and on for upward of 2,000 miles it sprawls, at various places reaching out its leglike spurs.

The Ming tombs are also near Nankow, but by the time one has ridden down the "Triumphal Way" between the rows of marble animals, monsters, and men, across the old river bed, and up to the disintegrating buildings, one wishes that he had been content to see these once-glorious tombs of Yung Lo and his twelve successors from the air or not at all, so atrocious are the roads now (see Plates X and XII).

#### WHEN WINTER COMES TO PEIPING

Winter brings a different, a barren and often cold, Peiping; and people submerge themselves in furs or several layers of padded cotton garments.

North China's arid winds bring few clouds or snowstorms; the sun shines clear almost daily on the golden roofs and the pink and gray walls. Peiping, however, is at no time more beautiful than when its battlements, roofs, and courts are piled high with an unusually heavy fall of snow.

On my last evening in Peiping, as I opened wide the window and tossed my last few coppers to a blind beggar, whose stiff, cold fingers plucked the strings of a Chinese guitar, a puff of dust struck my face. These dust storms will continue to ride in from the Gobi and empty part of their burdens within the city walls, so that industrious statisticians may figure the number of carloads that are deposited. Extensive asphaltting, already in progress, will reduce the layer of grime that is raised underfoot.

But, as new cycles come, it is to be hoped that they will not ignore the historic monuments and let them slip into shapeless masses of dust and ashes and silence forever the glory that was Imperial Peking.

\* See "A Thousand Miles Along the Great Wall of China," by Adam Warwick, in the NATIONAL GEOGRAPHIC MAGAZINE for February, 1923.



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IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over \$50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waiting when Pizarro first set foot in Peru.

THE Society also had the honor of sub-  
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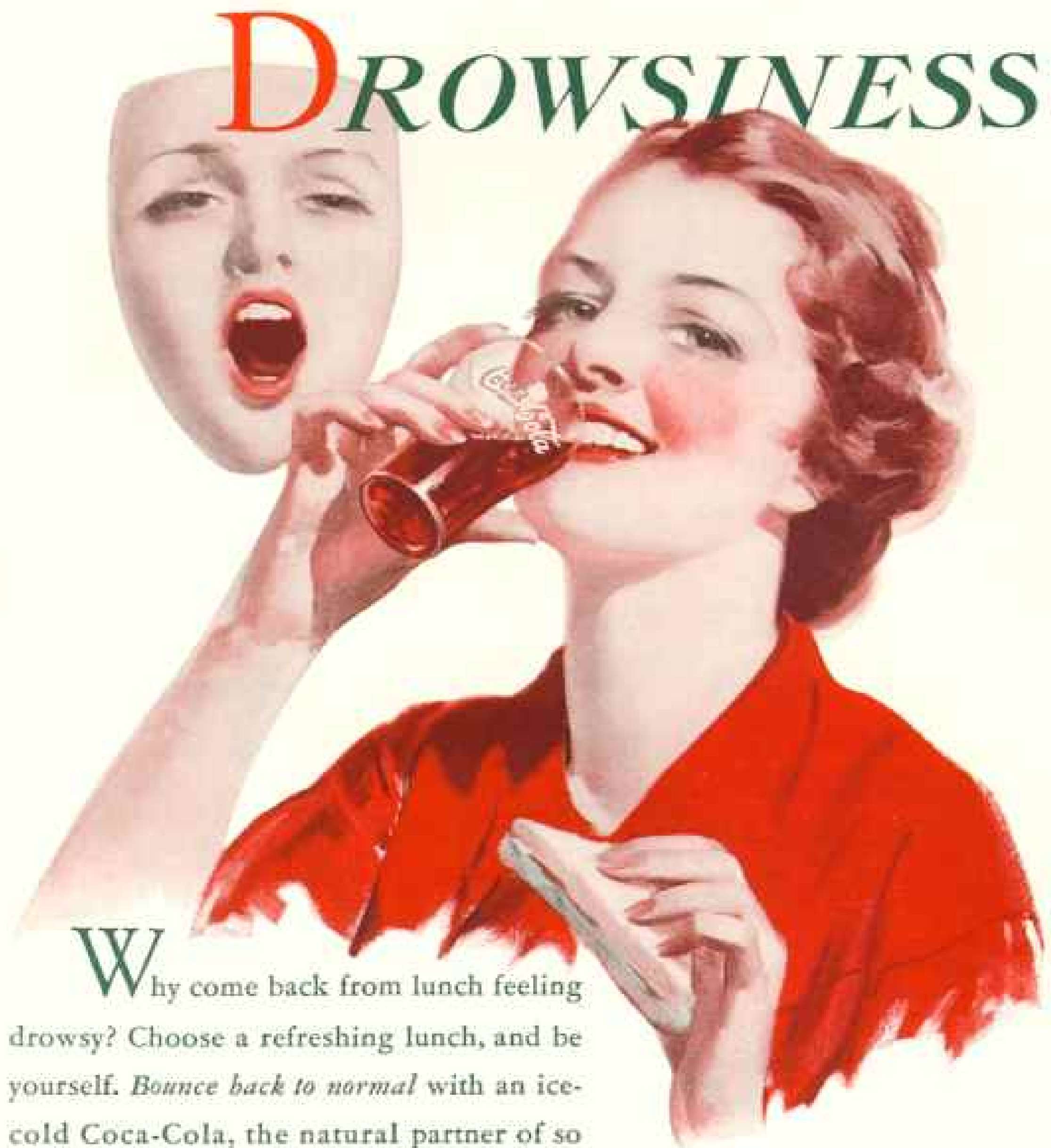
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the finest of the giant sequoia trees of California were  
thereby saved for the American people.

THE Society's notable expeditions to New  
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nearly eight centuries before Columbus crossed the At-  
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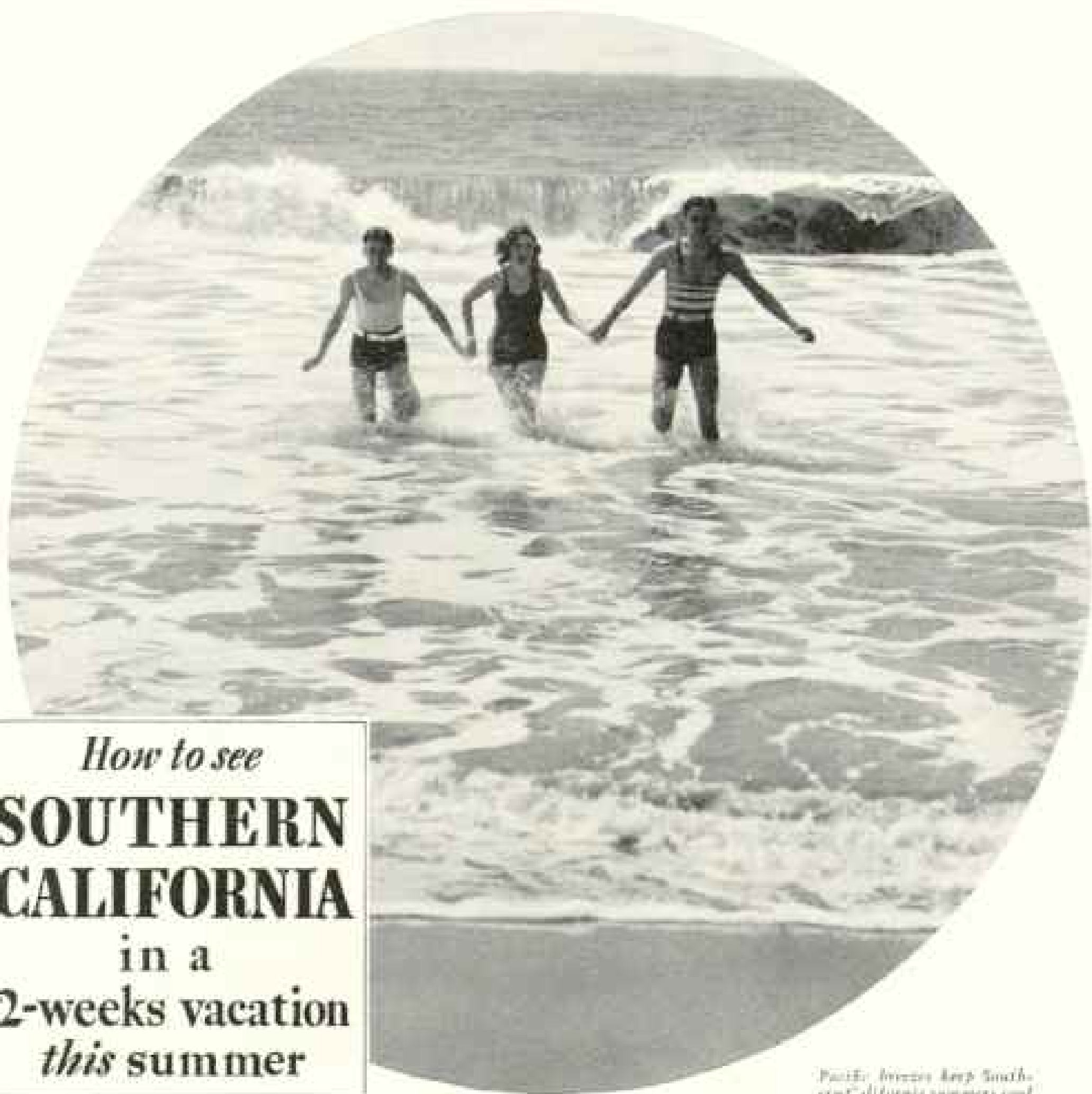


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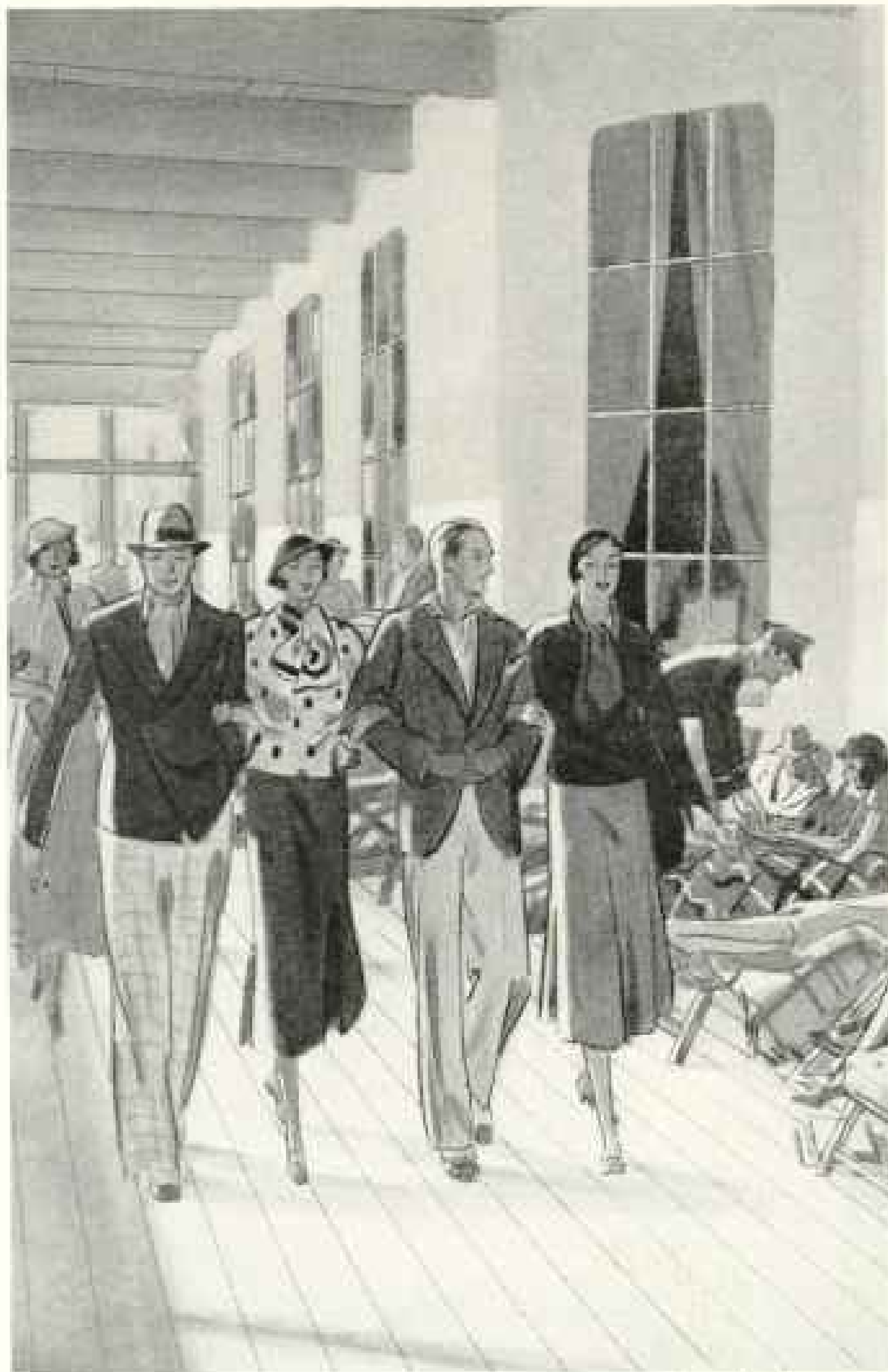
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## THE LAD WHO IS *SO LIKE YOU* is asking an even break

**A**LREADY you're planting hopes and dreams in that little boy who is so like you. Hopes and dreams that will grow through the years.

Will he have a fair chance one day to realize them? Look ahead for him now and see . . .

The fight he'll face will be more difficult than any we have known. At every step, he'll have to buck a fierce headtide of competition from college men.

These men are trained to fight, trained to win. They will reach out to grasp the very prize on which your lad sets his heart. To stand shoulder to shoulder with them, *he must have a college education!*

Find out today how you can assure for your boy, young as he is, this even start. That "other self" of yours,

which looks out from his smiling eyes, asks it of you.

And the Union Central Life, an old, conservative company which writes all accepted forms of life insurance, has a simple plan. Start this plan while your boy is little and the cost is surprisingly low.

Then, independent of what happens to family finances or to you, this plan will provide the money to give your boy a full college training.

The free booklet, "A Place in the Sun," will explain to you the interesting details of this practical plan. It will give you, too, an accurate check on costs at 300 colleges. Send the coupon at the right for a copy. It will show you how simply you can *guarantee* your lad the even break he deserves. There is no obligation.



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Please send me free details on the Education Plan as contained in the booklet, "A Place in the Sun."

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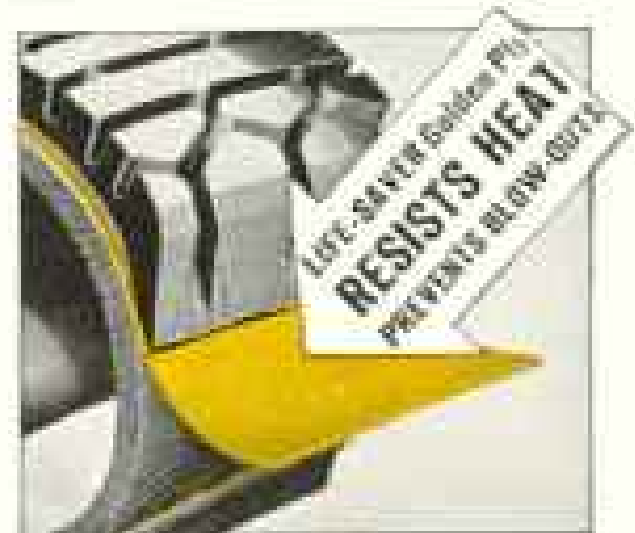


# BANISH FEAR OF BLOW-OUTS

## with this new 3-times-safer tire



Heat generated by internal friction separates rubber and fabric—starts "blisters", which grow and grow until BANG! A blow-out.



Remarkable new Goodrich invention resists heat—making the New Goodrich Safety Silvertown 3 times safer from blow-outs at high speeds.

**BANG!** A blow-out! The rim of the wheel hits the road . . . And a terrible drag sets in . . . Like some unseen monster, pulling your car off the highway.

It *could* happen to you. Investigation shows the chances are better than even you'll have a blow-out *some* day—unless you use this new kind of tire!

### What causes blow-outs

Traveling 40, 50, 60 and 70—mile after mile . . . the heat inside the tire becomes terrific. Rubber and fabric begin to separate. A blister starts . . . and grows . . . bigger and bigger . . . Until BANG! A blow-out! And you're in *real* danger!

Now, to protect you from blow-outs, every new Goodrich Safety Silvertown Tire has the amazing Life-Saver Golden Ply. This new invention resists terrific heat—rubber and fabric don't separate. Thus blisters don't form inside the tire. Blow-outs are *prevented* by overcoming the *cause* of blow-outs before they start.

### 3 times safer at high speeds

At gruelling speeds on the world's fastest track, the New Goodrich Safety Silvertown Tire, with the Life-Saver Golden Ply, lasted *three times as long* as first quality tires that did not have this feature. Other tires blew out at one-third the distance the new Silvertowns were

run. These Silvertowns NEVER blew . . .

Don't think slower driving can save you from blow-outs, either. Sustained speeds as low as 35 or 40 miles per hour generate terrific heat, too. That blister . . . that blow-out in the making . . . may be in your tire *right now*.

### Safest anti-skid tread

Scientific tests prove that the Goodrich Safety Silvertown has the most skid-resisting tread, too. Its squeegee drying action gives your car *extra* road-grip and reduces danger of skidding to a minimum.

Yet Goodrich Safety Silvertowns cost not a penny more. Put a set on your car now! Look up your Goodrich dealer's name under "Tires" in your classified telephone directory.

**FREE!** This handsome Safety League emblem with red crystal reflector to protect you if your tail light goes out. No obligation—nothing to buy. Just join the Silvertown Safety League at your nearest Goodrich dealer. Traffic Officials endorse Safety League membership. Write today. Dept. 146, The B. F. Goodrich Rubber Co., Akron, Ohio.



# Goodrich *Safety* Silvertown

Copyright, 1933, The B. F. Goodrich Rubber Co. WITH LIFE-SAVER GOLDEN PLY

# Watch your Arches

Your entire weight is shifted from one foot to the other more than 2000 times in a mile walk. Each time your foot hits the ground, the ground hits back. Step lightly.

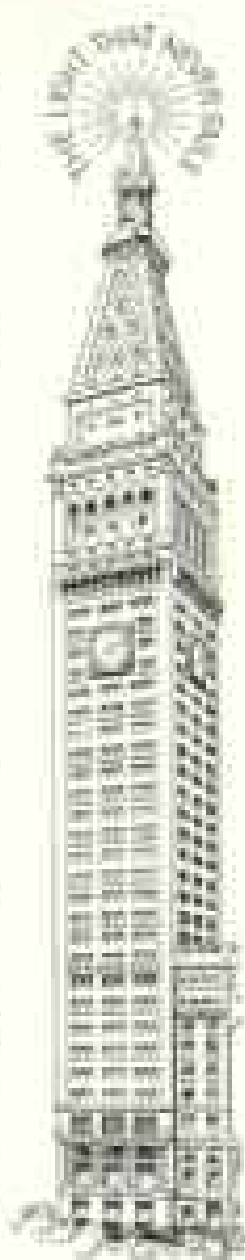


A GREAT deal of excruciating pain in the feet or elsewhere in the body, caused by weakened or broken down arches, can be relieved or completely removed. When the three main causes of foot trouble—misuse, abuse and disuse—are generally understood, a great deal more pain will be avoided.

If you walk with your toes pointed out instead of straight ahead you put a severe strain on your arches. Overstrained, they are likely to sag or flatten. Bones may be forced out of place, pinching and torturing sensitive nerves.

All too often these tortured nerves communicate their distress to nerve centers far removed from the feet. Leg aches, headaches, backaches and many other aches are penalties which follow the misuse of a hard-working foot.

Abused, either by being cramped in a shoe which does not permit the toes to lie flat, or sprawled in an ill-fitting shoe, no foot can support and move its burden comfortably and easily. Shoes should have a straight inner edge. They should fit snugly under the long arch and at the heel.



Examine your shoes to make certain that the sole, under the ball of your foot, does not round down in the center or bend up at the sides. If it does, every step you take tends to flatten the short arch across the ball of the foot. Then the needless pain.

Disuse is the third crime committed against feet which should be able to give willing and uncomplaining service. A foot which has little to do besides carrying its burden from bedroom to dining-room and from there to an automobile or other conveyance, loses its muscular strength, becomes almost an invalid foot through feebleness.

But when muscles and ligaments have lost their strength or arches have become weakened, the services of a competent foot specialist may be needed. He may, by proper treatment, or by prescribing corrective foot exercises or scientifically constructed shoes, restore your foot to a full measure of usefulness.

A booklet "Standing Up to Life" which tells how to overcome many foot ailments by means of intelligent foot exercises will be mailed free upon request. Address Booklet Department 633-N.

## METROPOLITAN LIFE INSURANCE COMPANY

FREDERICK H. ECKER, PRESIDENT

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Heinz Tomato Ketchup  
Heinz Cream of Tomato Soup



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In the middle of your busy day, how you enjoy a plate of delicious, invigorating soup! Its appetizing flavor often tempts you as nothing else does. It "goes right to the spot," refreshes and revives you, gives you a glow of satisfied contentment. And supplies you with the needed nourishment to sustain you through the afternoon.

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Campbell's Vegetable Soup is an ideal luncheon because it tastes so good and is so substantial and nourishing. Its fifteen choice, selected garden vegetables are cooked in rich beef broth so that all of their flavor and goodness are retained in the soup. Made to the Campbell's standards of deliciousness and purity—none stricter in the world!

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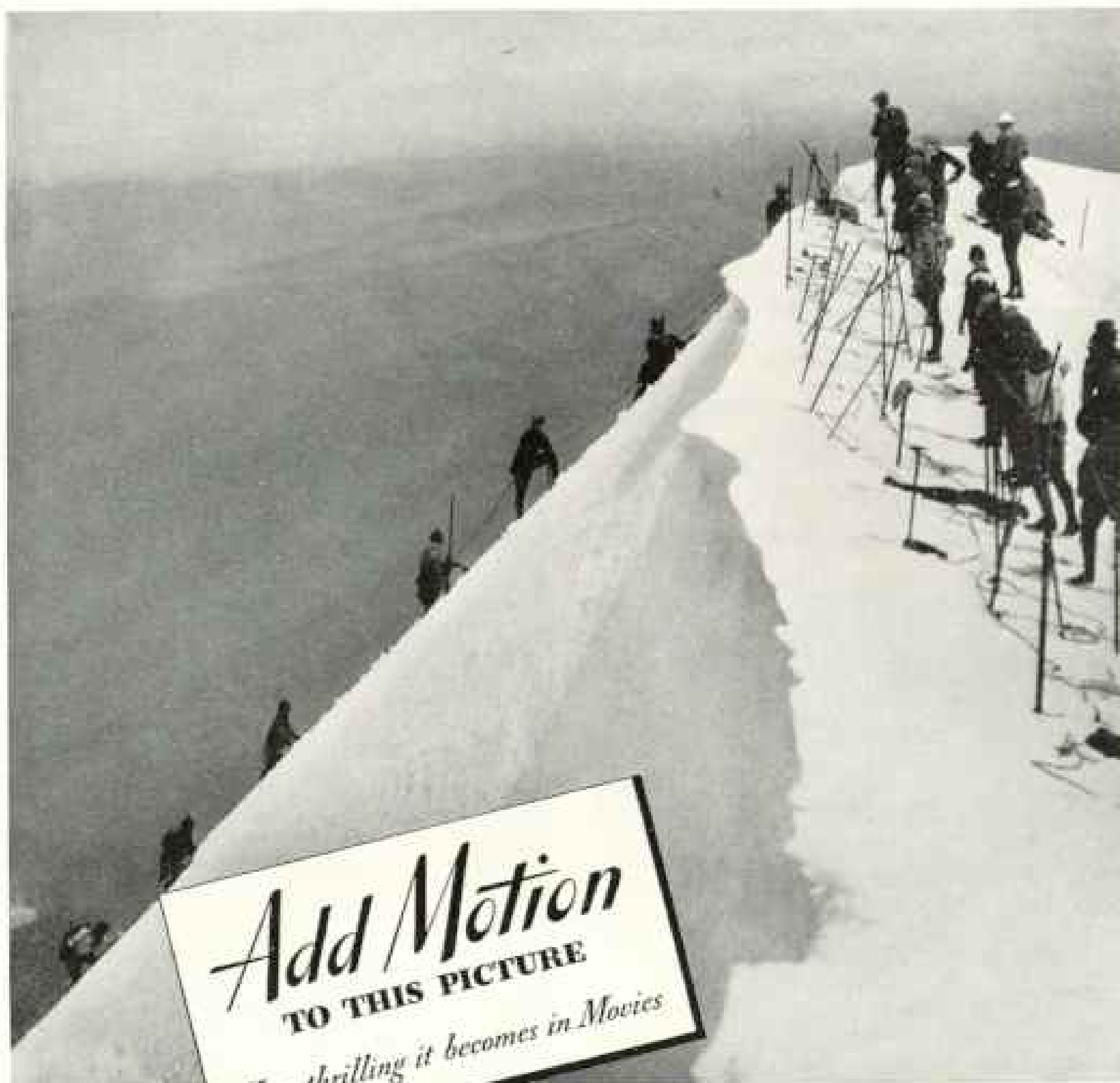
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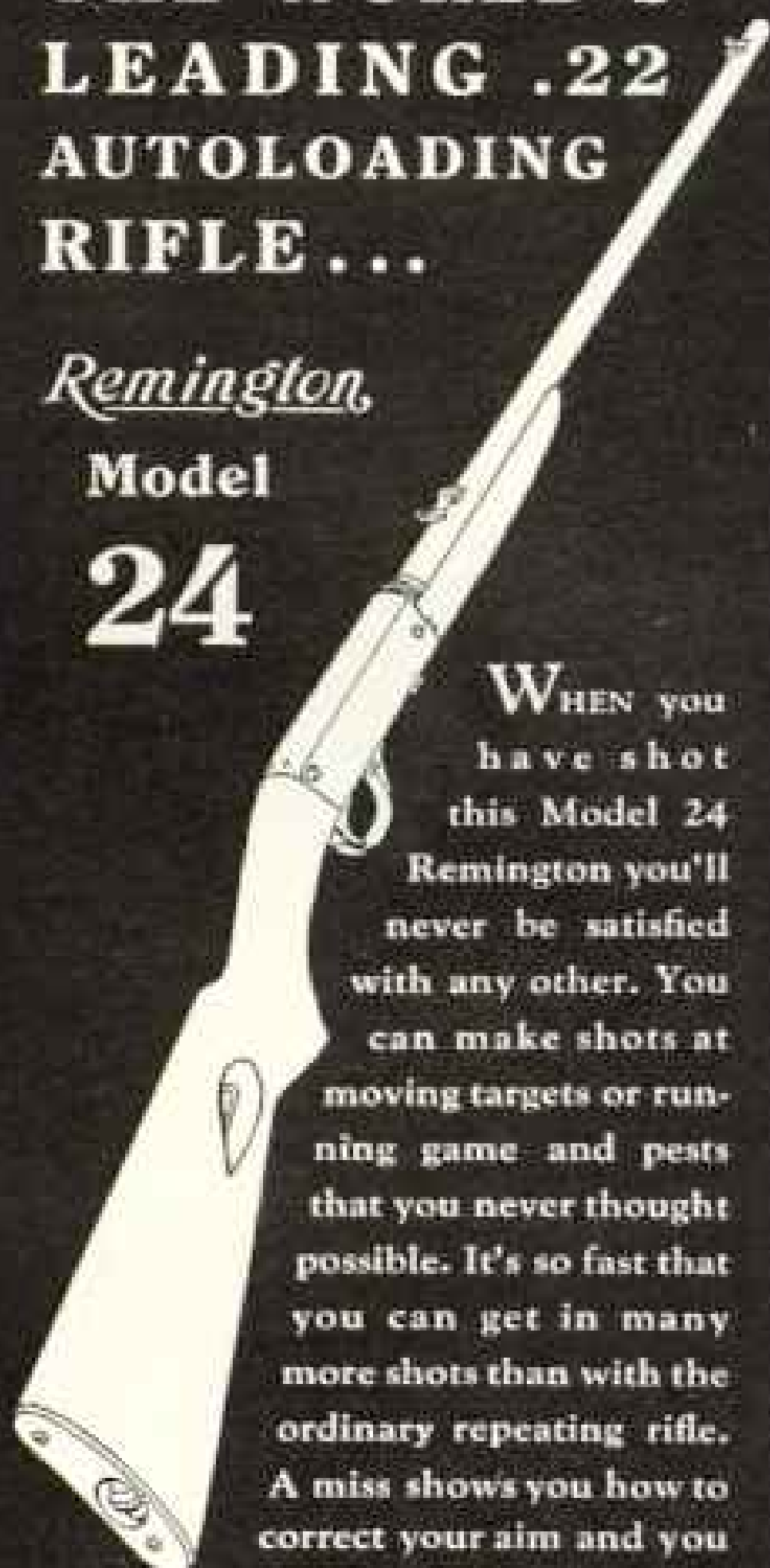
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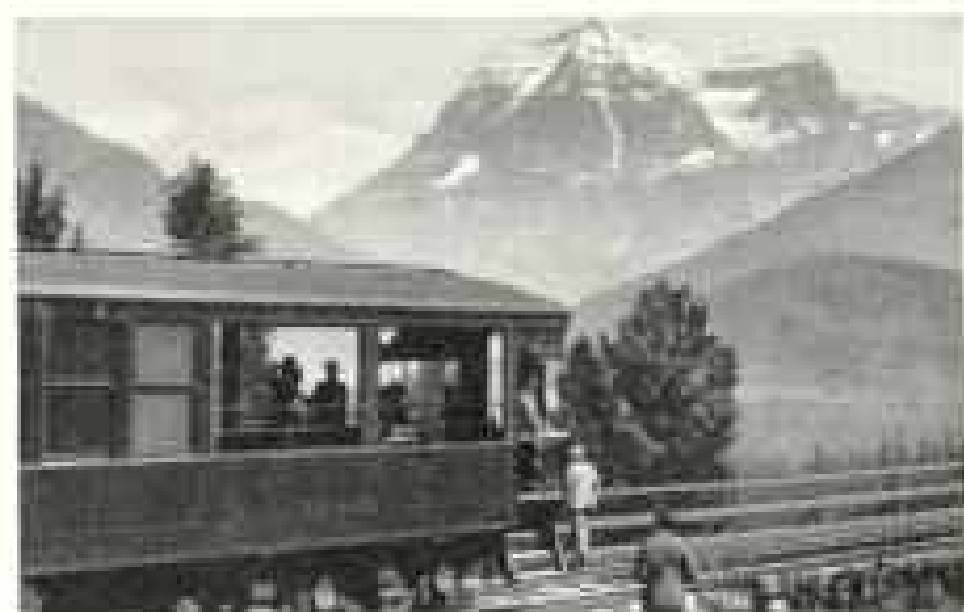
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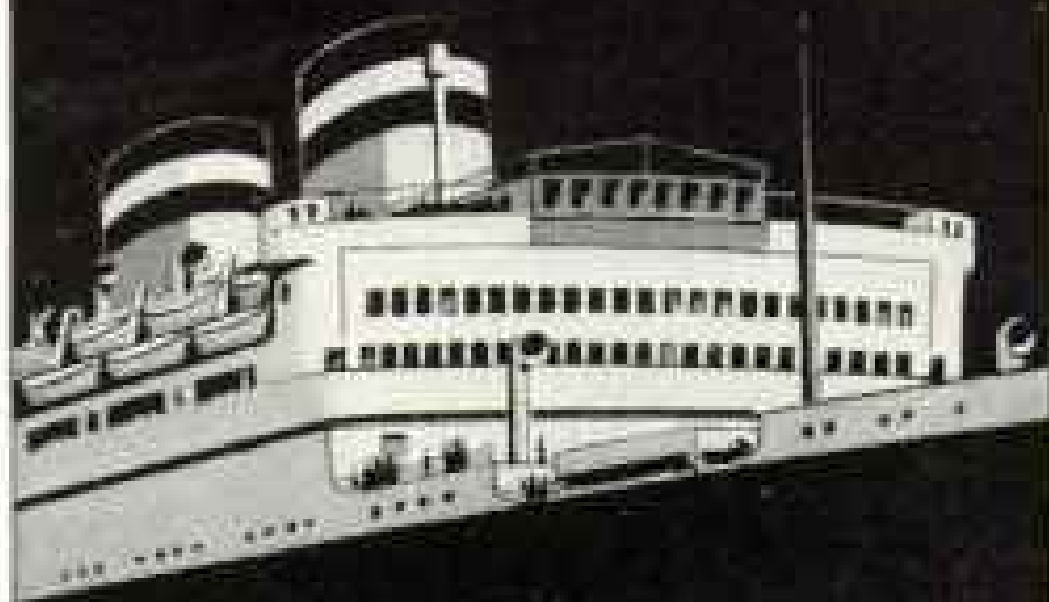
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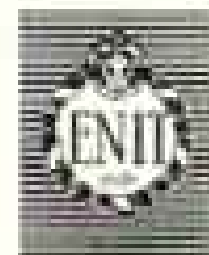


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