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THE NATIONAL GEOGRAPHIC MAGAZINE

JAPAN, CHILD OF THE WORLD'S OLD AGE

An Empire of Mountainous Islands, Whose Alert People Constantly Conquer Harsh Forces of Land, Sea, and Sky

By WILLIAM ELLIOT GRIFFIS

AUTHOR OF "THE EMPIRE OF THE RISEN SUN," IN THE NATIONAL GEOGRAPHIC MAGAZINE

WHEN occidental man first thinks about the Far East, China and Japan are envisaged as being much alike—indeed, almost as twins. But time enables him to discriminate.

Historically, China is old and ethical. The burden of all her literature is, "What ought I to do?" Japan is young and esthetic. The burden of her thought, as recorded for a thousand years, is, "What is beautiful?"

Geologically, China is pre-ancient; Japan is recent. Long after Mother Earth had settled down to rear her earlier brood of lands, Japan, the youngster, arrived. The land masses now occupied by China, India, Europe, and America were already adult when the earth-mother brought forth Japan, destined to be long and thin, without such rotundity as China possesses. She lies, even after a life experience of many centuries, sprawling through some 2,500 slender miles.

In China, Nature's forces are relatively static, but Japan is in the center of earth and sea convulsions and violent air disturbances. Throughout long ages, these cosmic forces have profoundly influenced the bodies, habits, and mental outlook of the Japanese people. In contrast with the conservatism, phlegmatic temperament and age-old stolidity of character in China, we see developed in Japan a more mercurial and daring people, ready to change, yet able resolutely to face the drawbacks of both Nature and inheritance.*

Only about threescore years ago Japan shocked her elders in Asia by departing politically and socially from the ancient ways and turning toward those of "the western barbarians."

In Nature, also, Japan has changed within our remembrance; Bandai San, one of the eruptions on her pretty face, misbehaved. For hundreds of years, so far as known in human records, perhaps during milleniums of unrecorded time, it had been entirely dormant. As suddenly as the discharge of a cannon, it blew off its rocky cap in 1888 and killed more than 400 human beings. Curiously enough, in Japanese the same sound, *san*, serves to the ear for either "mister" or for "mountain."

The one-time medieval frontier village, Yedo, and the swift-growing national capital, Tokyo,† which it became, was

* See "The Geography of Japan," by Walter Weston, in the NATIONAL GEOGRAPHIC MAGAZINE for July, 1921.

† Exact transliteration of Japanese names requires the use of certain diacritical marks, thus: Tōkyō, Kyūshū, Ryūkyū. In this article the simpler English spellings have been used. The new Map of the World, which members received with their December, 1932, issue of the NATIONAL GEOGRAPHIC MAGAZINE, may be consulted for these transliteration symbols.

Photograph by W. Robert Moore

ENTERPRISING MERCHANTS BRING BUSINESS TO THE WATER FRONT

When trans-Pacific steamers tie up at Kobe, the pier alongside the ship soon becomes a bazaar for silk garments, toys, beads, costume jewelry, and various trinkets that will lure money from passengers and crew.

leveled in 1855 and again in 1923 by destructive earth adjustments. Of old, the rest of the world knew not of these earthquakes. In the era of electric wires, even a tremor is news.

A BROOD OF DORMANT VOLCANOES

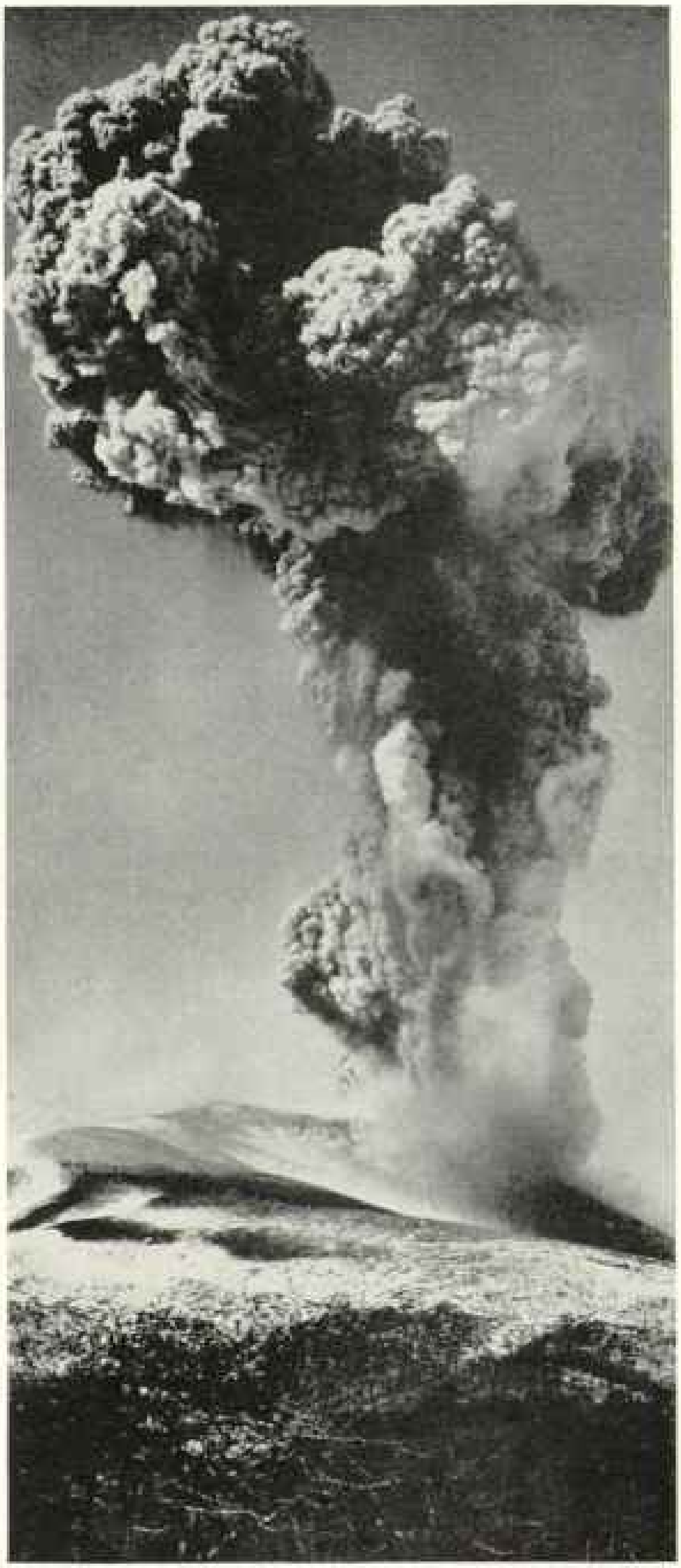
Like some vast factory town in which the blazing furnaces take a Sabbath rest, to begin again on Monday, Japan has some 200 dormant volcanoes. How pretty, flower-covered and of graceful figure, they seem! Yet these mountain forms are liable at any moment to become unruly, and when in these fits of deadly temper they often devastate vast areas of human habitation and alter many square miles of landscape, as we saw in 1923. At least 50 of these sleeping, fairy-like cones have the promise and potency of continual activity.*

Lovely as their outlines often are, their breath may be sulphurous to the point of danger. Even graceful Fuji, seemingly as demure as a virgin in her teens, cannot be trusted (see illustrations, pages 260 and 261).

Garments of green forests, of grand trees, the veils of bamboo thickets, a tapestry of flowers, or even a mantle of winter snow provide no insurance against direful outburst. But, if Japan acts often like a fury, we must excuse her, because the bed on which she lies is one of fire.

Go down to Beppu, in Kyushu, for example, where the daily rice is cooked by subterranean heat, where people resort to bake out or boil out their various ailments. In the hot seashore sand, thousands of men and women for hours, even days, lie covered with the pulverized

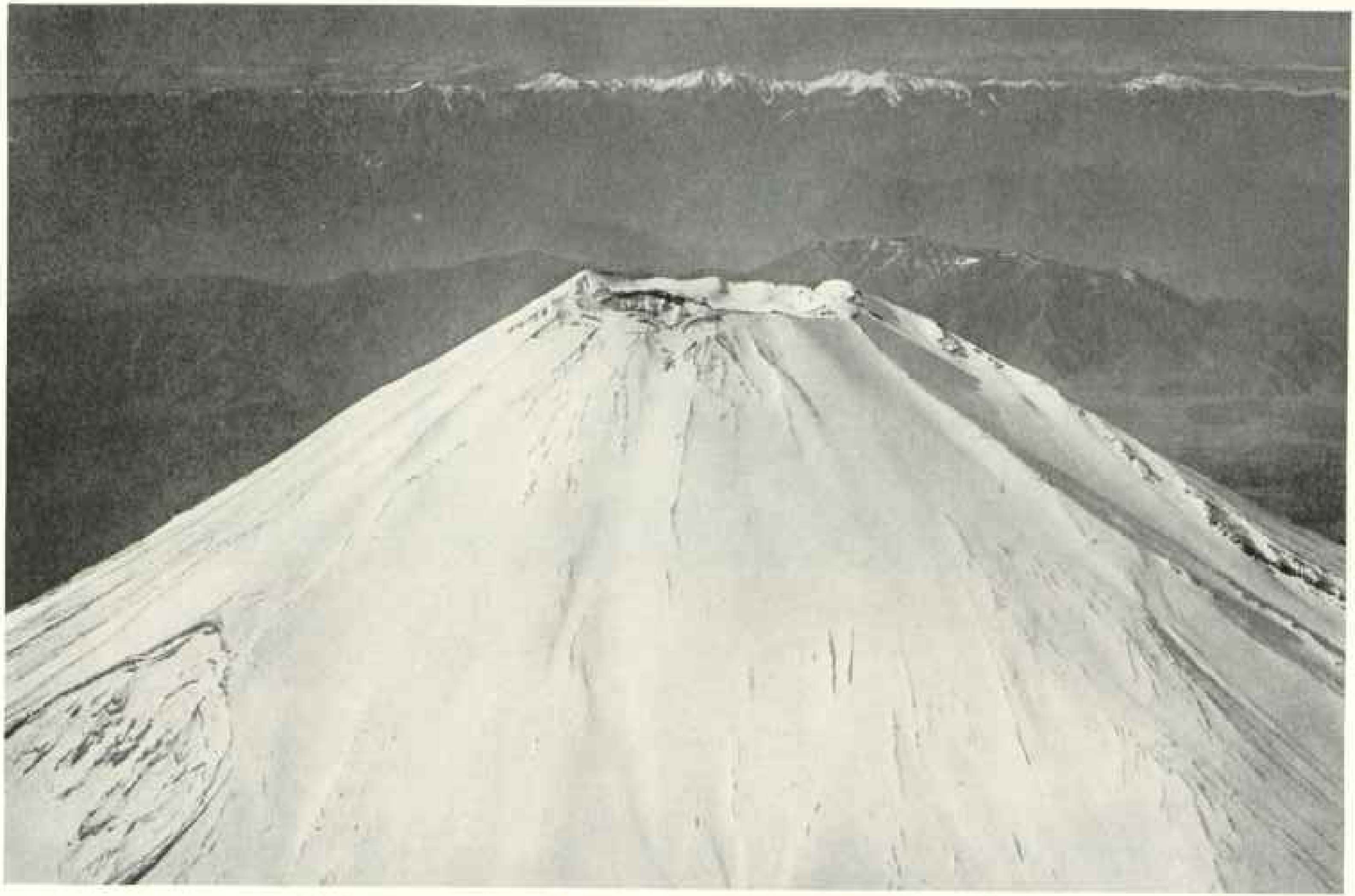
*See "How the Earth Telegraphed Its Tokyo Quake to Washington," by F. A. Tondorf; "The Cause of Earthquakes," by R. F. Griggs; and "Sakurajima, Japan's Greatest Volcanic Eruption," by T. A. Jaggar, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1923, and April, 1924, respectively.



Photograph by Dr. F. Omori

MOUNT ASAMA IN ERUPTION

This volcano in central Honshu is given to sudden, though not usually destructive, explosions. It is one of some 50 active volcanoes scattered along the chain of Japanese islands. The photograph was made at a distance of two and a half miles.



LIKE A GIGANTIC CONE OF SUGAR, FUJI STANDS SENTINEL OVER JAPAN

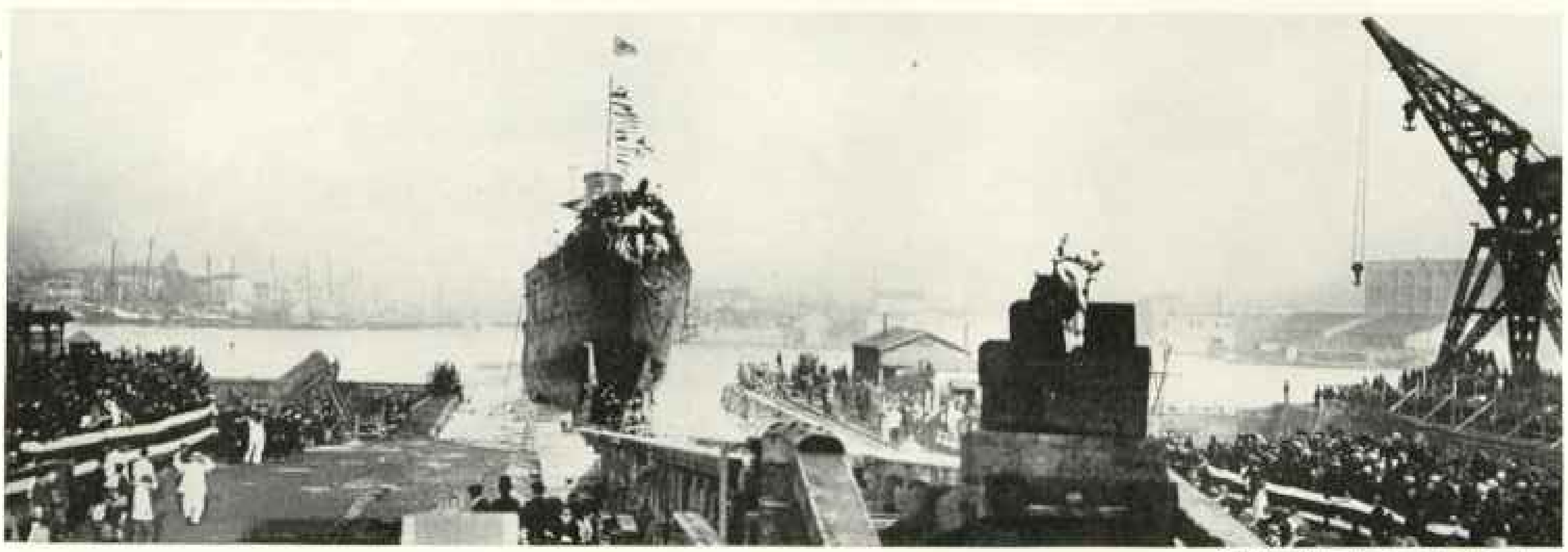
Airplanes on the commercial route between Tokyo and Osaka pass close to this sacred peak. The irregular portion at the lower left, the result of a small volcanic eruption, is the only blemish that destroys the perfect symmetry of the graceful cone, which rises to 12,395 feet.

Photograph by Kiyoshi Sakamoto

THREE FUJIS IN ONE PICTURE: THE "FUJI EXPRESS," FUJI RIVER, AND MOUNT FUJI

Because of their mountainous origin, the rivers are short and rapid. During the rainy seasons the waters flow so swiftly that the silt and top soil are carried to the sea, leaving wide gravel beds on the plain regions. Many acres of land surface are thus rendered useless to agriculture, and extensive bridges for roads and railways are made necessary (see text, page 285). During the summer months Fuji loses its mantle of snow.

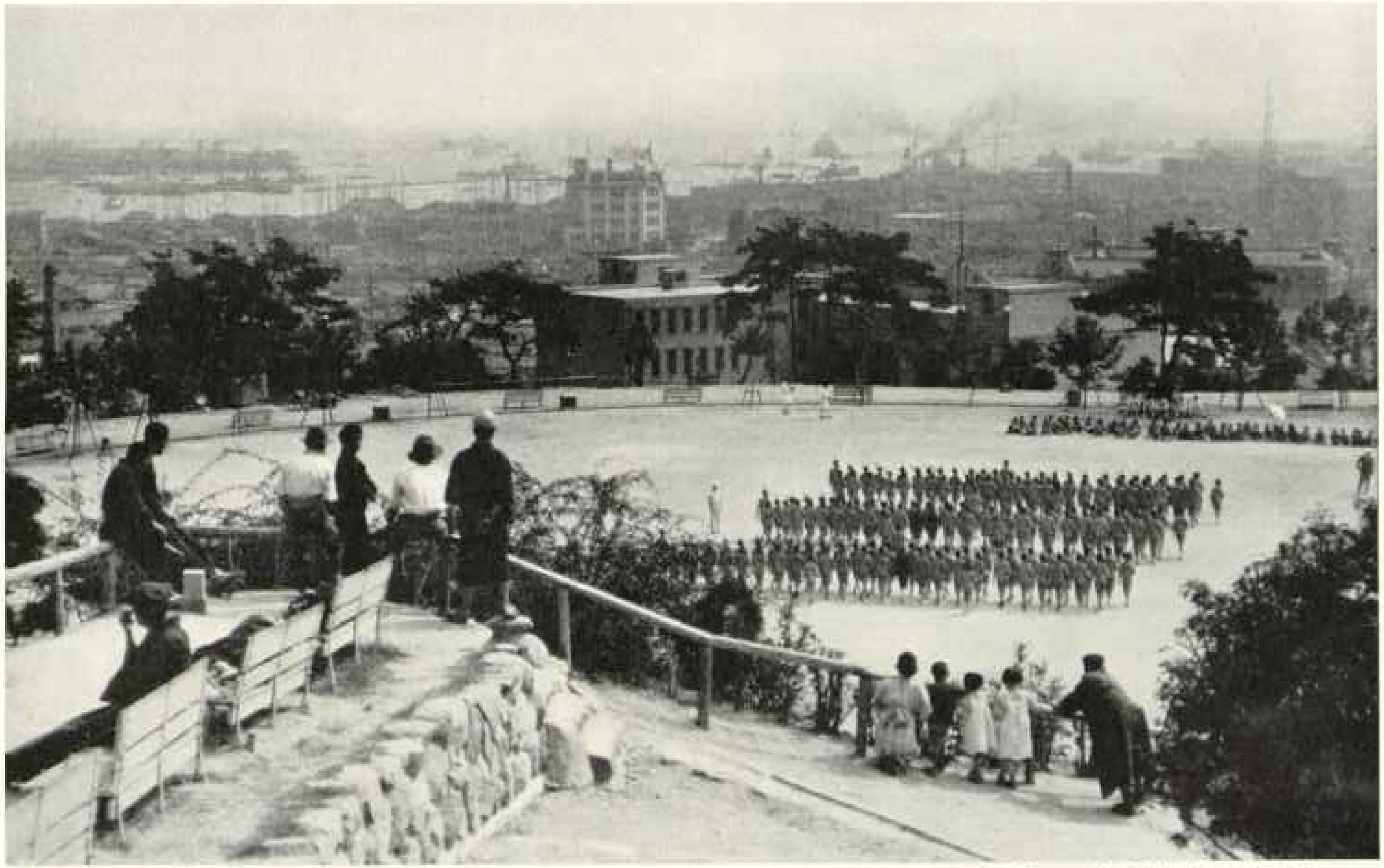
THE EMPEROR REVIEWS HIS TROOPS AT TOKYO



Photographs by Keystone-Underwood

A NEW DESTROYER SLIPS DOWN THE SKIDWAY

This latest and fastest destroyer was built for the Japanese Navy at the Ishikawajima shipbuilding yard at Tokyo. Besides four naval stations equipped with shipbuilding yards, there are four major private establishments which are approved by the Navy; some of these are capable of handling superdreadnoughts of more than 40,000 tons.



Photograph by Moulin from Ewing Galloway

FUTURE SOLDIERS IN THE MAKING

Boys drill on the Okura Recreation Grounds, overlooking a portion of the city of Kobe and its extensive harbor (see Color Plate VII). The larger cities of Japan have parks and playgrounds where children and young people are encouraged to play outdoor games. Athletics are helping build a taller and more vigorous race in the Empire.

Photograph by Kiyoshi Sakamoto

ENJOYING A HOT BATH AND MUD PACK AT BEPPU

At Beppu, in Kyushu, the Karlsbad of Japan, Japanese patients lie in hot sulphur springs and pack warm volcanic débris on their bodies to cure themselves of many ailments. There are many other resorts throughout the country where people go by thousands to enjoy the intensely hot sulphur waters that come from volcanic rifts and slumbering craters (see text, page 259).

volcanic débris. By wet baking or par-boiling, even to scarification, the patients seek to expel their many ills (see illustration above).

There are even delightful myths told of ships losing their anchors in these waters because the heat had melted the metal as it lay on the ocean floor!

Amid clouds of steam or ill-smelling vapor one can see springs boiling with red, white, blue, or green mud, melted rock and water. All are appropriately named from the vocabulary of the Inferno and in some cases are adorned with statues of man's imagination.

Beppu is a delightful place for a patient with rheumatic or other miseries. While there is a fair chance of being swallowed up and changed to a cinder by some fresh outburst of melted rock, such as only a century or two ago filled the valleys with scoria and lava, who cares, when no one can foretell the hour? Does not the man of Beppu know that other parts of fair Japan may be visited long before his turn comes?

Did not Sakurajima at Kagoshima, of old supposed to be solid rock, erupt and bury a whole town of 10,000 people?

Moreover, how welcome the sequel to these earth's outbursts—fertile soil covered with a carpet of lovely flowers and plants and easily coaxed into luxuriant production of food for man!

"LET US REBUILD!"

"Shigata ga nai" (Don't care) is the usual verdict on the unknown, with the merry-hearted sons and daughters—how fair are the latter!—of Nippon. One who has known the sons of the Land of the Gods for more than half a century classifies the two kinds of men into "Don't cares" and those who, after every repulse of Nature, cry "Let us rebuild!" Then, Calebllike, these hearten others by declaring, "We are well able to do it."

Like Nature's dress, which later clothes in threefold loveliness, with color, beauty, and perfume, what was once fiery scoria, the maidens know how to add to their physical charms through the witchery of

Photograph by Cabot Coville

SUPPLYING WIND MECHANICALLY FOR WINNOWING RICE

While a greater portion of rice cultivation, harvesting, and threshing is done entirely by hand labor, the Japanese have invented a few simple hand- and foot-powered threshers and winnowing machines to facilitate the handling of their all-important crop, which in Japan proper amounts to nearly ten and a half million tons annually.

raiment. In his ideas of beauty, and especially of dress patterns and whatever is applied to bodily wear, the Japanese artist-designer excels. For variety and originality he possibly leads the world.

FASHION COPIES NATURE'S MOODS

Men and women in their garb lovingly copy Nature's moods. When a maiden adds to her faultlessly graceful costume a "Fujiyama neck and shoulders," with a superb coiffure, who can do less than admire? Was it lackadaisical in the native poet to write of her: "One glance, and you would give your province; another, and you would barter your kingdom"?

Yet, as of glamour for their women, as expressed in strains of admiration, so also and more have their poets written of the beautiful scenery and the special features of their native land. They reckon even clouds, mist, sunrise glow, and sunset glory as part of their country's life and adornment. Yet it is not they, but we, who say "her" of Nature, for personification is rare in Japanese literature, art, or language. Of a thousand figures of speech in poetry, many of which refer to the moon, scarce a dozen bear any resemblance to the description of that luminary as "a fair maiden with white fire laden."

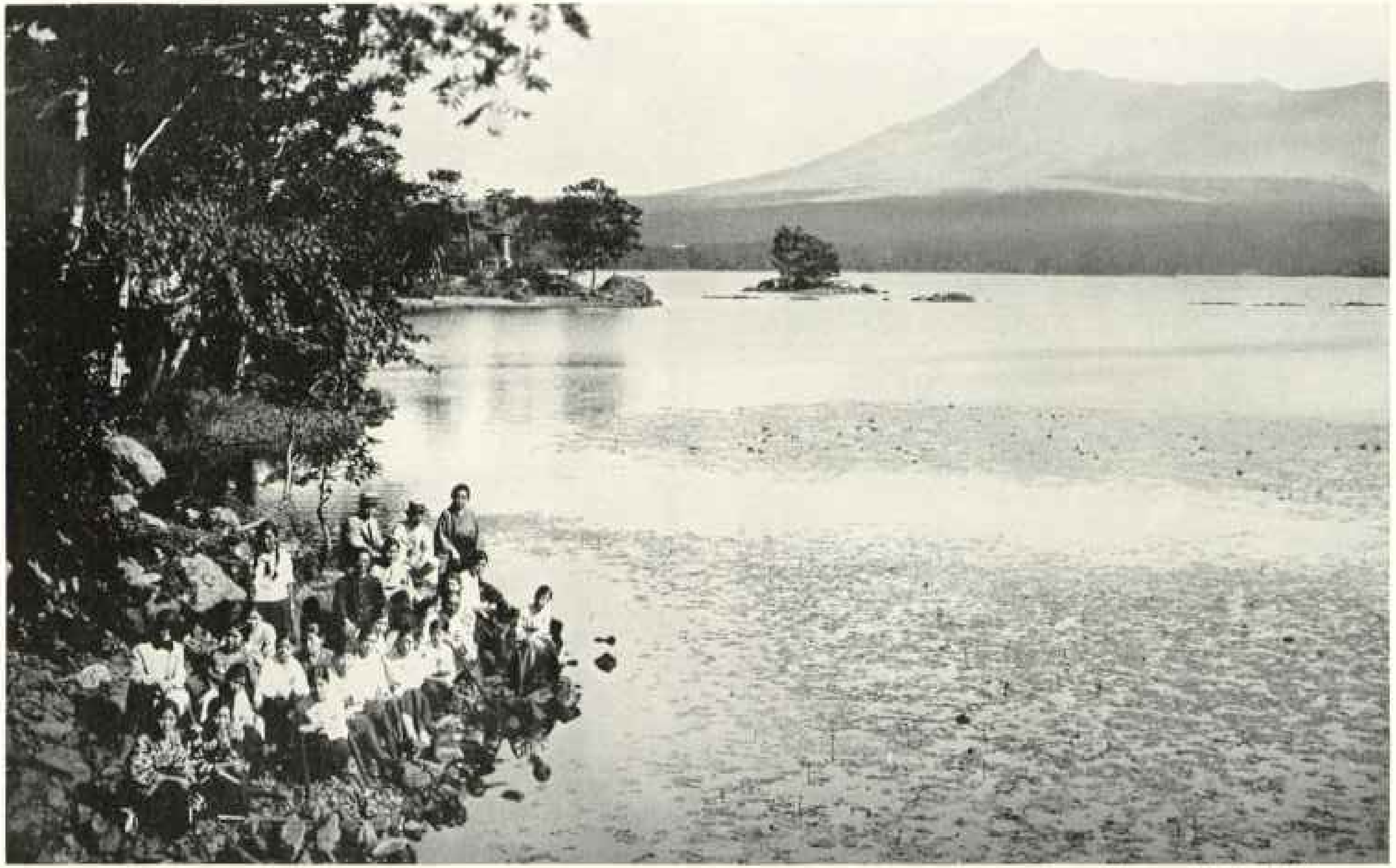
Nevertheless, apart from literature, in Japan all Nature is alive with personality. The mountains, especially in the beauty spots, are inhabited by gods and goddesses.

To the average native, these personalities in the realm of imagination seem as real as the virgin priestesses at the Shinto shrines.

The landscape, which science reduces to maps and measurements, is to the native clothed in or inhabited by lovely figures of mythology, which lend abundant charm.

WHEN A NATION TURNS TO POETRY

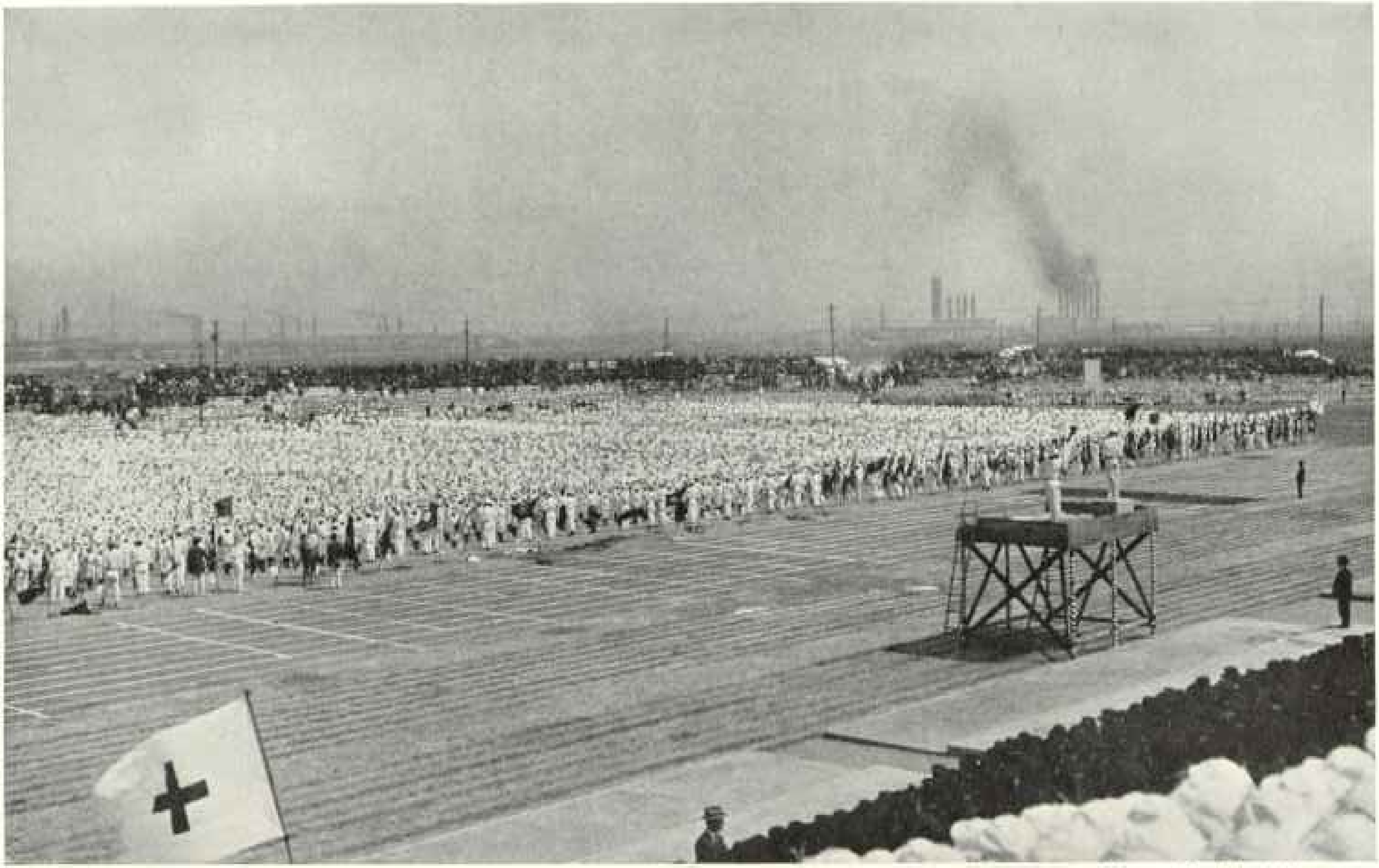
Every year, at the invitation and under the direction of the Imperial Court, thousands of the short, 31-syllable poems are sent, for oblivion or glory, by the people, from beggar boy to noble, to the Court's staff of literary appraisers and censors.



Photograph by Kiyoshi Sakamoto

PICNICKING ON THE SHORES OF LAKE ONUMA, HOKKAIDO

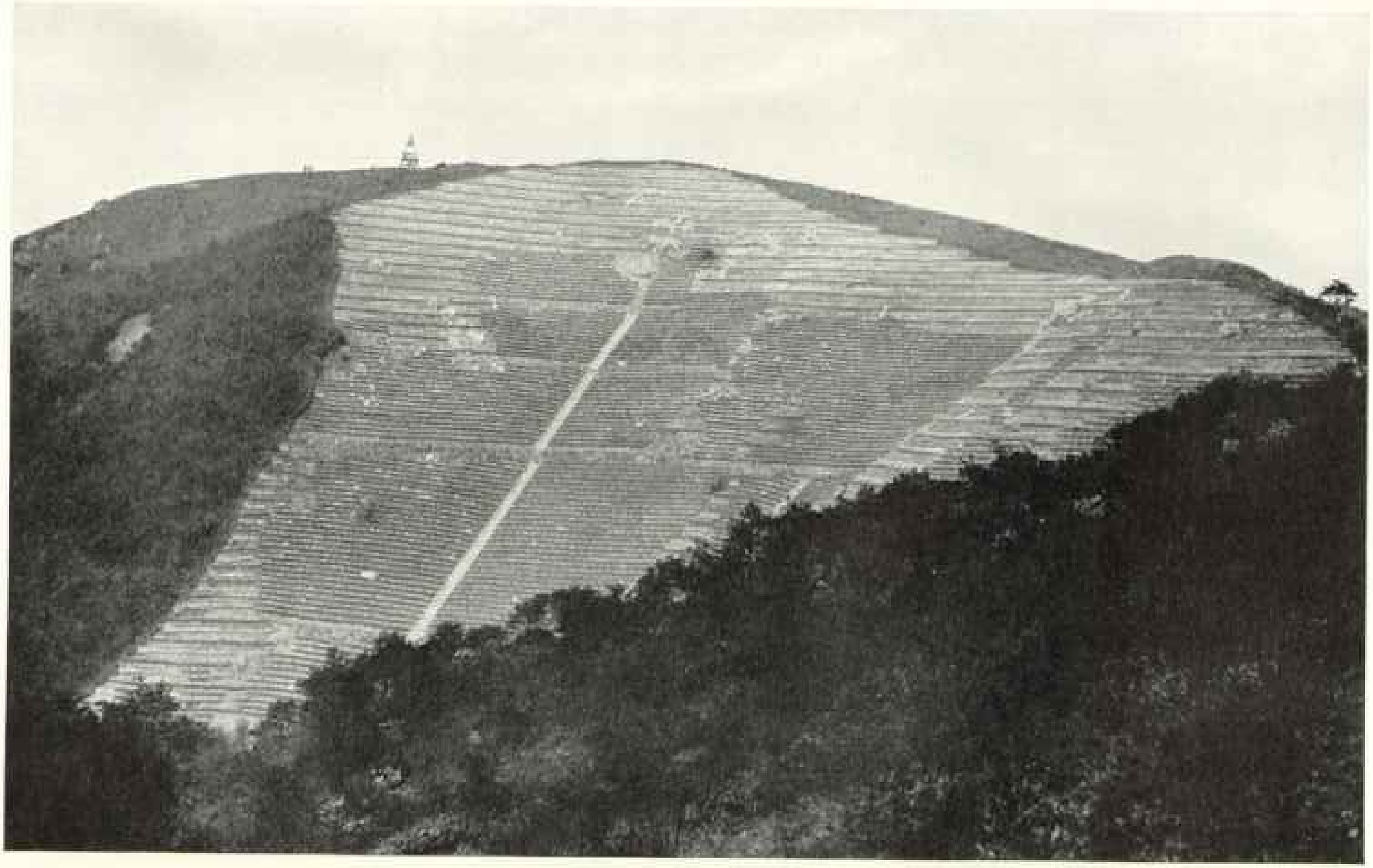
The lovely lake and its numerous islands attract many summer visitors. Komagatake, the peak in the background, is dormant at present, but it is given to explosive outbursts of temper.



Photograph by Kiyoshi Sakamoto

OSAKA GRAMMAR SCHOOL, BOYS PERFORMING GYMNASTICS WITH FLAGS

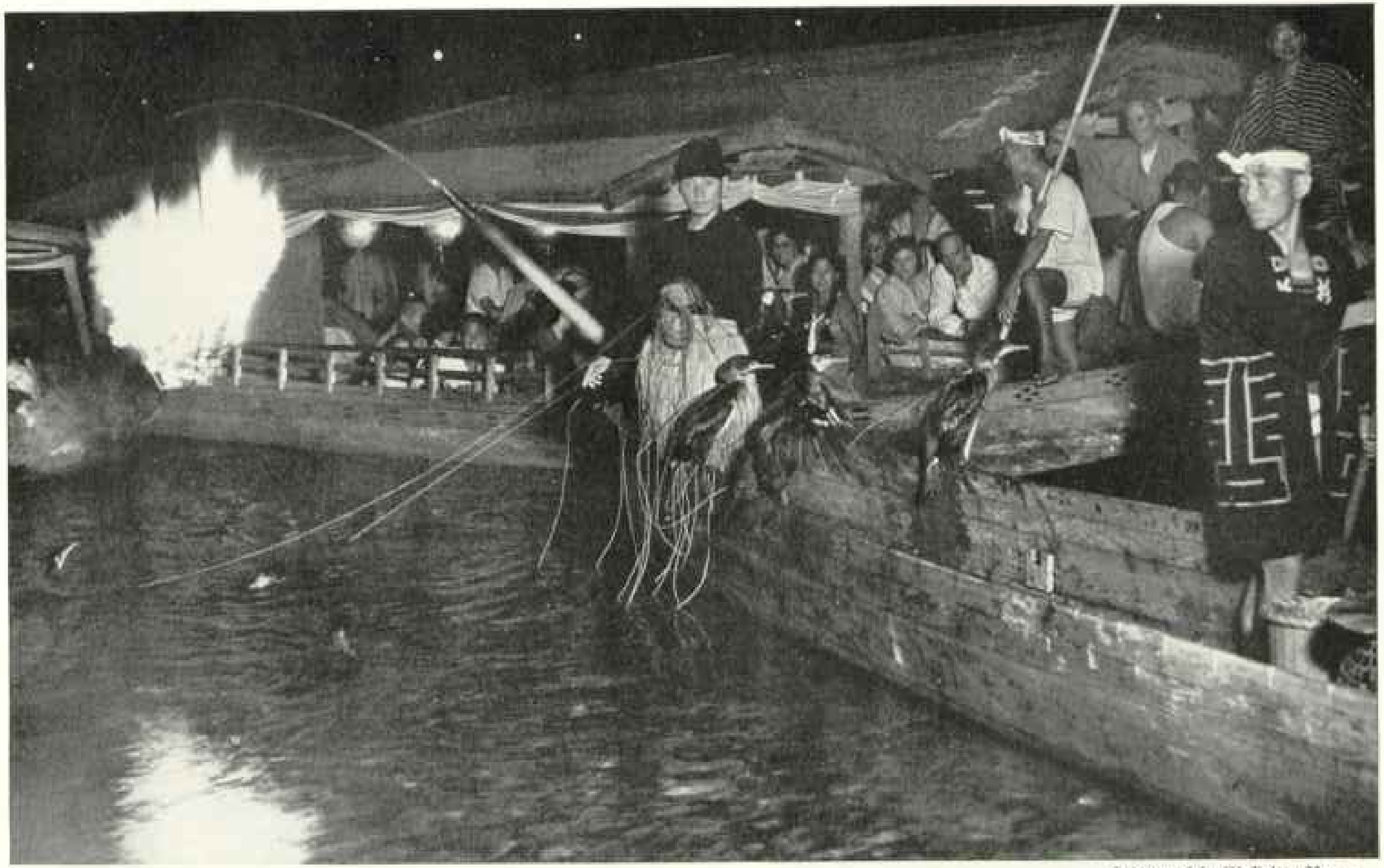
This municipal playground and stadium is one of the biggest in the East. The newer Meiji Shrine stadium in Tokyo, although covering less area, has a seating capacity much greater than this one (see "Tokyo To-day," by William R. Castle, Jr., in the NATIONAL GEOGRAPHIC MAGAZINE for February, 1932). Osaka, with a population of more than 2,450,000, is the chief industrial city of the Empire; factory chimneys are visible everywhere on its skyline.



Photograph by Kiyoshi Sakamoto

FORESTS OF THE FUTURE

Where the surface soil is comparatively soft, steps are made on the mountain sides on which to plant seedlings of pine, cedar, and other conifers. Recently afforestation has gone on in Japan at the rate of more than 366,000,000 trees in a single year.



Photograph by W. Robert Moore

CORMORANT FISHING IS DONE AT NIGHT

These curious birds, with strings tied around their necks to prevent them from swallowing their catch, dive in the water and capture fish from the schools that cluster around the pitch flares. Two boatloads of foreign visitors are seen in the background, viewing this novel scene on the Nagara River, near Gifu, northeast of Kyoto.

Photograph by Joseph H. Ehlers

PILING LOGS AT TOMAKOMAI, SOUTH HOKKAIDO

Forests cover more than half the total area of Japan proper, those in northern Honshu and on the island of Hokkaido producing the most lumber.

Photograph by W. Robert Moore

DOORSTEP GOSSIP IS POPULAR AMONG THE AINUS

These heavily bearded grandfathers belong to the fast disappearing race of aborigines who inhabited Japan before the other racial groups, which make up the larger proportion of the present Japanese peoples, migrated to the volcanic islands (see text, page 288). This photograph was taken at Shiraoi, on the northern island of Hokkaido, home of most of the pure-blooded Ainu groups.

After due scrutiny and appraisement, rewards are meted out, not to rhymesters, for there are none, but to the poets.

But let us come down to facts and figures of area and population and of facilities of movement by land and sea.

Travel to-day in the Japanese Empire is one of luxury and detailed convenience as compared with what existed in the time of my first visit, in 1870. Japan proper is now threaded with 15,413 miles of railways and trolleys, rivers are crossed by countless bridges, and the ocean paths to all continents are traversed by ships that move with an affluence and punctuality that are akin to the movements of the heavenly bodies. Three thousand three hundred and fifty steam and motor vessels and 15,497 sailing ships are registered in Japan's merchant marine; rivers and bays teem with small motor and sailing craft. The air is flecked with airplanes flying on regular schedules.

THE JAPANESE TAKE TO THE AIR

Aside from the military and naval air force, Japanese pilots are now flying more than a million miles annually over commercial air lanes. Between Tokyo and Osaka there are two services daily; another line dispatches planes every day, except Sunday, to Korea (Chosen) and Dairen, with five intermediate stops. This latter line is to be extended to Manchuria. For some little time, too, the Japanese have had in project an air route to Shanghai, eventually to join up with the Chinese airways which link Nanking and Peiping with that commercial port.

How well the writer remembers the seven-hour debate in 1871, when the makers of the New Japan discussed the respective merits of railways or armaments, to provide the best means to defend and unify the nation just emerging from feudalism. The vital question was, "Shall we expend the revenues derived from, or possibly because of, the abolition of feudalism on a modern army and navy? Or shall we build a railway from the northern to the southern end of the Empire, even if it pays no dividends for a thousand years?"

Local prejudices of the nearly three hundred petty feudal factions had to be turned to healthy nationalism if Japan was to be fused into a modern nation. How to break up the sectional quarrels, animosities, and customs? Wherewith? By a national army and navy or by railways and education?

Strikingly enough, a compromise was effected, largely through the wise counsel of G. F. Verbeck, a Dutch-American missionary.

To the eagerly listening company Verbeck said: "Peace is the hope of the Christian, the desire of all patriots and of good men in every age; but war is the history of mankind." Then he outlined a plan of national development, both intellectual and material.

It was electric, unifying the opinions of the Japanese leaders and in time securing both military defense and internal unity; the unity won by brains and the printed page proved fully as potent as that gained by arms in the field.

It was the public schools and universal education that made certain, from the first, the victory over illiterate Russia. It was the mental training of youth in public-school literature, as fully as military reform, that created the Japan we know to-day.

Intellectual preparation for change had been in progress a century or more before the arrival of President Fillmore's peaceful armada of 1853. Japan's modern history is truly as much one of interior discipline as of any reinforcement coming to her from the outside.

PERRY'S VESSELS IGNITED A LONG-SMOLDERING FLAME

Had Perry's squadron not appeared in Yedo Bay, there would undoubtedly have come, and quite probably before the twentieth century, a revolution in Japan, requiring new policies, new executive movement, reconstruction of government and society; and an outlook, such as was never before, had taken place on the world at large.*

On the other hand, America's intervention under Perry was really an extension and fresh application of the Monroe Doctrine. It came at an opportune time. The old Mikado, or Emperor, Komei, was nearing his demise, and his son and heir, Mutsuhito, who was destined to rule the

* See "The Empire of the Risen Sun," by William Elliot Griffis, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1923.

Photograph by T. Enami

A BEACH PARTY AT HOMMOKU DURING SHELL-HUNTING TIME

Hommoku is one of the suburbs of Yokohama, where bathers can enjoy seawater and dig for shellfish over the long stretches of sand when the tide is low. The Japanese are among the cleanest of the world's peoples, and the frequent references in the old chronicles to "the cure of the brine" indicate that they have long been acquainted with the benefits of salt-water bathing.

Photograph by Moulin from Ewing Galloway

MARKETS ON WHEELS SUPPLY MANY OF THE NEEDS OF TOKYO HOUSEWIVES

This itinerant fish peddler rolls his merchandise around on rubber tires, and wears a fancy costume as an advertisement. The barber shop in the background has an American sign.

New Japan in the longest reign (1867-1912) known in the Nation's history, was soon to take the throne.

During his reign the compromise between the personalities and energies representing war and peace, effected in Verbeck's parlor, resulted in shattering forever the Chinese claim of sovereignty over the Ryukyu (Nansei) Islands and Korea and rolled back the tide of Russian and European aggression.

The present-day Empire consists of the four large islands of Japan proper, with nearly 4,000 smaller ones; Taiwan (Formosa); Karafuto, the portion of Sakhalin Island below the 50th parallel of north latitude; and Korea (see text, page 279).

The country's life centers on Main Island, Honshu, the chief theater of its history. Here is the bulk of the population; and here are the chief cities; towns and villages are thickly clustered. Hence, in the minds of foreigners, this large island, with its 86,300 square miles of area, is practically Japan.

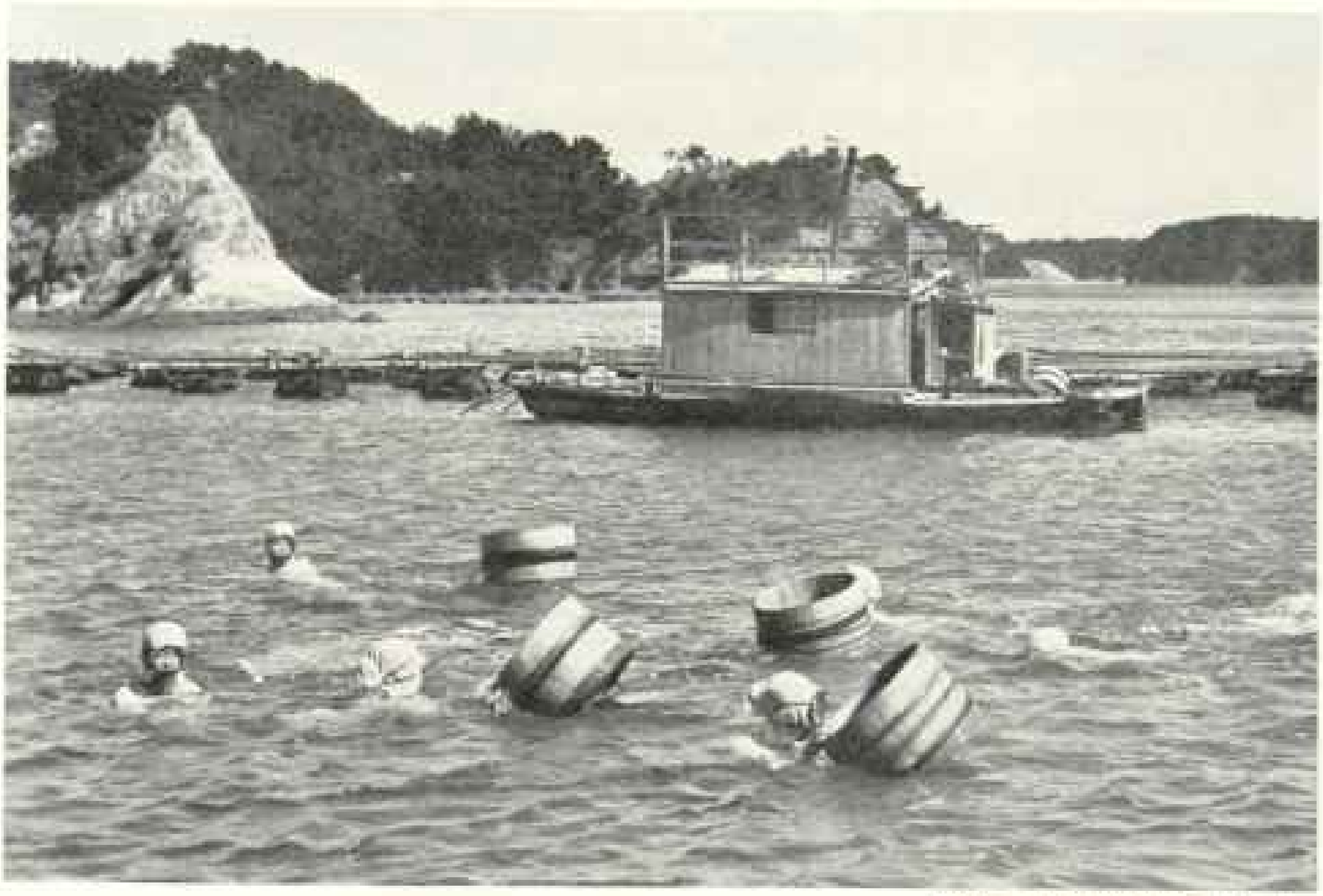
To risk a further computation, I fancy that 80 per cent of all visitors to Japan "do" Honshu only. Nevertheless, Kyushu, with busy Nagasaki on its southwest tip, being the historic home of the Dutch who, for nearly three centuries, kept the world informed concerning the hermit nation, is far from unknown to the world at large.

Japan is not an ideal place for the agriculturist. It required at least twenty generations of human toil to make the ground produce sufficient food to sustain its inhabitants, even when the population was but one-half of what it now is. Few other

Photograph by Kiyoshi Sakamoto

JAPANESE FOOTBRIDGES ARE GRACEFULLY ARCHED

The girl is finding difficulty in crossing the bridge of the Sumiyoshi Shrine grounds in Osaka, in spite of the cleats which are attached to provide a better foothold.



Photograph by W. Robert Moore

DIVING FOR OYSTERS OFF THE ISE PENINSULA, SOUTH HONSHU ISLAND

In recent years pearl cultivation has become a thriving industry in Japan. The oysters are obtained and cultured at the age of three years by inserting small beads of shell into the bodies of the mollusks, after which they are allowed to remain for four years before they are opened. Bamboo rafts, holding cages of cultured oysters, are seen in the background. Most of the divers are women (see text, page 287).

Photograph courtesy Osaka Mainichi Shimbun

LOOKING DOWN ON SHIONO PROMONTORY, WAKAYAMA PREFECTURE, SOUTHWEST OF OSAKA

Rock-ribbed coast lines and numerous islands offer many hazards to navigation in Japanese waters. Because of repeated shipwrecks in years past, the Government has developed an extensive system of lighthouses and wireless stations to safeguard the extensive water-borne traffic.

lands show, in their area of food production, such evidences of prolonged human labor.

THE EVOLUTION OF THE TINY FARMS

In old Japan nearly all the farms were fractions of an acre. The terraced slopes in many areas make the scene more like that of a succession of gardens than of farms.

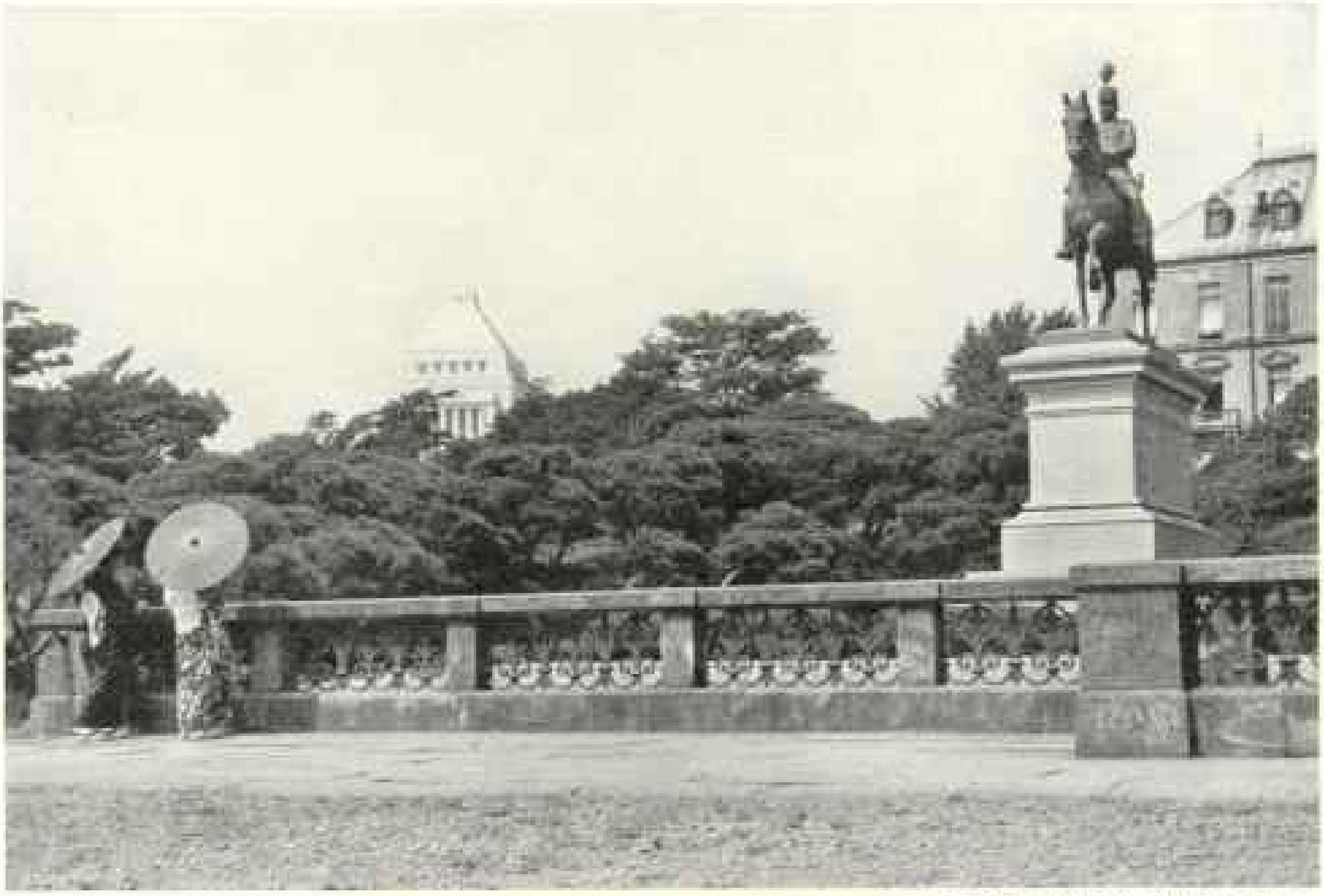
Rice, the chief article in the national diet, grows in the valleys and needs irrigation. In modern agriculture, cooperation and the practical union of several or many farms into one have greatly eased the situation. A movement for a more varied diet and for total abstinence from sake (rice beer), which now requires the use of a million bushels of rice a year, will, if successful, increase the food supply.

Despite ages of endless spade industry and unceasing human toil, Nature is not always kind to the Japanese. On national memory are scars of famines that often and long desolated the land.

In those famine times whole villages were often depopulated; human remains were cremated in a mass when individual burial was impossible. These ash heaps of cremation, formerly so visible, but now covered with bamboo and undergrowth, have long been concealed; their history is unsuspected by modern aliens or even by youthful natives.

Since the introduction of steam as motive power in boat and on rail, the discernible cremation heaps and the "knee-deep dust that once was man" are very few. In many ways the agencies of steam have been as efficacious as Elijah's fire tokens and prayers for rain.

Even yet, however, the floods from numerous unbridled rivers spread ruin over cultivated fields, many of which were won only by persevering labor. Not until the days of motor power on land and sea did famines cease their almost periodical visitations. In hermit days even the attempted relief usually came to naught, because food-laden junks were becalmed, or the



Photograph by W. Robert Moore

THE STATUE OF PRINCE ARISUGAWA OVERLOOKS THE BUSINESS CENTER OF TOKYO

The soldier Prince was one of the leading military figures after the Meiji Restoration of 1868. The tower of the new Diet Building rises in the background. Paper parasols, such as the two women are holding, are used for sunshades as well as during rainy weather, because the Japanese women do not wear hats.

Photograph by Ewing Galloway

TOKYO ARCHITECTURE GOES MODERNISTIC

The Central Telegraph Office is built of steel and concrete and has modern offices and a roof garden. It is located in the heart of the capital's commercial section.

Photograph by Keystone-Underwood

WHEN THE JAPANESE NAVY GOES ON PARADE

The Emperor's flagship (center) leads a procession of warships during a naval review. The Japanese ensign flying at the left represents a rising sun, with 16 rays radiating from it. The sun and rays are red, the field white.

oxen on land had to eat the loads of grain they hauled.

U. S. MARINES AIDED EARTHQUAKE VICTIMS

In this connection of ideas on disaster relief, a felicitous comment upon my speech in Tokyo in June, 1927, before a notable audience, in which I had asserted that "the United States had never landed a hostile soldier on the shores of Japan," was made by Viscount Kaneko (a graduate of Harvard).

He was proud and grateful to say that when Tokyo was leveled by the great earthquake of 1923, food and hospital supplies were promptly landed from swift American warships, and 200 marines kept order and distributed rations.

All rural Japan seems at certain seasons of the year to take to the road.* During the intervals following the times of sowing and harvest, thousands of farmers go on pilgrimages.

Disposed to indulge in climbing, for sport as well as piety, people in the country, more than in the city, mix the two phases of life, toil and pleasure, oftener and with greater apparent success.

* See "Motor Trails in Japan," by W. Robert Moore, page 303 of this issue of the NATIONAL GEOGRAPHIC MAGAZINE.

Photograph from E. Gertrude Bradley

RIDING PICKABACK IS THE JAPANESE SUBSTITUTE FOR A BABY CARRIAGE

Children are taught to assume home responsibilities at an early age and they often spend much of their time taking care of their younger brothers and sisters. This manner of carrying the babies, which is rapidly being abandoned, interferes with the proper development of the legs (see text, page 288).

In old days, what with the myriad white-robed pilgrims and jolly parties to famous shrines or beauty spots, it seemed as if half the Nation had put on traveling sandals and had gone on a picnic. Now, however, in the era of railways, not only adults, but school children by the million, learn patriotism by traveling to different parts of their native land. If locomotion statistics reveal the facts, the school vacations are certainly well improved.

Utilizing a national trait and habits, it is the determined purpose of the priests of the long-prevailing religion to offset the inrush of modern ideas by increasing the number of wayside shrines. Scenes of pious legends and miracles are usually in most attractive spots. Geography is made an ally of citizenship.

In her long centuries of hermit life, having no foreign enemies and with slight communication with outsiders, Japan followed the trend of human nature, as in most lands. But in the struggle for existence, political or physical, is recorded an unusual number of civil wars.

In epitome, Japan's political history is as follows:

By the 12th century the greater part of the land had been brought under the sway of the Mikado, who dwelt in the capital, first located at Nara, and then in Kyoto. In 1192, after five or six centuries of conquest and advance of the conquerors from the mainland of Asia and the amalgamation of the four or more races, there began that separation of civic and military functions, or dualism in government, which lasted until 1867.

At Kyoto, in central Japan, lived the Mikado; at Kamakura, in the east, was the headquarters of the *shogun*, or "tycoon" of foreigners. The Throne and the Camp were the symbols of administration. In the former were centered all reverence, tradition, and popular awe; in the latter, all actual government. Throughout all the civil wars and the rise and fall of military dynasties or regencies, in succession the Minamoto (A. D. 1192-1219), Hojo (1219-1333), Ashikaga (1333-1575), and

Tokugawa (1604-1867), this same relation, the nominal administration of the shadowy Kyoto ruler and the actual Kamakura, or Yedo governor, continued. "The Mikado all men love, the Shogun all men fear," expressed the popular feeling.

Of three eruptions by foreigners, the first, that of the Mongols, in attempted conquest, met a fate similar to that of the Spanish Armada in British waters; the second, that of the peaceful entrance of Portuguese and Spaniards, in the interest of religious education, from 1541 to 1637, ended in expulsion and massacre, because suspicion was aroused that foreign political supremacy was to follow religious teaching.

The third series of foreign influences followed upon President Fillmore's peaceful diplomatic victory, through Commodore M. C. Perry, in 1854, followed by Townsend Harris's revelation to the world of the real source of power in Japan and the opening of the Empire to foreign residence and commerce. These events, in their consequences, brought Japan into the brotherhood of nations.

Photograph by W. Robert Moore

SANDALS FOR OLD AND YOUNG

Although some of the Japanese have adopted foreign footgear, the distinctive sandals are popular and shops where they are sold are found everywhere in modern Tokyo, behind plate-glass windows or in open shops, as here. The sandal is easily removed when entering a Japanese home, while foreign shoes, with their laces, give endless trouble.

THE RISE OF MODERN JAPAN

From 1868 begins the story of the modern Japanese Empire. When first made known to the world, centuries ago, by the Polos, who had traveled to China and returned to Italy, it consisted of four large islands with 3,000 islets more or less inhabited. The Yedo Government had also a shadowy grip on Yezo (Hokkaido), Sakhalin, the Ryukyu Islands, and various outlying insular groups.

To-day, as officially stated, the Empire consists of six large islands and Korea, and covers a total of 260,764 square miles (see text, page 273).

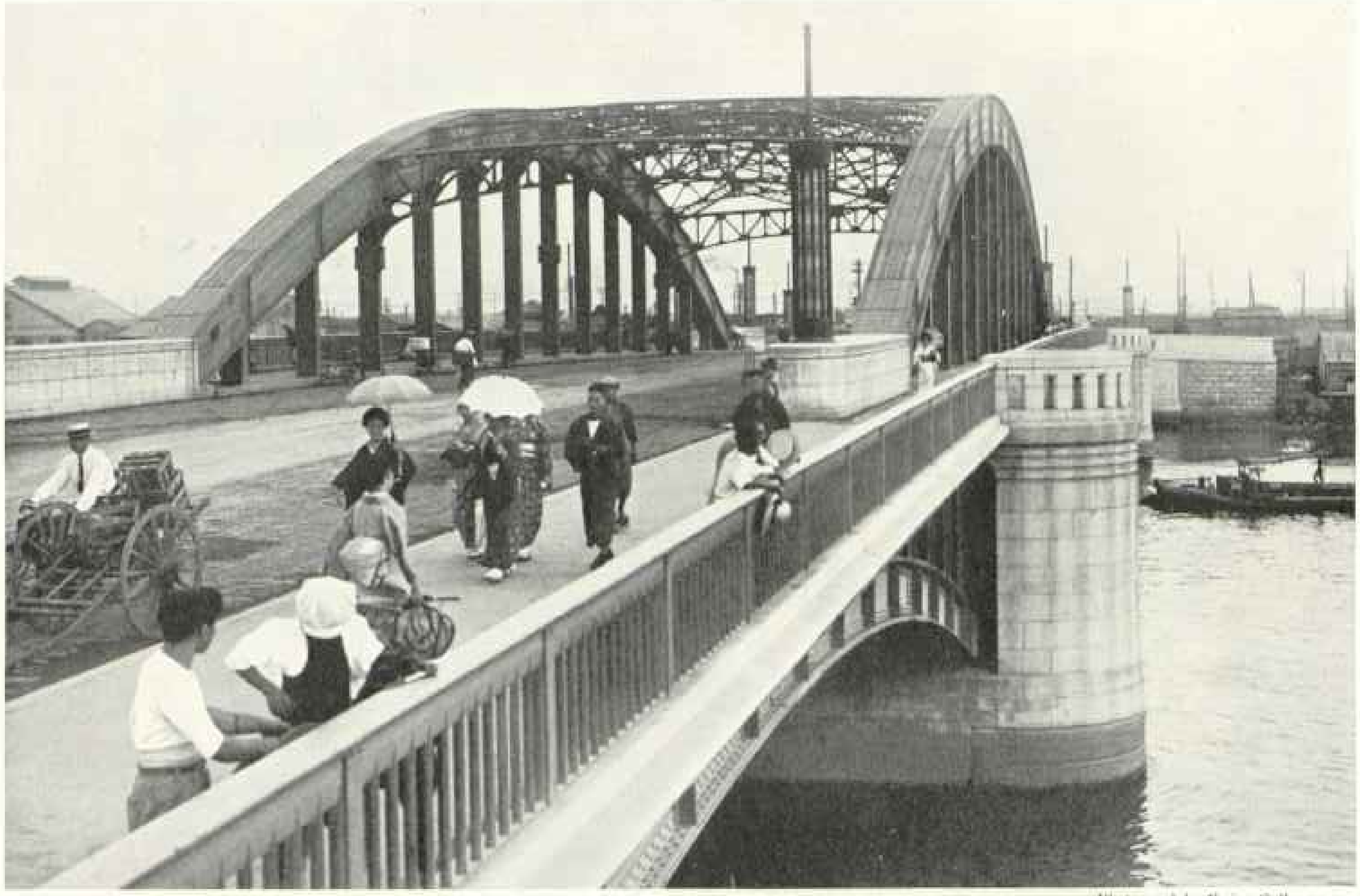
In this area are included all inhabited islands, besides each of those possessing a coast line of more than two miles. Of the two archipelagoes, the Chishima, or Kuriles, have 31 islands and the Ryukyu, 53 islands.

Most of the Empire has been surveyed and mapped. The chief concentrations of

Photograph by W. Robert Moore

YOKOHAMA IS JAPAN'S CHIEF GATEWAY TO THE PACIFIC

Practically all steamers from the United States and Canada call at this port; and from here is shipped most of the fresh silk that is speeded to American shores. The excellent harbor has extensive breakwaters and sufficient quays and piers to accommodate 21 ships at a time. The new park that extends along the bund has a swimming pool (right foreground).



Photograph by Ewing Galloway

FIVE MODERN STEEL BRIDGES SPAN THE SUMIDA RIVER IN TOKYO

All of the bridges have been built since the earthquake in 1923. The designs are all different. The construction work was carried out by Japanese architects and engineers. This is the Komagata Bridge.

Photograph by W. Robert Moore

WEATHERED STRUCTURES ATTEST JAPAN'S ANCIENT SKILL IN WOOD

The great gate at Koyasan Monastery, south of Osaka, is a fine wooden structure which dates back more than 200 years. Two venerable wooden images stand in opposite loggias and glare at all who pass. An aged woman pilgrim is just entering the gateway of this oldest and most sacred of Japanese Buddhist monasteries.

Photograph by Kiyoshi Sakamoto

LEARNING EARLY TO BECOME STRAIGHT SHOOTERS

As a youngster the Japanese boy plays with toy soldiers and enjoys the annual Festival of Armor and Flags. Military education is included in the regular curriculum of the secondary grade and high schools, and service is obligatory for all males between the ages of 17 and 40, two years of which are spent in active duty (see illustration, page 262).

population are on the main islands and in Korea and Formosa. In Korea, besides its nearly nineteen millions born in the land, there are 564,624 "foreigners," Japanese and others, dwelling within its borders. In Formosa, also, the Chinese and natives exceed the number of Japanese by almost 20 times.

In this distribution we see mirrored the inclination of natives of Nippon toward becoming emigrants to countries within the temperate zones. Korea, not Formosa, is the Land of Hope for the enterprising.

AN EMPIRE OF MANY MOUNTAINS

Scarcely anywhere in the Empire is there any large stretch of level land, for everywhere there are mountains. Of these there are 231 peaks, each rising more than 8,000 feet above sea level; 39 of them are in Formosa.

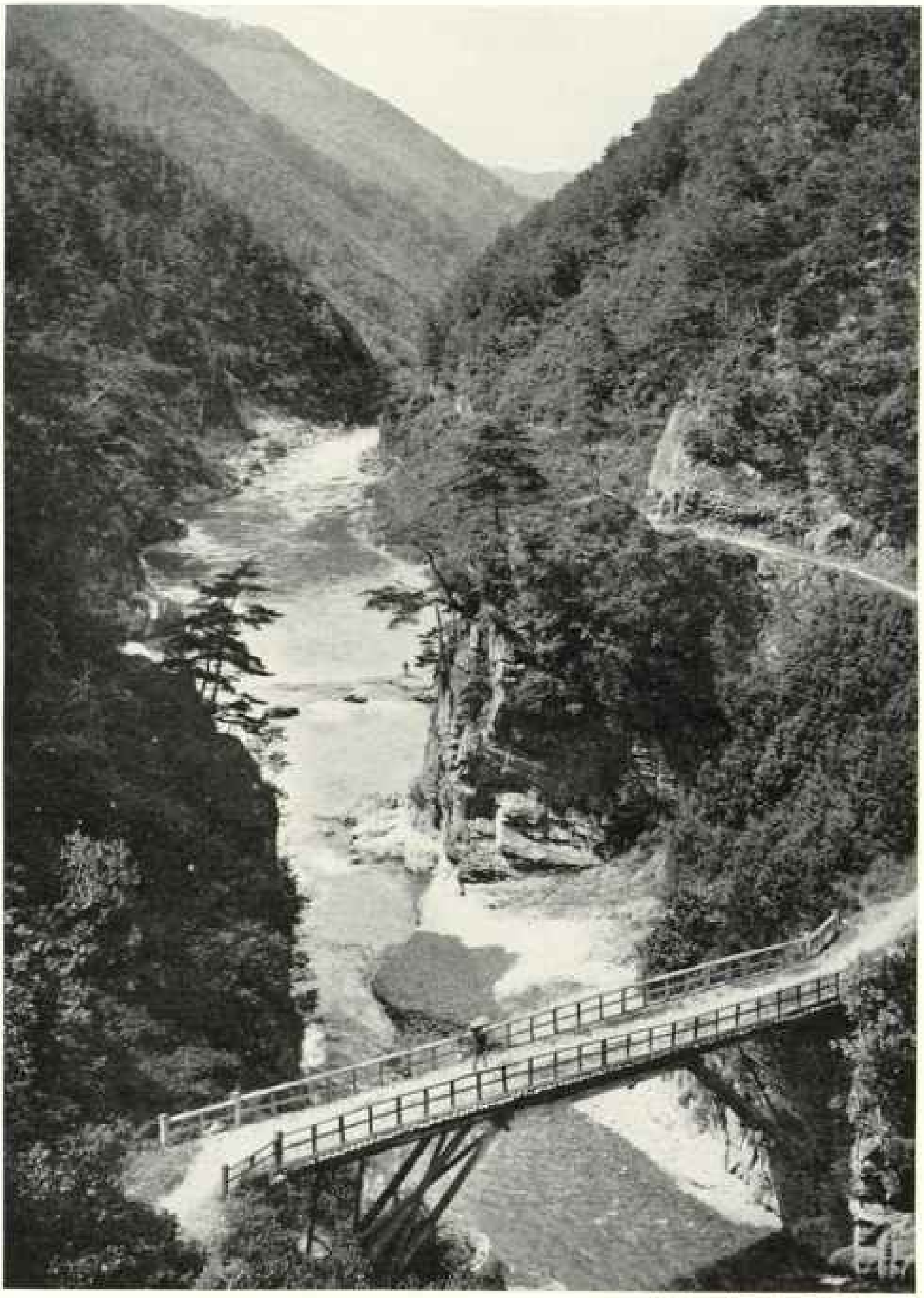
It created little joy in Japan proper when it became generally known that Fuji, 12,395 feet high, was no longer the "peerless" mountain soaring toward heaven, but that Mount Morrison, in Formosa, excelled, outtopping Fuji by 564 feet.

No longer could the "No Two Such" (as the name Fuji may be written in the Chinese characters) be so called. However, the Japanese, equal to the occasion, gave to Formosa's queen a name that softened their undoubted disappointment, Niitaka, "The New High Mountain."

Upon the Japanese imagination, as shown in the literature, legends, superstitions, esthetic conceptions, readings of barometric pressure, or notions of weather, the influence of the mountains has been both prodigious and prolonged.

Unlike the bare ranges and naked single peaks of Korea and China, the elevated lands of Japan are almost always richly clothed with trees or vegetation, the latter being usually scrub bamboo, so harmful to sheep and cattle.

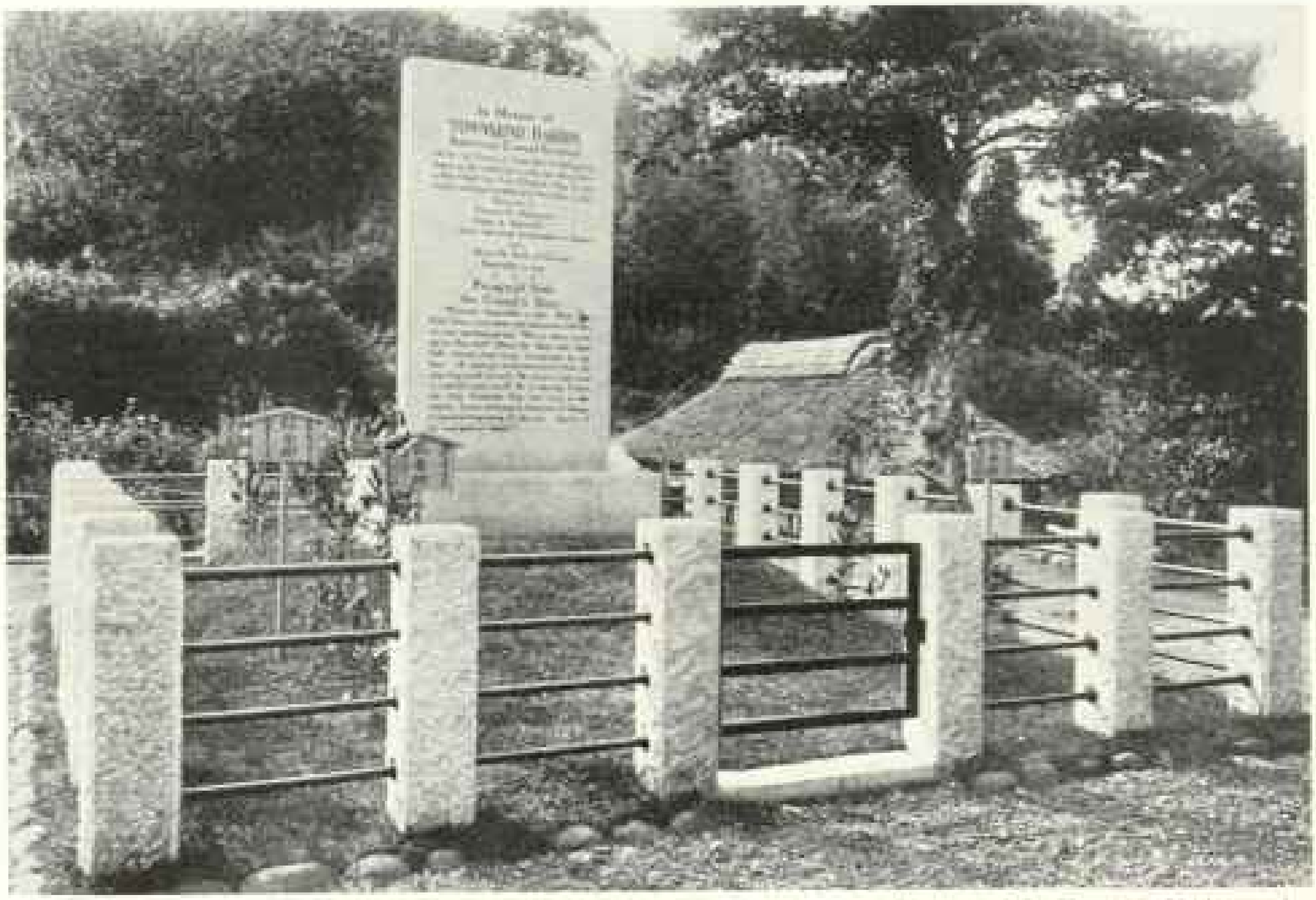
Economically, the forests are sources of wealth, while furnishing measurable protection against river floods. To temples the tall evergreen trees are fire arresters.



Photograph by Kiyoshi Sakamoto

ROCKY GORGES AND TOWERING HILLS FEATURE THE JAPANESE LANDSCAPE

Visitors get many thrills by shooting the rapids of the Hozu-gawa, west of Kyoto. Because of the islands' many mountains, the rivers in Japan proper are short, none reaching a length of much more than 200 miles.



Photograph by Keystone-Underwood

WHERE AMERICAN INFLUENCE FIRST TOUCHED JAPAN

This inscription, at Shimoda, on the southern tip of Izu Peninsula, southwest of Yokohama, tells the story: "In Memory of TOWNSEND HARRIS American Consul-General, who by the Treaty of Yedo, July 29, 1858, opened Japan to the world and on this spot, September 4, 1856, raised the first Consular flag in this empire and here resided until November 23, 1857. Erected by Viscount E. Shibusawa, Edgar A. Bancroft (Late American Ambassador to Japan) and Henry M. Wolf of Chicago, September 4, 1927." Then follows a paragraph from the Consul's diary telling of the difficulty in raising the flagstaff and his reflections on the benefit of the contact to Japan (see text, page 279).

Among populous countries, Japan is probably the most richly afforested. The island of Hokkaido is almost an untouched timber preserve; there the bears have little interruption in their strongholds. From time immemorial, public law and custom have required that when one tree is felled, two others must be planted in the place of the one gone (see illustration, page 268).

Because of the prevalence of so many mountains everywhere, Japan's rivers are short, rapid, and are ever liable to overflow. Hence they are at once an enrichment and a drawback to national prosperity and progress.

While none is the chronic "sorrow" of the Nation, as are some in China, the chief rivers of Japan have compelled an immense expenditure of human toil and treasure in the building of dikes and the piling of long bags of plaited bamboo filled with stones to resist the rush of waters. Even yet the annual devastation of cultivated fields is great.

Nevertheless, the value and character of the water floods have unexpectedly, in modern times, rehabilitated the situation. For the illumination of cities by electricity, the almost omnipresent water supply furnishes an abundance of cheap light and power transformable in a thousand ways.

A LEADER IN MANUFACTURING LIGHT

So it happens that the once hermit Japan has become one of the leading torch-bearers in the race of civilizations, for in the production of artificial light she has few rivals, even in America or Europe.

Japan is now, in the cities at least, a land of electric motors. Whole pages detailing electric enterprises add a new chapter to Japan's annual official volume of statistics. Electricity now lights 36,839,609 lamps and turns more than 497,000

Photograph by Kiyoshi Sakamoto

THE BALL GOES OVER!

An active game of volley ball on the excellent court at a girls' school. The blurred object, almost directly over the ball on the ground, is the ball in action.

industrial motors, thus adding mightily to the wealth of the Empire.

The use of gas generated from coal for illumination and various industries, as developed chiefly from the year 1913, is notable. Seventy-eight firms have some $160,000,000 invested in this line of industry.

Nevertheless, there are yet many untamed forces of Nature, which mean waste rather than profit, that still await the disciplining influences of man's genius and science. Millions of acres of land go to waste in the dry beds of most of the rivers, now vast areas of stone and gravel, where there ought to be food-producing land.

FLOODS TAKE HEAVY TOLL OF BRIDGES

As Japan becomes more and more a manufacturing country, with an ever-increasing population to support, she must address herself to the task of taming the rivers and bridling the floods, so as to produce the needed food for her people. Now her alternate dry wastes and uncontrollable floods are as wild horses on the prairie.

In time of downpour, especially in July and August, the torrents give a severe test to several thousands of bridges. Whether of bamboo and cordage, of timber, or of riveted steel, many are swept away every year. The railroads have suffered most severely; but, as a beneficent sequel, more permanent structures of cement and steel take the place of the weaker bridges.

Nearly all of Japan's lakes are volcanic or seismic in origin. Of the lakes in Japan proper, Biwa is the queen. It is named after the well-known musical instrument, producer of sweet sounds, whose shape it resembles. Both surface and edges provide harmony for the eye. Here are the charms of Nature, with the fascination of feudal castles, the halo of romance in literature, art, and the annals of valor, with not a few whispers of fairyland and its population, which add so lavishly to the pleasures of travel in the storied Empire of Japan.

Beauty, not extent, is the keynote of the lakes in Japan. Biwa, which is three times larger than any of the others, covers 260 square miles. Lake Chuzenji, at Nikko,

Photograph by Kiyoshi Sukamoto

JAPANESE SCHOOLGIRLS LEARN THE ART OF FLOWER ARRANGEMENT

Because of the national love of flowers, skill in their arrangement is considered one of the chief accomplishments of a Japanese bride. Many competitive schools have developed to give expression to the symbolism of flowers. In all of the styles three sprays of different heights are featured. The tallest symbolizes Heaven; the shortest, Earth; the intermediate, Man. Other sprays may be added, but never an even number.

and Ashi-no-ko, at Hakone, are the most popular show places.

The abundant lore of fancy, the poetry, proverbs, and general literature of Japan are also rich in references to the sea which surrounds the realm. Relatively very shallow toward China, the salt waters are much less measurable in the Sea of Japan. In one part of the great Tuscarora Deep along the Kuriles, first sounded by the men on a United States ship and named for it, the water was found to be more than five miles, or nearly 28,000 feet, deep. Farther south, off Yokohama, is another depth, which reaches almost 31,000 feet.

Economically, for salt, edible seaweed, and fish food, the ocean is rich; of late years the industry of culture pearls has also taken on magnitude (see page 274).

The devastation of the pearl-oyster beds by enemies and devourers is of more interest to students of marine life than to the owners of the beds. Starfishes, squids, borers, and gastropods with insatiable appetites, to say nothing of the red microscopic organisms so numerous as to tint the water, and the seaweeds, play havoc with the mollusks.

WOMEN MORE EXPERT PEARL DIVERS

As I have witnessed, the more expert divers are women; they can stay longer in the water than men. They come back to air, after three minutes, with the baskets strapped on their backs, full of abalone or whatever forms of sea life are desired.

Rivers such as the great Kuroshio (the Japanese or "Black" Current) flow along the east coast. The Gulf Stream of the Pacific is warm. The various conduits, cold and warm, serve not only to supply the Japanese with food, but also with light, since the occupation of whale fishing, which, with huge strong nets, is diligently pursued by Japanese boatmen and fishermen, furnishes an abundance of oil.

The Japanese make cormorants their fellow helpers in lake and river fishing. It is fun for a night, and a lifetime for many, to see the grimaces and actions of

these comical birds, each wearing a necklace to prevent them swallowing their prizes (see page 269).

As for the tides, those on the Pacific side and the Sea of Japan are light, averaging scarcely two feet, one of the lowest records in the world. As if in compensation, off the Kyushu coast these tides range from 18 feet, and at Jinsen (Chemulpo), in Korea, to 34 feet. Thus the Empire has sufficient variety of water depths and altitudes.

Four times as many bays and inlets front the Pacific as are on the Sea of Japan. The beautiful Inland Sea, so justly praised alike by native and foreigner, is rather an inland basin. It is connected with the ocean by four narrow straits, of which the one at Shimonoseki is the most famous in history, war, and commerce.

To the north, Tsugaru Strait separates the geologically young Hokkaido from Honshu.

As one might expect, several racial bloods course through Japanese veins. Certainly four great strains of humanity are discernible in history: the Ainu, straight-eyed and full-bearded; the Malay; the Semitic; and the Manchu, or ancient conquerors, all well blended now.

ISLANDS FORM A GAZETTEER OF NATURE'S FORCES

There is a long catalogue of the forces of Nature, the impact of which during the ages has modified both the bodies and the minds of the islanders. In the air are monsoons from the north in winter and from tropical areas in summer, with typhoons and cyclones chiefly in autumn. Below the atmosphere are tidal waves, earth tremors (averaging five a day), and quakes, often devastating large areas and reducing whole cities to rubbish. High above earth level are fire-belching volcanoes, with occasional explosions of some supposedly dormant.

Well may we ask, What kind of humanity is this, thus produced or modified by Nature apart from human culture? Certainly it is the general verdict of the world that the Japanese human product is a notably distinct child in the human family.

What about his stature? What about facial protuberance, especially of the mouth and teeth? Let not the comparatively low stature, or even the prognathism of the Japanese, be laid wholly to the charge of Nature. There is here, I think, no "primordial necessity," to use Humboldtian language. There are removable causes. The reasons for short legs, the Japanese body being normal, lie on the surface.

For centuries the Japanese mother has made her back the baby's resting place and means of transportation, usually with its lower limbs tightly strapped, instead of allowing plenty of space on the floor, or in the cradle on rockers, for kicking up its legs and swinging its arms to promote easy circulation and the healthy impulses of growth (see illustration, page 278).

Yet, as if the carrying of the youngster so tightly swathed on its mother's back were not enough, a further process of arresting blood circulation is continued by most of the Mikado's subjects when they squat on their heels and make seats of their ankles and calves for long hours at a time.

In the case of the children, prognathism is introduced often by habitual and prolonged resort to the maternal fountains, even until the age of four or five years. The exercise of the lips required for refreshment thus obtained has notable effect in producing what amounts to disfigurement by an abnormal development of the lower face, noticeable in many adults. To wean most of the rising generation as early as in other lands would mean improvement in the Japanese physiognomy.

Reform has begun. One need only look into the surgeon's official reports concerning the soldiers and sailors in the national service to see that the routine of life in the barracks and on modern ships tends to nobler stature. The Government offers prizes to those who sit in the occidental manner and do not squat on their heels or ankles. Hence the official statement of increase of stature, even in one generation!

WHY NEXT GENERATION MAY BE TALLER

Even more, in the public and missionary schools, the same beneficial effects in favor of stature are decidedly visible. The chair, baby carriage and cradle factories, and general business of providing baby furniture are very hopefully enlarging. It is reasonable to suppose that another century will show a notably taller race in Japan.

Apart from physical growth and more pleasing appearance, what is the reaction in Japanese human nature by the impact of forces from the Occident and the adoption in large measure of the civilization of Europe and America?

© National Geographic Society — Finlay Photograph by W. Robert Moore

COLORFUL BILLBOARDS ATTRACT TOKYO THEATER-GOERS

These young women have paused to scan the advertised scenes of a stage drama that is appearing at the Kabuki-za (theater), the capital city's fine playhouse for classical historical productions. Although it is designed in the architectural style of earlier Japan, the theater is built of reinforced concrete and has a revolving stage.

Finlay Direct Color Photograph by W. Robert Moore

THE INLAND SEA REVEALS TRANQUIL BEAUTY ON A LATE AFTERNOON IN AUTUMN

Stone lanterns, fishing boats under full sail, blue waters, and lovely islands conspire to provide the Inland Sea with vistas of matchless charm. Heavy mists often obscure the delightful views and not infrequently make hazardous the passage of ships through the narrow channels.

Finlay Direct Color Photograph by W. Robert Moore

PINE-COVERED HILLS, RICE FIELDS, AND THATCH-ROOFED COTTAGES TYPIFY RURAL JAPAN

Overlooking the small village of Une, about 50 miles west of Kobe, at rice-harvest season. The ripened grain, after being cut by hand in late October or early November, is hung on poles to dry, and is threshed later with flails or small foot-power threshers.

 Finlay Photograph by W. Robert Moore

AN AFTERNOON CHAT OVER THE "HIBACHI," OR CHARCOAL BRAZIER

Attractiveness in the interior decoration of a Japanese home is gained through studied simplicity. The alcove, called the *tokonoma*, in the central background is reserved for the *kakemono*, or panel-shaped picture. The tokonoma is the most important feature of the home, and at dinner the chief guest is seated nearest this specially decorated recess.

 Natural Color Photograph by Kiyoshi Sakamoto

ENJOYING A SISTERLY GAME OF "SUGOROKU"

This game resembles somewhat our children's playboards of "pachisi," "horse-racing," etc., where the player progresses or loses according to the number of places he is allowed to move by the cast of a die. The game is played during the festivities of the New Year.

TEA AND RICE, PLEASE!

Young subjects in the Land of the Rising Sun learn early how to use chopsticks for handling their rice, fish, and vegetables. The Japanese dish best known to foreigners, composed of meat and vegetables, usually is eaten but once or twice a week by the people themselves. Fish, not meat, is the usual adjunct to the rice.

 Natural Color Photographs by Kiyoshi Sakamoto

AN ORIENTAL CUSTOM THAT RECALLS HALLOWEEN

In Tokyo, boys, and sometimes even girls, put on weird masks and stroll about the streets carrying fanciful paper lanterns on poles, to celebrate festival days. The "Festival of Dolls" for girls, and the "Festival of Armor and Flags" for boys, are outstanding events for Japanese youngsters.

THE PIGEONS AROUND JAPANESE SHRINES HAVE MANY FRIENDS

On holidays and at special festivals people come in hundreds to the shrines to worship and to enjoy an outing with their children. A courtyard at the Nanko Jinja, a Shinto shrine in Kobe dedicated to the renowned warrior of the 14th century, Kusunoki Masashige.

 Finlay Photographs by W. Robert Moore

PAYING TRIBUTE TO THE EMPEROR KWAMMU, FOUNDER OF KYOTO

On October 22 each year the former capital city performs the Jidai Matsuri, a pageant which portrays the highlights of its history from its founding A. D. 794 until the Meiji Restoration of 1868. A Shinto priest is performing the opening rites before the sacred palanquin in which the spirit of Emperor Kwammu is supposed to ride. The $750,000 City Hall is in the background.

FAIR MEMBERS OF A VISUAL EDUCATION CLASS VISIT KOBE PIERS

Kobe, city of many factories and industries, and deep-sea port to mighty Osaka, handles some 35 per cent of the country's total export and import trade; Yokohama, alone, outrivals it. Kobe also has several important dockyards.

 Finlay Photographs by W. Robert Moore

ONE, TWO, ARMS UP!

Many new buildings of the most modern design now house the school children of Tokyo. This group of primary pupils is enjoying morning exercises and drills to the accompaniment of music broadcast by the loud speaker that may be seen on the first small veranda above the entrance. Athletics have a definite place in the activities of the upper grades; baseball is popular.

© National Geographic Society Finlay Photograph by W. Robert Moore

"SIGNS OF THE TIMES" ALONG THEATER STREET

The countless motion picture houses in the Asakusa district in Tokyo seem never to lack for patrons. Japan is a major producer of motion pictures. Hollywood productions, however, are popular, and the running story is usually told by an interpreter or is flashed in Japanese characters beneath the screen.

Perhaps the view of Japanese history and civilization, as given throughout this paper in glances, may explain the theory held by the writer, that intellectual development, which began long before Commodore Perry came, even more than material forces, is the key to much of the flowering of modern Japan.

Not least of the forces from without, coworking with those generated by the native intellect, has been the work of the American missionaries, who arrived in 1859, under the Harris treaty. They opened the eyes of the thinking and scholarly Japanese, not only to the past, but to the immediate treasures of occidental civilization, with promise of greater things to come. They not only filled the minds of the Japanese thinkers with the ideas of education for the masses at home, but urged them to send abroad native students, and to dispatch an embassy to explain to the world at large the recent revolutions in thought and custom that had created a new nation with modern ideas. This embassy, or "beginners of a better time," were to ask for the recognition of Japan as an equal in the councils of civilization.

As the world knows, the mighty program was carried out in detail. The writer, after returning to Japan 57 years from his first sight of Fuji, and after having traversed the Empire from the most northern to the most southern of the large islands, and traveled in Korea and Manchuria, utters his faith in the permanency of the civilization of Japan, as built upon the "Charter Oath" of the Emperor taken in Kyoto in 1868.

In the Japan which the writer first saw in 1870, there were only the beginnings of foreign commerce and economic conditions. From an alien's point of view, these were rudimentary. Except for a very limited trade with China and an annual ship or two between Europe and the Dutch on the isle of Deshima, at Nagasaki, there had been of old no foreign commerce. Moreover, restricted by an edict of the 17th century, there were only native-built junks traversing the waters surrounding the islands, while the coasts were unlighted at night.

Now, in Japan proper, there are 1,463 harbors of all grades, which include 795 trade ports and six naval ports; 41 of these are open to foreign steamers. More than 58 million tons of shipping enter and clear her ports annually. Between two-thirds and three-fourths of Japan's foreign imports and exports are carried in her own bottoms.

LIGHTHOUSES ARE BEACONS OF NATIONAL PROGRESS

Besides the apparatus for storm signals by day, there are several hundred lighthouses, beacons, fire signals, and even radio-compass stations which by night make navigation safe.

Not only large mercantile steamers, but powerful men-of-war, take shape in modern Japanese dockyards (see page 262).

In the large cities even, and in the seaports of Japan, as I noticed in the seventies, life moved at what seemed to the American a very deliberate, not to say sluggish, pace. Palanquins, open or closed, borne on men's shoulders, were the vehicles, for no horses were or could be used for traction. Now, in contrast, in Tokyo and Osaka and other hustling centers one usually runs the risk of his life in crossing a street because of swift vehicles moved by electricity, gasoline, or pedals.

Manufactures, and in general the modern economic development of Japan, as viewed in the perspective of over fifty years, seem more like a fairy tale than daylight reality.

In the first place, all the old sumptuary laws and customs having fallen into desuetude, population has nearly doubled; and instead of former divisions into classes, with privileges and opportunities more or less restricted, there is now a virtual equality and practical amalgamation.

Even the right of universal manhood suffrage was granted in 1925, and there is a fair prospect of the other sex winning the ballot within a generation or less.

The women of old, who, under the feudal system, were restricted closely to the household and its duties, now share the same privileges of public education as men, while most of the avenues of industry in both indoor and outdoor activities are open to them. One may see this in banks, offices, factories, industrial establishments, and in various forms of private and public service. In Osaka, the leading manufacturing city, this is especially visible.

In the list of articles and substances, virtually unknown in Japan a half century

Photograph by W. Robert Moore

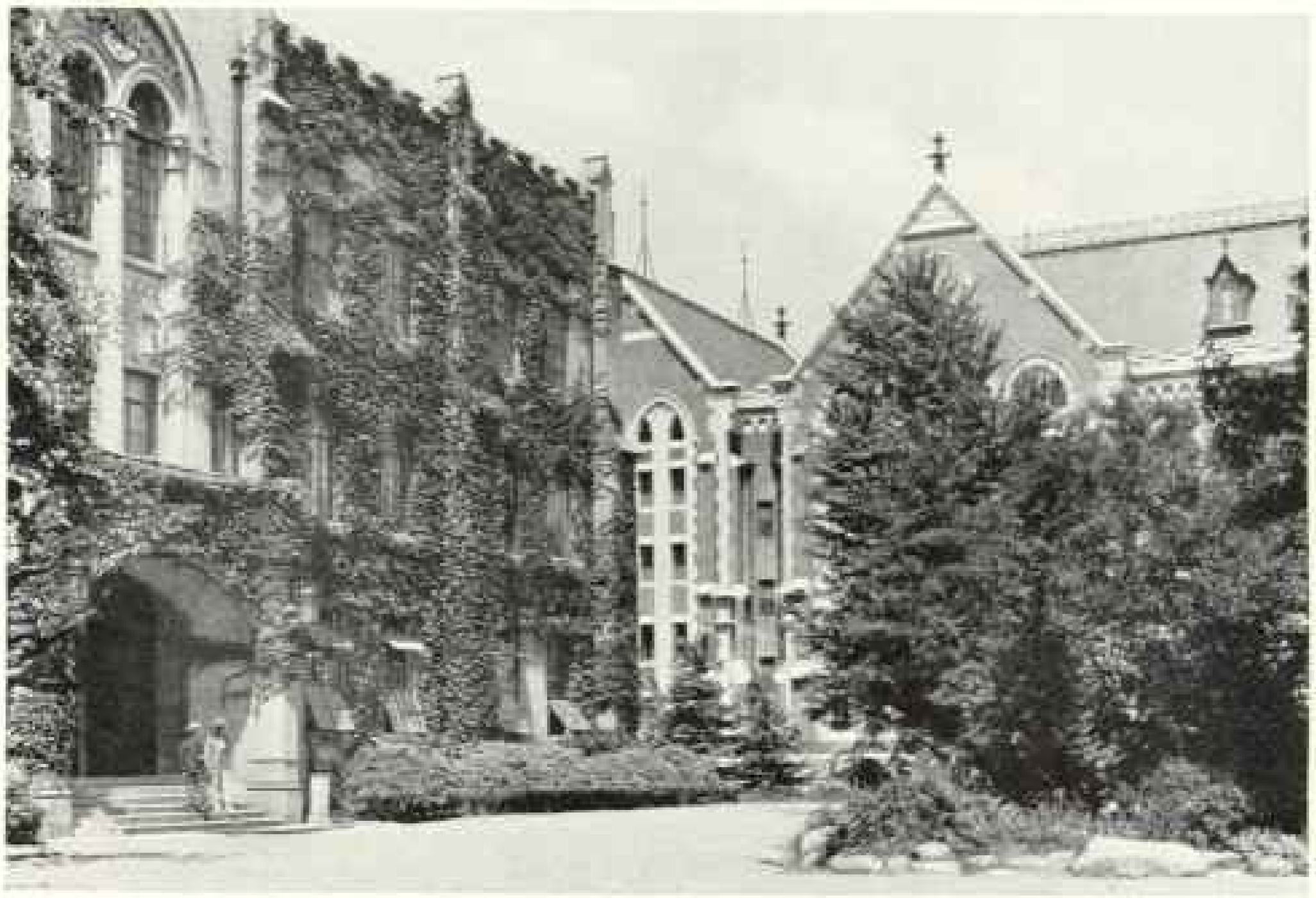
ANCIENT PAGEANTRY PASSES UNDER JAPAN'S LARGEST TORII

The Festival of the Ages is performed annually in Kyoto on October 22 by the leaders of the chief Shinto shrine of the city, in commemoration of the founding of the early Japanese capital by Emperor Kwammu. The festival portrays the costumes and historical events which have taken place from 794 A. D. until the Meiji Restoration in 1868. The torii is of reinforced concrete.

Photograph by Kiyoshi Sakamoto

WITH BRUSH, NOT PEN, JAPANESE YOUNGSTERS LEARN TO WRITE

The written language has two methods of expression, one by use of Chinese characters, and the second by a group of 48 signs which have been formed by modifying certain ideograms to represent syllables. Unlike our method of writing from left to right across a page, the Japanese sentences are written in vertical lines, starting at the upper right-hand corner of the sheet.



Photograph by W. Robert Moore

TOKYO IS A CITY OF UNIVERSITIES

There are 22 Government and private schools of university rank, and a number of centers of technical and professional education. Keio University, which includes this fine, ivy-covered building, is one of the oldest and largest universities in the capital, and has an attendance of about 7,000 students. To the right is the university library.

Photograph by Kiyoshi Sakamoto

"OVER THE PLATE"

Baseball has captured the enthusiasm of the youth of Japan. Everywhere one sees youngsters "playing catch" in the streets; games are in progress in the parks and recreation centers; and stadiums overflow with ardent baseball fans. Games are broadcast by radio.

ago, there are now manufactured and exported machinery (often patented), chemicals, explosives, soaps, pearls, clocks, watches, medicines, paper, and various articles of native origin.

The larger line and bulk of products exported, however, are in silk, tea, metal, paper, lacquer, etc., which is very much the same as of yore, though in mass and value there is a marked increase.

Japanese capital, also, has gone abroad to build cotton mills in Shanghai, Tsingtao, and other Chinese ports, railroads in Manchuria,* and other commercial enterprises in the East.

One clause in the Charter Oath of 1868, taken by the Emperor in Kyoto, was that he would "seek throughout the world for ability and talent to relay the foundations of the Empire."

In following out this idea, probably no fewer than five thousand *yatoi* (salaried foreigners) were employed in Japan between the years 1870 and 1900, the writer of this article being the first brought out from a foreign country to arrive in Japan.

NATION DEVELOPS ITS OWN EXPERTS

Within that span of 30 years, so many thousands of native young men and women had received education abroad that the services of foreigners, except in small numbers, were no longer sought or required. The educated Japanese men and women were found competent to carry on the work and new enterprise of civilization. Some of the ablest projects and accomplishments in engineering, in military matters, and in the varied work of modern progress are by native Japanese.

To-day education has spread its network over the entire country. Japan proper has five Imperial universities and forty other institutions of university rank. The list of technical schools is imposing, while those of primary and secondary training are legion.

Do the Japanese possess an original and inventive mind? Whatever be the answer to this question, one must remember their comparative youth as a nation, fused of various elements, and their historic seclusion for many centuries.

Before the sudden inrush in the 19th century of foreign ideas and inventions, the results of ages of occidental progress, the new Japan perhaps has scarcely had time to make record of things original and recognized as inventions.

In 1909 the Society for the Encouragement of Inventions was organized, and since that time the Imperial Government and Imperial Household have given funds from which rewards are given for invention and research.

Being eclectic in everything, it may be said that the Japanese first adopt, then adapt, and finally become adept in most of what they experiment upon. Notable is the invention of a paint for the protection of the hulls of iron ships. In the medical realm, and especially in the domain of bacteria, the discoveries and work of Doctors Kitazato and Noguchi have won recognition in Europe and America. For chemical inventions, adaptations, and improvements on previous knowledge and applications, the Japanese have won renown in the world of science and business.

To sum up, the writer, after sixty years of acquaintance with the Japanese, and especially with their mental processes, their history and literature, discerns in the Nation inherent powers of perpetuity, progress, and re-creation. Even when unaided, and apart from occidental or any foreign influences, these are discernible. In contact with modern forces and discoveries, they show Japan in the van of progress.

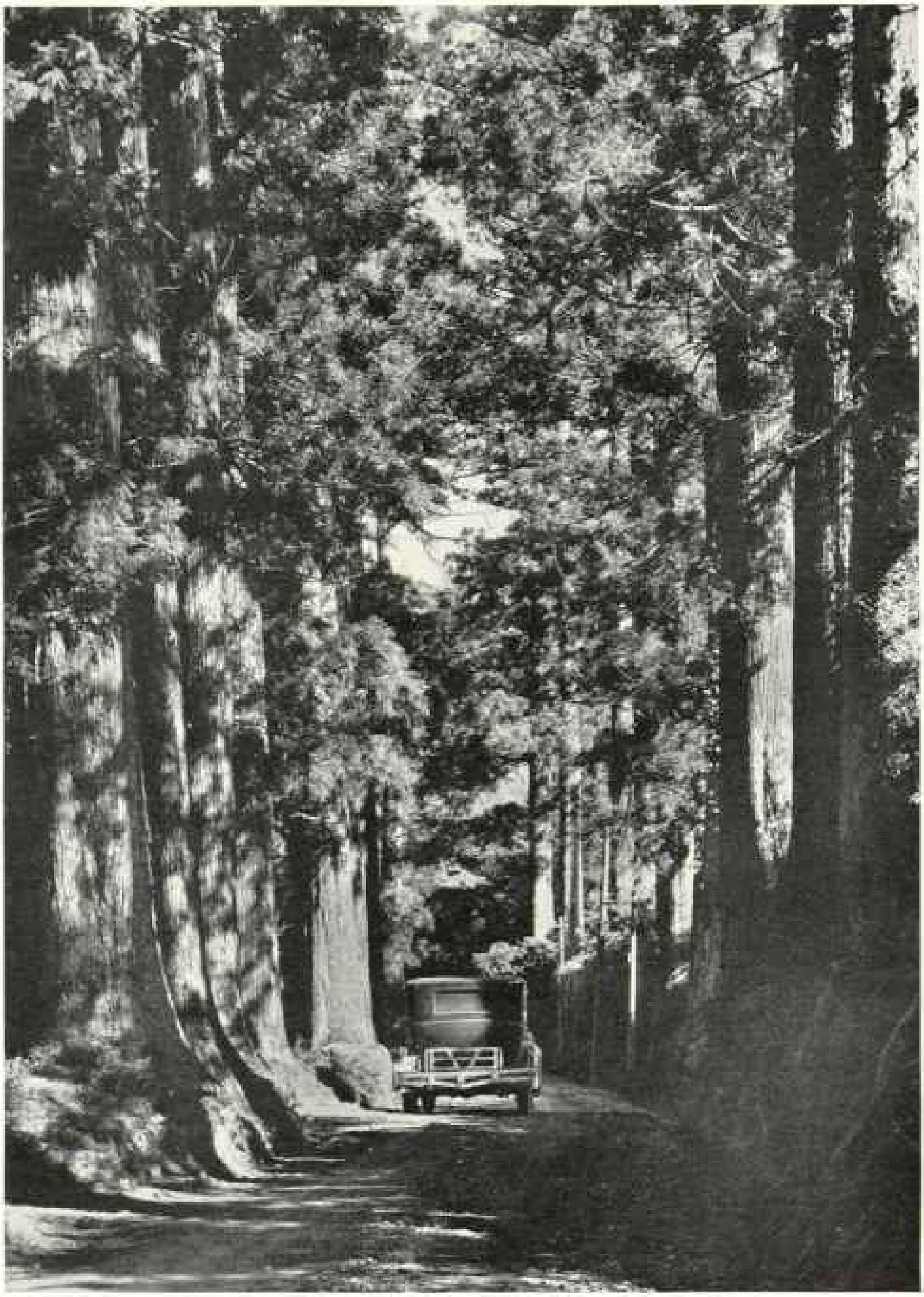
In earlier centuries the absence of external pressure and danger compelled dualism in government. In modern days, with outside stimulus and example, progress must and will be in coöperation with the rest of the world. None discern this more clearly than the Japanese themselves.

They will improve, they have already improved, upon what they borrowed—that is the whole sum and substance of their previous history. They accept nothing without alteration when necessary to suit their needs.

Even modern Christianity, one of the most powerful of all the forces that are making the new Japan, will continue its transforming power. But the final product will not be the Christianity of the West.

The ideal and practice most likely to be accepted by the Japanese of the future will approach very nearly to what Jesus, the Founder, himself taught and lived, though modified by the indestructible inheritances of the Japanese race.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Here in Manchuria," by Lilian Grosvenor Coville, February, 1933.



Photograph by W. Robert Moore

WHERE THE TOKAIDO ROAD TUNNELS THROUGH ROWS OF GIANT CRYPTOMERIAS

Many of the fine old trees, including gnarled pines, that once lined the military highway between Tokyo and Kyoto are still standing. The motor road between these two cities follows much of the route of this old "Via Appia" of Japan. This view was taken between Miyanoshita and Lake Hakone (see text, page 306).

MOTOR TRAILS IN JAPAN

By W. Robert Moore

Author of "Raft Life on the Hwang Ho," "Cosmopolitan Shanghai, Key Seaport of China," "Coronation Days in Addis Ababa," etc., in the National Geographic Magazine

"AH, SO?" replied a friendly Japanese official, his voice rising in extended interrogation, as if he were not quite sure he had heard aright. "You want to travel through Japan by motor?"

I explained further my desires and tentative plans and asked for suggestions.

"Yes, it's possible," he replied, hesitatingly. Then, with a smile playing about the corners of his mouth, "But you won't find the roads like those which stretch across your country."

Throughout our talk his face continued to betray the thought that I was most peculiar not to avail myself of the obviously easier means of transportation, the splendidly efficient, country-wide network of Government and private railways.

RAILROADS THE PRIDE OF JAPAN

Why, indeed, travel by motorcar over the narrow, and often rough, roads in Japan when more than 10,000 miles of railways lace the 86,300 square miles of green-clad mountains and highly cultivated valleys of the island of Honshu alone? Such is the split-second regularity of train service that a passenger, operators boast, need only glance at his time-table at any station to know the exact position of the hands of his watch.

I included thousands of miles of travel on the trains in the course of my visits to several parts of the country, but I also took to the highroads and bypaths and at leisure recorded with the color lens many scenes that the cars would have whisked me past too rapidly.

Naturally, other foreign visitors are asking, as I did, whether it is possible to motor extensively in Japan. It is possible, I discovered, although, it must be confessed, sometimes slightly uncomfortable, to go by automobile throughout the length and breadth of the country. To be sure, many of the roads are true "sunshine roads," which mean woe to him who attempts to travel them during the rainy seasons, when light bridges across flooding streams often become unsafe for heavy traffic or float away entirely; yet motoring at proper times presents only minor difficulties.

Drive with me along that historic Tokaido Road from Yedo (Tokyo) to Kyoto, past Hakone Lake, sacred Fuji, and the East Seacoast. With the sharp autumn air bringing red blood tingling to your cheeks, spiral up to Chuzenji from Nikko along the zigzag road carved on the steep mountain side. Behold there the exquisite panorama of multihued maples. Climb to the mountains that gird the blue waters of Lake Towada, lush in the greenery of summer or aflame with riotous golds and reds of frost-tinted October.

Direct your car out into the country byways when summer rice planting or autumn harvest makes evident the patience and ceaseless industry of rural life. Discover for yourself charming places along the Inland Sea, the Fuji lake district, and elsewhere. If you take one such trip, you will agree that motoring is well worth the effort, even when the roads are in poor repair (see Color Plates II and III).

MOTOR TRAFFIC GROWS APACE

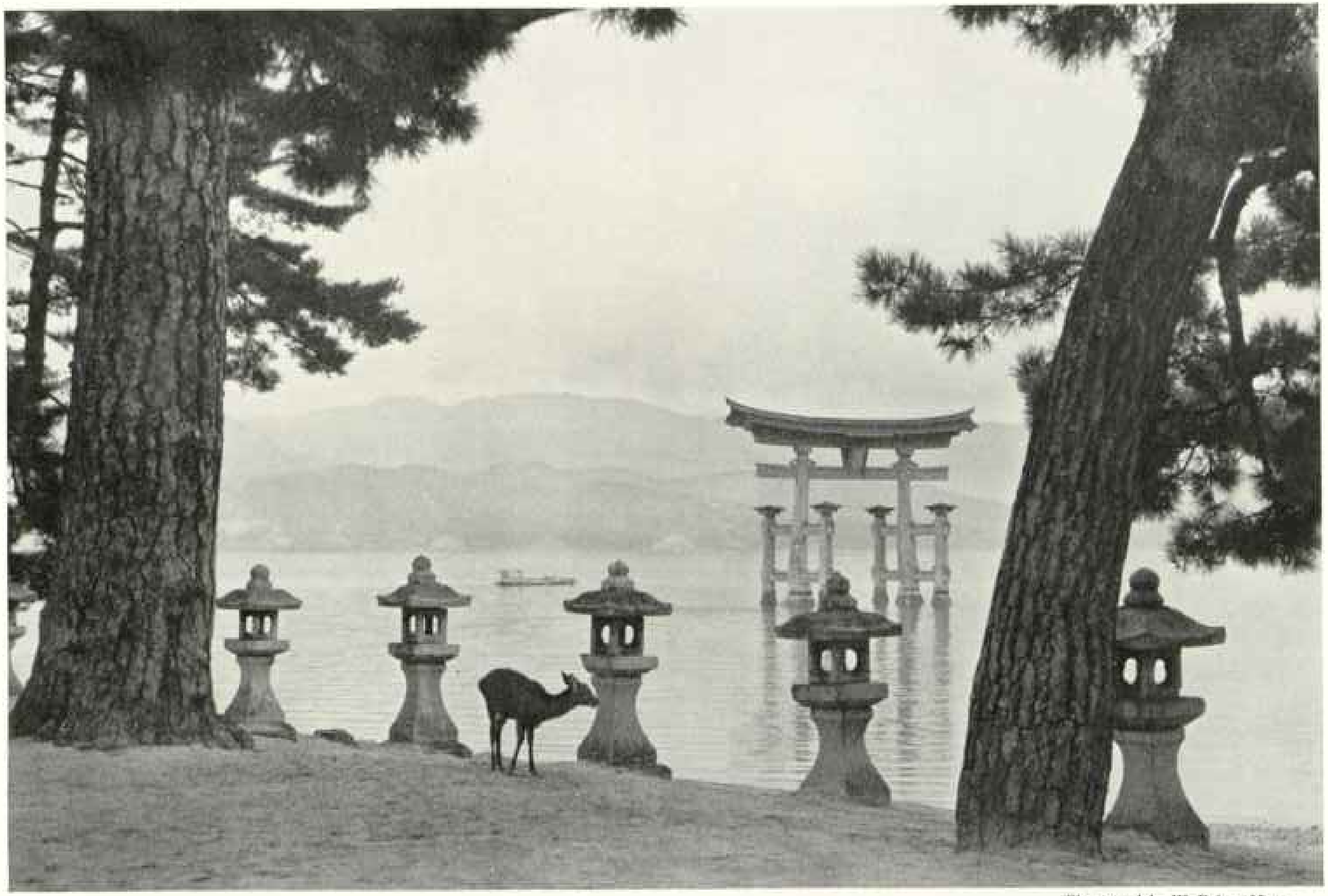
To-day, in Japan, automobile traffic is steadily expanding. If one excepts the innumerable motorcycles and three-wheeled delivery autobicycles that dart about everywhere, and includes only the tiny flyweight cars, the raucous taxicabs that cruise the city streets for 50-*sen* fares (normally about 25 cents), the public and private automobiles, the lumbering trucks, and the long, low 18-passenger buses that overfill the narrow roadways, there are now nearly 70,000 motorized vehicles on Honshu alone, and on the four main islands a total of more than 160,000.

The number of cars already in operation, together with those arriving daily at the docks or taking final shape in locally established assembly plants, is ever a pressing argument for better roads. In the first eleven months of 1932 the United States exported to Japan 2,828 buses and trucks and 2,736 passenger automobiles. The value of automobile parts exported in this same period was $2,348,665.

Every day motors are widening their sphere of activity. Treaded pneumatic tires are leaving patterns in paths which

A PEASANT CONTEMPLATES THE SPLENDOR OF FUJI

The sacred peak dominates Japanese art and literature as positively as it does the landscape of central Honshu. Striking views of it are afforded along the old Tokaido Road skirting Lake Hakone (see text, pages 303 and 306).



Photograph by W. Robert Moore

A SACRED ISLAND WITH A DISTINCTIVE TORII

Miyajima is one of the famous "scenic trio," and formerly every effort was made to prevent birth or death occurring on its soil. The side supports of the torii which fronts the island distinguish it from the usual type. Tame deer wander among the stately pines and stone lanterns lining the water's edge and beg rice cakes from the visitors.

Photograph by W. Robert Moore

BELIEVE THE SIGN; THERE ARE CURVES AHEAD!

On some of the Japanese roads are warnings, such as this at the left, to indicate curves and railway crossings in the road. At present, however, the practice has not been extended throughout the country (see text, page 313).

for ages knew no prints save those of bare or sandal-clad feet. Gasoline fumes now mingle with the dust that rises from roadbeds heretofore powdered and rutted only by the wheels of dog-, bullock-, or man-drawn carts.

The roads are rapidly changing, even the historic old Tokaido from Tokyo to Kyoto, which served Japan as the Via Appia served ancient Rome. It is doubtful whether Ikku Jippensha, the Rabelais of Japan, would recognize many places of the present graded surface along the 53 stages of that military highway. The strips of concrete or asphalt between Tokyo and Yokohama and the small portions now being extended beyond would feel strange to the feet of his two impecunious heroes, whom the author's writing brush sent marching along their ribald path at the beginning of the 19th century, their salty dialogue serving as a lively comic guidebook.

The artist Hiroshige, too, would find that life and activities have changed greatly since he prepared his blocks and produced his 53 exquisite color prints of the picturesque Tokaido artery. To-day he would have to picture people crossing the rivers by means of bridges of concrete and steel rather than by man-propelled rafts and ferries.

PROGRESS LEAVES THE VIEW UNSPOILED

Although the old roadbed that echoed to the hoofs of horses in the grand days of chivalry has been altered, until only cobbled spots between the weathered gnarled pines and stately cryptomerias identify it, the panoramas are as delightful as ever.

Mount Fuji still stands supreme in her winter-whitened mantle or in the blue haze and shroud of cumulus clouds; the rivers still rush down from the purple hills, and the inrolling waves of the Pacific still break along the East Seacoast as in bygone years.

"There is the music of the harp in the pine trees and the sound of the timbrel in the waves; the panting of the carriers is like the sound of flutes, and the stamp of the horses' feet like the boom of the big drum."

If Chomei were to write that portion of his Tokaido diary to-day, he would have to find some additional instrumental similes

Photograph by W. Robert Moore

BETTER DAYS ARE IN PROSPECT FOR THE MOTORIST

Until recently little thought was given to motor traffic on the roads, but new roads are now under construction and others are being widened and improved to keep abreast of the rapid increase of motorized transportation (see text below).

for the exhaust of motors and the blatant sounding of klaxons.

The old Hakone barrier gateway has been gone these 60-odd years. No more do armed sentries there challenge one and demand to see passports and credentials, as in the days when glittering trains of daimios (feudal lords) marched in ceaseless parade back and forth on this route between the courts of the Shogun (Generalissimo) and Emperor. Motor trekkers now stop only if they are interested in examining the age-old site. It is sheer pleasure, however, to loiter along the way and enjoy the surpassing views across the cerulean Hakone Lake, which on calm days mirrors that stately mountain named by the aboriginal Ainus Fuji, the Goddess of Fire.

Not only along the Tokaido, but elsewhere as well, men with picks, shovels, and dump carts are beginning to carve wider and better trails of joy and utility through the Empire.

A wide asphalt and concrete road, which connects the Titan industrial city, Osaka, with the port of Kobe, is in the final stages of construction. And, mind you, "speed cops" are stationed along the way to check up on motorists trying more than the permitted 25 miles an hour!

Thus far, however, motor traffic has grown much in excess of the development of the roads and the education of the people to the innovation that is elbowing its way into the congested thoroughfares.

Persons who have become accustomed to wide macadam highways or spacious boulevards and are inclined to tread rather heavily on accelerators may find travel in Japan somewhat irksome at first. Anxiety and impatience must be left at home; otherwise the nervous strain will destroy all of the pleasures of motor vagabonding. Careful and patient driving is, of necessity, the motorist's watchword on the Japanese highways.

Not only are the roads generally narrow and full of turns, but up and down them passes a multifarious traffic. There is a constant succession of heavily laden bullock carts, bicyclists beyond count, people plodding under ponderous burdens, high-piled carts with dogs straining at leash to assist their perspiring masters to pull them,

Photograph by W. Robert Moore

A COAL CART FORCES THE AUTO TO THE GUTTER

Unused to automobiles, the horses in a row of these carts picked the road as they chose and let the chauffeur look out for himself. The cart driver walks behind his load to push when necessary.

peddlers hawking their wares, trundling horse-drawn wagons, and children—babies playing in the open streets, youngsters going to and from school, hundreds of students on picnic or pilgrimage—children everywhere. And there seems to be little inclination on the part of any of them to share the road.

Probably nowhere else in the world is there such extensive "jay-walking" or such a horde of irresponsible bicyclists.

Squeeze the bulb of your horn repeatedly, then sound your electric klaxon (every motorcar is equipped with both), and still there is little movement in the traffic.

Why there is such slowness to respond to the repeated signals is hard to understand, since courtesy is one of the outstanding traits of the people. Many persons have tried to analyze the problem in the hope of finding a remedy.

Some attribute the apparent attitude that the first on the highway should have a monopoly to the fact that the Japanese have been accustomed to slow traffic for so long that they have not yet learned to understand the greater speeds and the difficulty of suddenly slowing down and stopping a heavy automobile. But in most other countries the reaction is quite the contrary, and there is a natural tendency for the people to flee to the roadsides. It is of course quite obvious why men cannot get heavily loaded carts out of the way quickly on narrow roadbeds, but unfortunately many carters make no effort to draw aside, even where roads are wide.

SPLASHING MUD HURRIES PEDESTRIANS

Other observers believe that the slowness of the people to move is a result of their being unaware of the warning sounds. But certainly, even though chauffeurs in crowded thoroughfares may sound their horns with such frequency that pedestrians' ears become inured to the incessant sound, a warning blast should be heard on a quiet, open road.

Every motorist discovers that the people's auditory nerves function keenly enough on rainy days. When the highways are wet, the most stubborn jay-walkers heed the first warning to get out of the way of splashing mud!

THE AUTHOR'S CAR TRIES TO GO AMPHIBIAN

The chauffeur was forced to the edge of the narrow road upon meeting a truck and the soft shoulder gave away, nearly letting the car in for a ducking in the irrigation canal. It took more than two hours to get it out, with the assistance of about 25 spectators. Bicyclists are soon on hand at any place (see text, page 313).

Photographs by W. Robert Moore

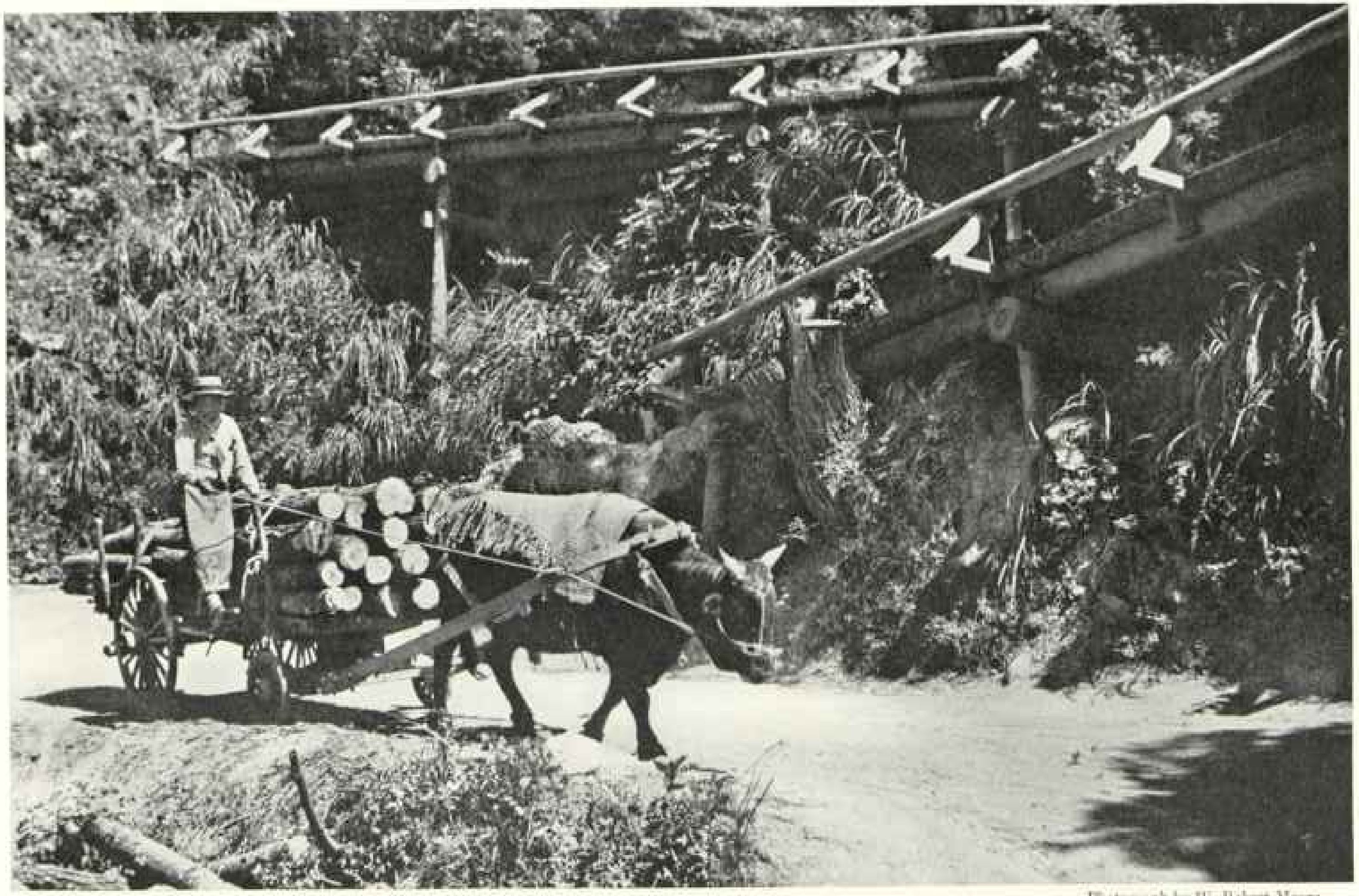
MASTER AND DOG COÖPERATE IN DRAWING LOADS

Throughout central Japan dogs are used to help pull heavily laden two-wheeled carts, bicycles with trailers, and other light conveyances. Sometimes several dogs are employed in this manner.

Photograph by W. Robert Moore

BRAKES, NOT SPEED, ARE THE CHIEF MOTORING REQUISITE HERE

Over part of the mountainous section motorcars descend a series of steep hairpin curves, almost amounting to switchbacks, along a road that is built on wood inclines. This stretch lies along a portion of Japan's main thoroughfare through Shizuoka Prefecture.



Photograph by W. Robert Moore

ROADWAYS BUILT ON STILTS

This photograph was made at the bottom of the same series of hairpin curves shown in the illustration on the opposite page. Bullock wagons add further to the obstacles to motor travel. In Japan bulls are not gelded.

Photograph by W. Robert Moore

"UNTIL YOU HAVE SEEN NIKKO, DO NOT SAY SPLENDID"

So runs a Japanese saying because of the many attractions of art, Nature, and religion in that locality. Two groups of buildings which form the mausoleums for two of the Tokugawa shoguns are considered peerless in the Empire's architectural beauty. A green-robed Shinto priest is standing before an inner gateway of the mausoleum of Ieyasu, first of the Tokugawa shoguns, who died in 1616.

"How many miles we get out of our horn, and not how many miles we get out of our tires, is the question we have in Japan," a motorist resident jokingly remarked to me one day when we were discussing the subject of congestion on the roads and streets.

Give a man or boy a bicycle in Japan, where there are five and three-quarter million bicycles to be reckoned with, and he will dart about with utter abandon, entirely disregarding traffic of all kinds. Consequently, bicycles constitute easily the most serious of motorists' worries. If only the traffic police in the cities would devote to bicyclists a little of the assiduous attention they seem to think necessary in controlling motorcar traffic, the situation would improve. I saw one bicyclist reprimanded the last day I was in Japan. Perhaps clearer roads are in prospect.

Irrespective of facts regarding the right of way, the motor owner usually has, as yet, the heavier responsibility in court in event of a traffic accident.

Congestion and delays that would evoke from Americans floods of vituperation leave the Japanese chauffeur outwardly unperturbed. If he speaks at all, it is probably to ask, with most profuse apologies, if the carter who blocks the road will be so kind as to try to move his vehicle far enough to one side to permit a car to squeeze past. After more apologies for causing inconvenience, the chauffeur expresses his thanks and drives on. It is a rare gift, indeed, this courteous etiquette of chauffeurs.

Fortunately, railroad crossings in Japan represent cause for few accidents, for most of them are guarded with gates or placed where roads make sharp S-curves, which entail slowing down to a minimum speed. Crossings are also marked with signs giving an equivalent warning to "Stop, Look, Listen" for approaching trains.

On many of the roads signs are being placed to warn motorists of dangerous curves, steep descents, and obscure crossroads ahead; but signposts giving directions and distances to different towns are as yet only in Japanese, and some of them apparently are not too illuminating in their information. Even a Japanese chauffeur, unfamiliar with the highway, often has to inquire his way through villages and at the numerous forks in the road.

With the expansion of travel and further development of motor clubs, route markings will no doubt soon come to facilitate the movements of the itinerant motorist. Four automobile associations have been formed already—one in Osaka, two in Yokohama, and one in Tokyo. The last named is the largest and has a membership of more than 300. A motorist's handbook, with detailed maps and descriptions of places and routes, has made a welcome appearance recently in the city bookstalls.

DELIGHTS OF A JAPANESE INN

From personal experience, however, I am inclined to favor venturing forth to take things as they come, without all the sundry details of a perfectly planned itinerary. The unusual and unexpected add spice to any journey.

To roll and jolt along for many hours over some gypsying trail and then to come upon some secluded and unspoiled Japanese inn is one of the unique pleasures of any motoring ramble. It was thus that many of my days in Japan came to a close.

As the visitor draws up to the gateway, the host or hostess and a group of round-faced, kimono-clad *nesans*, or maids, come hurrying from every direction and kneel at either side within the doorway to bow him in and murmur words of welcome. The ceremony gives one the exalted feeling of being a much-honored guest.

As soon as that first requisite of removing shoes and slipping the toes into a pair of heelless slippers has been completed, the guest is escorted down the corridors by one or more of the nesans. Frequently the inn is built around a small garden, with its pool of water, stunted pine trees, and old stone lanterns—a bit of scenic Japan in miniature.

Frail paper doors are slid back, and the visitor is shown the room he is to occupy. A simple and neat place it is. There are plain walls, made up largely of many wide, sliding paper windows; cool rice mats on the floor; a low table; a cushion or two; the *hibachi*, or small charcoal stove; a scroll hanging in its niche; and a spray of flowers tastefully arranged below as only Japanese women have learned the esthetic art of flower arrangement. Every inn or home is much the same, and virtually all are finished in the natural wood.

Photograph by Mrs. J. B. McGovern

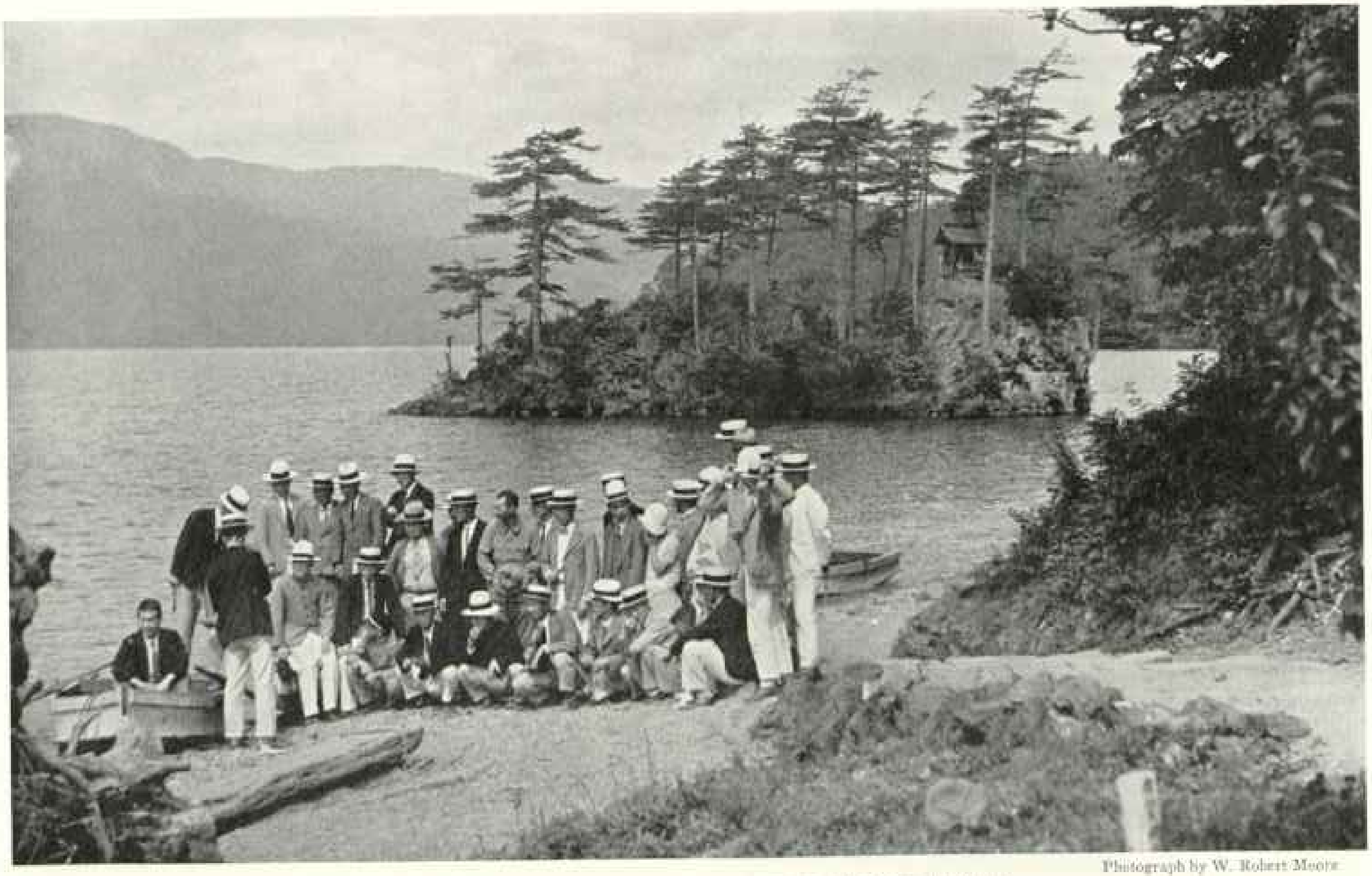
"GOOD NIGHT; PLEASANT DREAMS"

The regulation bed is made up of padded mattresses laid on the floor when the person is ready to retire. The square box, near the resting woman's head, holds the urn containing coals of burning charcoal. It is used for warmth and for heating pots of tea, such as the maid has in her hand (see text, page 313).

Photograph by T. Enami

JAPAN IS A LAND OF FESTIVALS

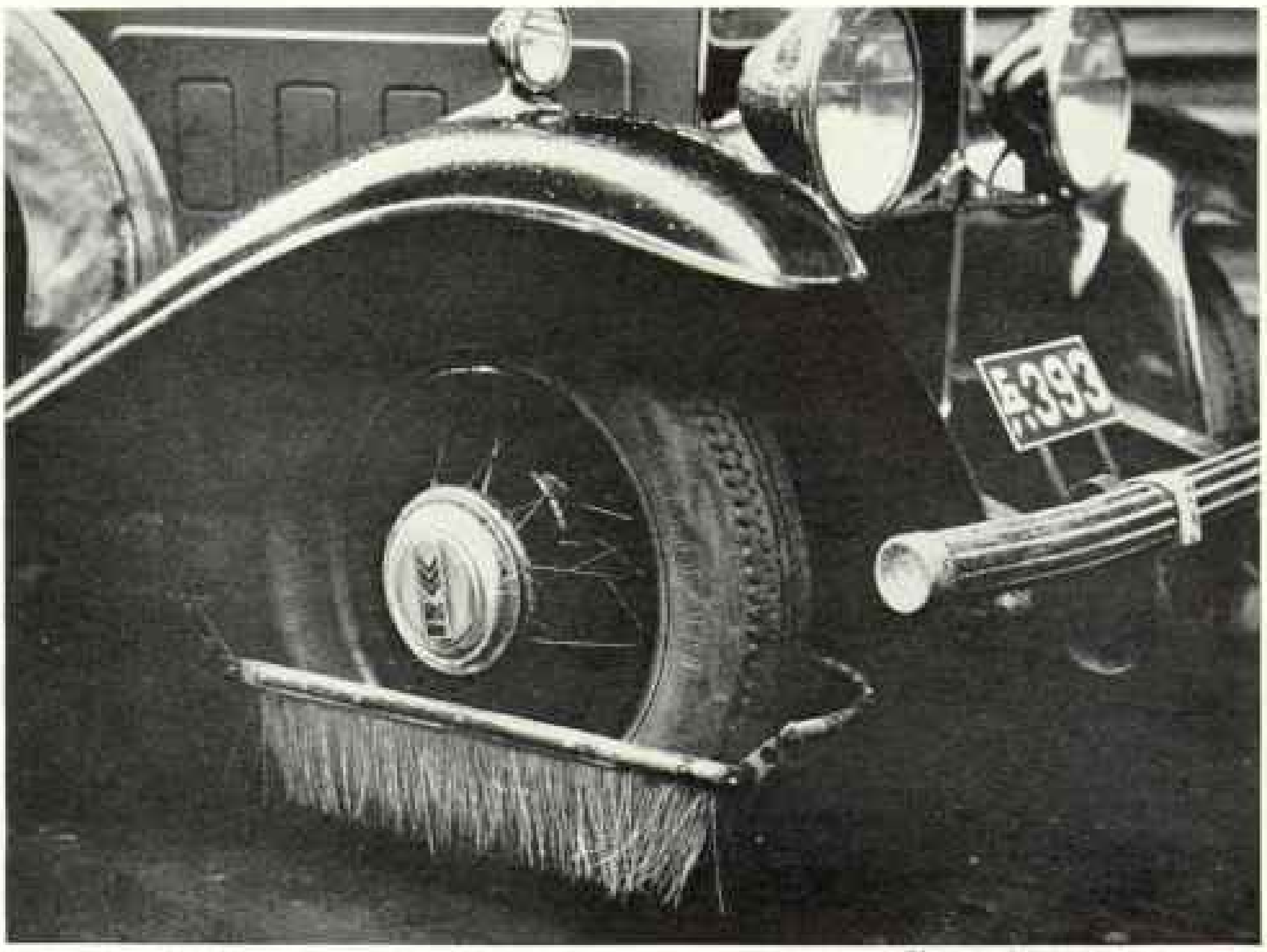
In addition to 12 national celebrations, there are many others of general and local interest. Some of them present great historical and religious pageants, portraying the ceremonies and wearing the rich costumes of bygone centuries (see text, page 317). A gaily decorated car, carrying a group of musicians, being drawn by men through a narrow village street.



Photograph by W. Robert Moore

JAPANESE VACATIONERS ENJOY A HOLIDAY AT LAKE TOWADA

The Japanese are enthusiastic outdoor people; thousands every year visit the scenic places and historic shrines of the country (see text, page 317). Towada, 1,476 feet above sea level, is the largest mountain lake in Japan, occupying an area of about 30 square miles. Its waters are stocked with trout.



Photograph by W. Robert Moore

RAINY DAYS BRING OUT THE "ANTI-SPLASHERS"

Japanese law requires that automobiles be equipped on all four wheels with brushes or sheets of rubber to protect the pedestrians who walk along the narrow streets.

Tea is quickly forthcoming, and one can settle down on the cushions and sip it until time for the event of the evening, the bath.

What assistance guests receive in disrobing and donning the bath kimono! The first experience, be it admitted, is somewhat confusing.

The Japanese bath is a communal affair, but it is hardly so formidable as one might imagine upon first learning that every one at the inn uses the same tank of hot water of an evening. Preliminary soaping and rinsing precede submersion in a sunken wooden tank of water so piping hot that no self-respecting bacteria could exist in it. It was with considerable temerity that I forced myself to enter some of the baths. They turned my skin the color of boiled lobster. Many of the hotter natural sulphur plunges that are so popular with the Japanese were quite beyond my endurance.

After the bath it is customary to lounge about in the informal attire of the dressing kimono and await the arrival of dinner, brought in on low serving tables. Soup, rice, fish, bean curd, a sweet, and some tea constitute for me a truly delicious and satisfying meal. The maid is ever attentive to fill and refill the rice bowl as soon as the chopsticks have cornered the last remaining grains. For any good trencherman three bowls at least are proper.

When the wooden shutters of the inn front are closed for the night, it is usually time for bed. The guest claps his hands, and the maid brings in the *futons*, or padded mattresses, and spreads them upon the floor. A single futon usually suffices for a Japanese, but I was ordinarily pampered with a pile of them, three to six in depth. After looking at my six feet of stature, the maids would fold some at the ends to lengthen the bed a foot or two.

Restful sleep ended, shutters clack, clack in opening; morning ablutions are performed in a row of brass basins; rice and fish and perhaps an omelet are served; the bill and gratuities are settled; there is more bowing, and the traveler is ready for the road again.

Photograph by W. Robert Moore

STILTED CLOGS AND PAPER PARASOLS APPEAR IN RAINY WEATHER

A well-groomed Japanese lady is careful of her delicate soft straw and felt sandals and guts on clogs, sometimes six inches high, to protect them from the water of the street.

The Japanese people themselves do a great deal of traveling, and the larger inns are usually filled with guests. It has always made me wonder to see the large numbers of people using the many lines of communication. Platforms at the railway stations are thronged daily with men, women, and children boarding or leaving the crowded trains. The electric cars and bus lines are equally heavily patronized.

Every temple or sacred place attracts hosts of pilgrims; every noted place of scenic beauty has its crowds of Nature lovers; mountain trails and scenic byways are filled with hikers. With the advent of the motorcar more people are being transported to their favorite spots, with loads in each car that would fill the manufacturers with amazement could they see them.

Extra seats are placed between the fronts and backs of touring cars to make room for additional passengers. To see one of these cars disgorge its occupants brings amazement as to where they all could have found seating space.

Larger bus services have had rapid development, and many well-managed networks have sprung up throughout the country, both in sections remote from the railways and on spur roads connecting with the steam and electric lines. Many operate on fixed time-table schedules.

One company operating in central Japan possesses a fleet of 125 automobiles and buses, some of them low, swift greyhounds, such as those which have found popularity on the highways of the United States.

Late one afternoon, the last of my many joyous days of motor caravaning, when I was anxious to complete the final stage of my Kobe to Shimonoseki journey and desired to make connections with a night express, I came upon a village festival.

The sun, already low, was casting its final shafts of light on the peaks of the autumn-tinted hills. Evening haze had spread its gossamer mantle over the village. A long temple procession, dressed in ancient costumes, marched slowly through the street, bearing colorful banners, cases,

Photograph by W. Robert Moore

FOR NEARLY 700 YEARS THIS COLOSSAL BUDDHA HAS ATTRACTED THRONGS OF DEVOTEES

The bronze meditative Daibutsu at Kamakura is a representation of Amida. It was cast in plates about one inch thick. The height is 49 feet 7 inches, and the circumference is more than 97 feet. The boss in the center of the forehead contains 30 pounds of pure silver.

and tributary gifts, as did the famous old daimio trains in their heyday. A high personage, representing the daimio, was riding a prancing charger at the rear.

Thousands of people had gathered from near and far over the countryside and were massed along the sides of the long, narrow street that wound through the village. Further decreasing the width of the route, gaily decorated booths had been erected along the entire front of the shops to display the myriad souvenirs, toys, staple products, and gewgaws common to fairs the world over.

For an hour or more I crept along at snail pace or stood waiting behind the procession, as I made my way through the milling throng along that slender highroad.

I felt the need of haste, yet I appreciated the opportunity provided to see close at hand the people enjoying the full spirit of carnival and the reenactment of the splendid old daimio procession.

What a jarring contrast my modern motorcar must have presented in the narrow streets of that celebrating village, among lantern bearers, flutists, chanting burden carriers, and chargers in a daimio train. It was an anachronism on a page torn from the historic story of yesteryear.

THE POLAND OF THE PRESENT

By Maynard Owen Williams, Litt. D.

Author of "Struggling Poland," "Russia's Orphan Race," "Latvia, Home of the Letts," etc., etc., in the National Geographic Magazine

EVER since reborn Poland assumed the responsibilities of a sovereign State, with the Polish Corridor holding the limelight while a dozen other corridors are ignored, the Polish Republic has largely been considered in the light of a vanished past or a problematical future rather than of a vital and engrossing present.

Even before world economic conditions clouded the issue, Poland had made substantial strides toward materializing the air castles its people had cherished for so long.

On war-wasted territory stretching over the ancient forest area from marshland to mountains, Poland brought agriculture back beyond pre-war levels. Factories which it found destroyed or idle were rehabilitated. Railway mileage was increased and a uniform gauge adopted, so that rails bound Poland together instead of tearing it apart.

President Wilson championed Poland's aspiration for independence, and the United States Government loaned funds for the purchase of food, clothing, and supplies which were essential in the early stages of national rehabilitation.

More densely populated than Pennsylvania, Poland is still an agricultural nation, and the consequent elasticity of its labor supply, the economic independence of its peasants, and the modesty of their needs give it social stability in spite of the rapid growth of urban and industrial life.

"Without the sea and the seacoast ('bez morza i Pomorza'), there is no Poland," has proved a potent slogan. Last summer, at Gdynia, a city of more than 30,000, so new as to be shown only on the most recent maps, Poland celebrated its first "sea festival" near where General Haller, after fighting his way to the Baltic, dropped a ring in its waters to celebrate the union of land and sea.

Where eight years ago I waded in deep sand, dodging the wind-shaken, weblike nets, seeking "types" in upended boat-halves converted into shelters, or watching women bury potatoes in straw-lined sand pits for the winter, there are city streets and five-story buildings. Gdynia, with a port that can accommodate fifty vessels at a time, now handles more than five million tons of exports and imports in a single year (see illustrations, pages 320, 322, 323, and 324).

Near-by Danzig, eight times as populous and once one of the great ports of the Hanseatic League—which in its golden day virtually controlled the trade routes of northern Europe—far from being wiped out through this new rivalry, now handles eight million tons, four times the pre-war tonnage, and the largest traffic in its history. Among Baltic and North Sea ports, Danzig's tonnage is exceeded only by that of Hamburg, Bremen, Copenhagen, and Stockholm. The Vistula River system drains most of Poland, and Vistula-bound traffic passes to or through Danzig before reaching the sea.

RAILWAY IS KEY TO ECONOMIC FREEDOM

But it is Gdynia which gives significance to the "Polish Corridor" foreshadowed in the thirteenth of President Wilson's famous Fourteen Points. And the new railway from Upper Silesia to the Baltic, avoiding the Free City of Danzig, assures Poland's economic freedom.

France has cooperated in financing the railway, and Swiss financiers extended a loan of $2,500,000 to the city of Gdynia.

A Polish naval base on Polish soil could have been foreseen, but politicians fourteen years ago never dreamed of Gdynia. Now there it is, one of the best-equipped ports on the Baltic, and Polish emigrants to North America embark there, direct from Polish soil, instead of at other European ports which their predecessors once helped make prosperous.

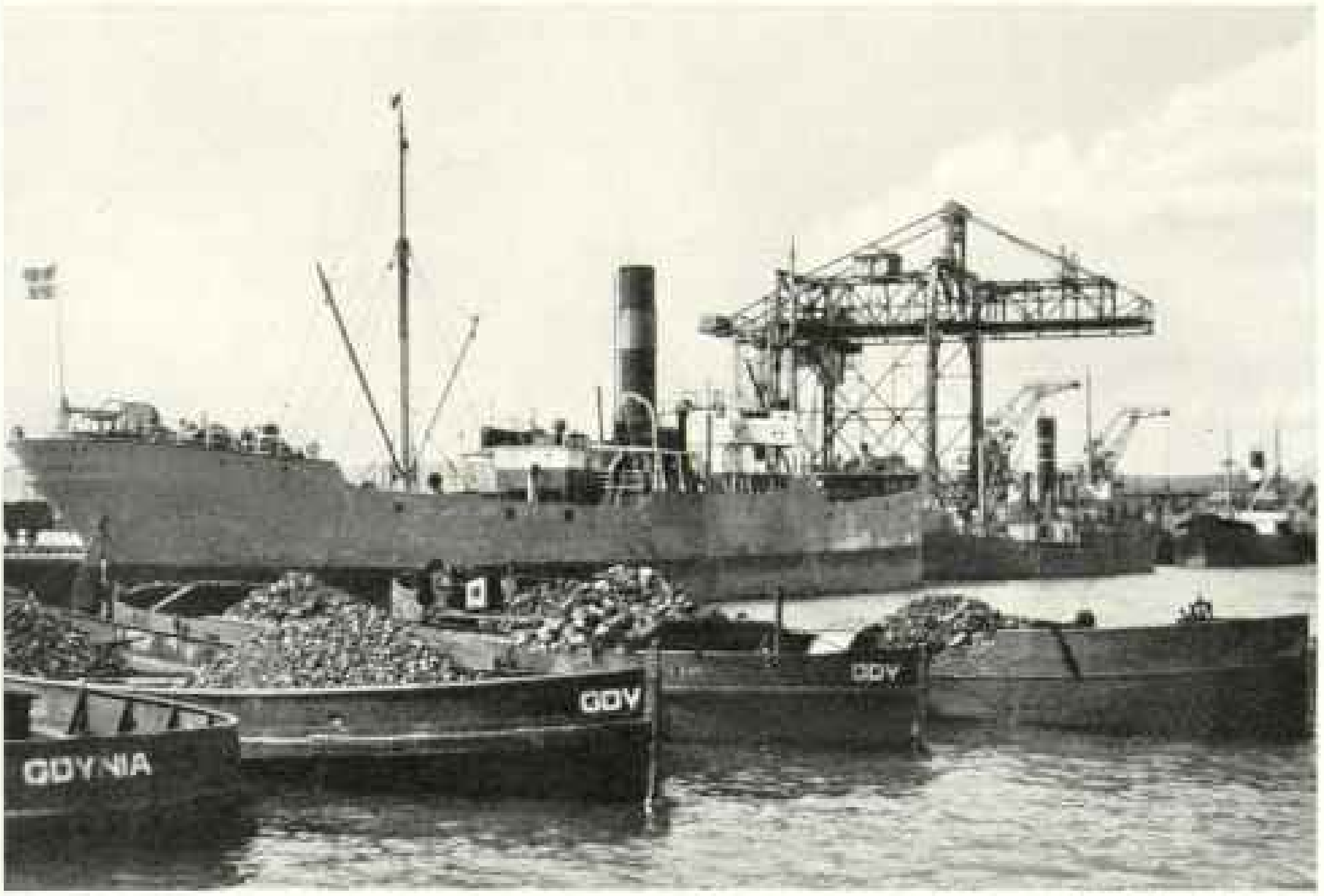
During the days when Poland was divided, the trade of the Vistula basin was originally diverted to or through Russian, German, and Austrian lands. Under such conditions, the once rich city of Danzig not only failed to serve the vast region drained by the ubiquitous Vistula across whose mouth it stands, but its own commerce dwindled away.

Five-eighths of all Polish trade, moving through the ports of Danzig and Gdynia,

Photograph from Wide World

POLAND'S RAILWAY OUTLET TO THE SEA

Gdynia Station typifies the country's ambition for an all-Polish rail route through the Polish Corridor. In addition to freight shipments, passenger ships now run to England, France, and to North and South America (see text, page 324).



Photograph by Ewing Galloway

COAL IS A MAJOR EXPORT OF GDYNIA

A special basin between the passenger pier and the coal pier is designed for handling a rapidly increased tonnage of bituminous coal, of which Poland has shipped out more than three million tons in a single year.

VENDERS GATHER AROUND A STATUE TO A POLISH POET

Fruit, soft drinks, newspapers, and cigarettes are sold from kiosks or portable stands, located at places of heaviest pedestrian traffic in Warsaw. Adam Mickiewicz, Poland's popular poet, was long a professor in Lausanne and Paris.

Photographs by Maynard Owen Williams

A PEASANT LAD ENJOYS WARSAW'S CUISINE

While his mother serves a customer, this bright-eyed lad looks to his own interests and exemplifies Napoleon's famous comment that "Warsaw is always amusing" (see text, page 337). A scene in the Square of the Three Crosses, which really has two.

Photograph by Henryk Poddebski

THE PROMENADE OF POLAND'S COMMERCIAL PORT

South of the busy basins and forest of cranes of the seaport of Gdynia a recreation center stretches past the small yacht harbor and the beaches and pavilions of Gdynia's bathing-resort section.

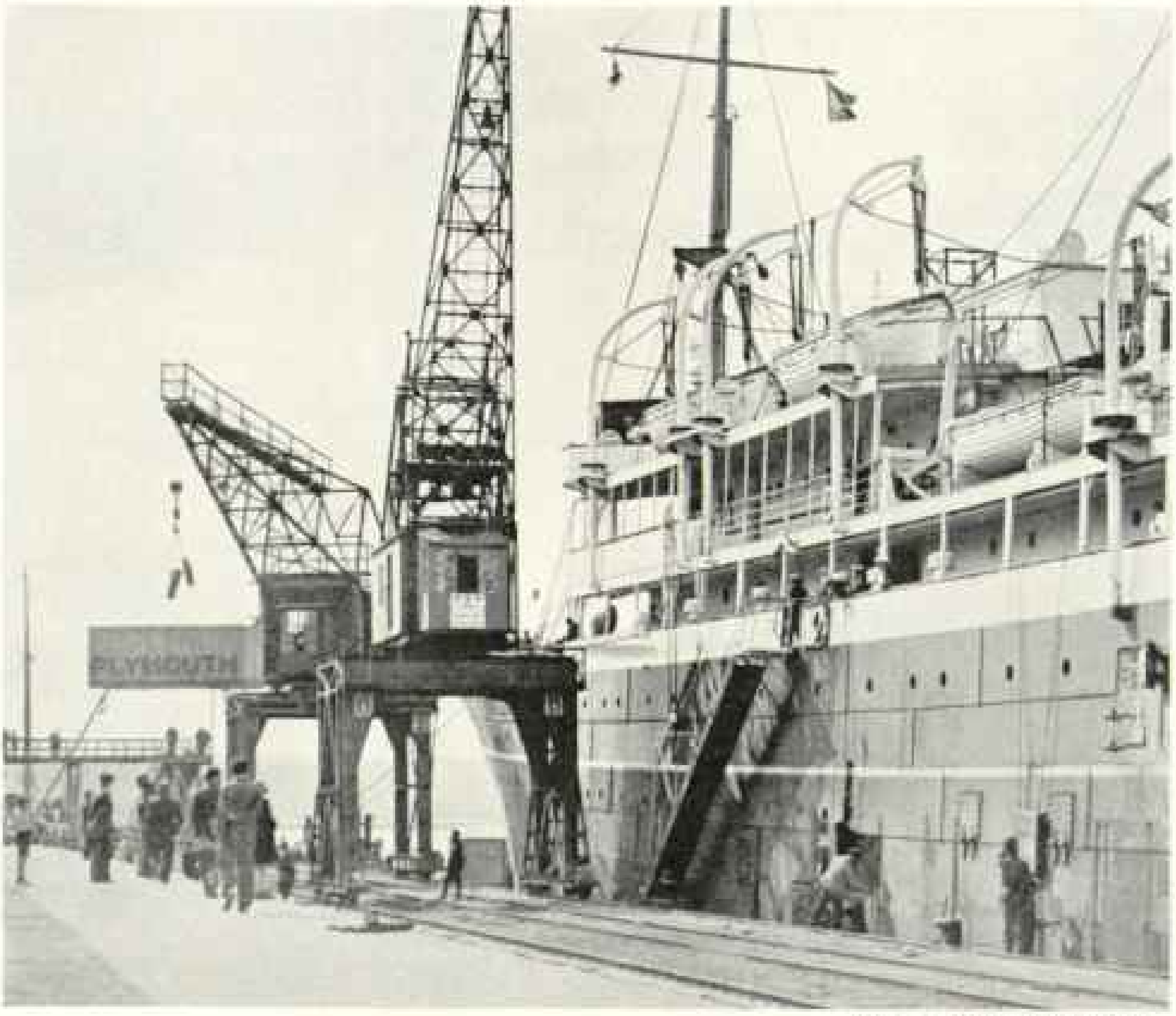
Photograph by Maynard Owen Williams

ONLY A WIND-SWEPT BEACH WHERE A CITY NOW STANDS

More than 30,000 people now live where a few Kashube fishermen formerly dried their nets and stored them in upended boat-halves. On the right is the headland, to the south of the present city of Gdynia, from which the view below was taken, facing across the area shown in this photograph.

Photograph from Wide World

POLAND'S MADE-TO-ORDER CITY AND PORT AS IT APPEARS TO-DAY (SEE ABOVE)



Photograph from Wide World

UNLOADING HEAVY FREIGHT DIRECT ON A GDYNIA PIER

An American automobile is virtually ready to take to the road when uncrated. Around fine, large basins are many wharves whose names suggest the reach of Poland's sea trade. There are Norwegian, Polish, French, Belgian, Dutch, Spanish, Swedish, and English wharves, and one, best equipped with railway tracks, was named for a former President of the United States, the Woodrow Wilson Wharf.

creates a north-and-south traffic in the Polish Corridor seven times as heavy as the east-and-west commerce, although much trade between Germany and Soviet Russia is diverted across the corridor and through East Prussia and Lithuania, away from the heart of Poland.

PORT A SYMBOL OF POLAND'S DESTINY

Recently iron ore and cotton for Czechoslovakia entered through Gdynia, thus providing return loads for coal cars from the south. One ship from New Orleans unloaded 7,350 bales of American cotton in a single day.

Naturally, the Poles hold the Polish Corridor to be essential to their very existence. Mr. Eugène Kwiatkawski, builder of the new port, was cheered loud and long during his address at last summer's sea festival when he said: "Our ancestors did not come to this Polish shore either as guests or immigrants; they did not here establish themselves by the grace or through the protection of anyone; here we stand on our own soil, rooted in our own past, ofttimes heroic and victorious, sometimes cruel and bitter. Here we will remain and achieve our destiny."

Sheltered from Baltic storms by the sand spit of Hel, Gdynia, although an artificial port, is well protected and capable of almost unlimited expansion. A school for the merchant marine, a huge modern post office, through which all possible foreign mail is routed, and the shipping offices

Photograph by Maynard Owen Williams

LATE COMERS KNEELING OUTSIDE THE ABBEY CHURCH AT ŁOWICZ

The headshawls, often deeply fringed, are made of brocaded silk, or silk and wool. The tight-fitting bodices are usually a thin material with a sheen. Some, like the central woman in this picture, wear colorful ribbons. The real glory of the costume is the wide, stiff skirt of thick, coarsely woven wool and heavy apron of contrasting tones (see Color Plates I, V, VII, and VIII).

connected with Poland's growing fleet are prominent along the shore. Modern machinery is used in transshipping the exports, principally coal, lumber, zinc, bacon, eggs, sugar, and butter, and the imports of foodstuffs, cotton, metals, and machines.

To the photographer the Gdynia of today is less picturesque than the barren, breezy beach dotted with Kashube fisher folk, and the real treat for eye and lens is Łowicz, color capital of peasant Poland.* Sunday after Sunday I went back there, for no lens hunter was ever tempted by finer promises of photographic game. But autumn had brought its clouds and cold and the bright summer dress had been laid aside. Wrapped in long homespun cloaks, the girls evidently regretted being pictured in anything but their fair-weather finery.

To be chosen from the ever-moving ranks of women in spotless kerchiefs, rainbow skirts billowing wide over heavy petticoats and high-laced boots might be an honor, however awkwardly phrased by the eager photographer, but to accept the invitation was to subject oneself to the jollying which familiar friends can make most embarrassing in the presence of strangers.

There is no lack of cordiality as the bright parade leaves the abbey church. These broad-faced women of the fields gaily smile into the lens so long as they can keep moving and hence not reveal any

* See "Struggling Poland," by Maynard Owen Williams, in the NATIONAL GEOGRAPHIC MAGAZINE for August, 1926.

Photograph by Maynard Owen Williams

IN LUMBERING, POLAND IS EUROPE'S STATE OF MAINE

Logs are floating down the Vilija River, past Wilno (Vilna), and for a mile below the city the banks are lined with rafts and lumberyards. The bridge in the background is a link in projecting what once was the Georgievski Prospekt, a name abandoned with the divorce of Wilno from Russia. Poland, which was once a vast forest area, still has 20,000,000 acres of forest land, a third of which belongs to the State.

individual vanity concerning their unquestioned attraction. But the color plate is a slow, jealous worker and demands undivided attention.

Hans Hildenbrand's color plates represent skill and infinite patience. Even the summer sun could not give such vivid reflections of peasant splendor were it not for friendliness and tact.

PEASANT MAID ADMINISTERS A REGAL REPROOF

How well I remember the mistake which ruined one of my days at Lowicz. I had a city-bred interpreter, all too conscious of his fancied superiority to country folk. Across the cobbled square came a girl of nineteen, so magnificently beautiful that even broad sleeves and bulky short skirt could not make her look dumpy. Around her neck she wore such amber as the adventurous Phoenicians sought along the far Baltic coasts and her eyes were so frank as to betray my cicerone to our common failure.

Before such a peasant queen this nondescript citizen should at least have blushed. Instead, he stood ten feet away and called to her, "Hey, you! C'mon over here and give us a picture!" These might not have been the words, but they suggest the spirit. No sooner had he spoken than I knew our day was done. I could have censured him, but after the devastating, yet dignified, look that towering damsel gave him, there was little left to censure.

Photograph from Wide World

THE WOODROW WILSON MONUMENT AT POZNAŃ (POSEN)

Unveiled on the Fourth of July, 1931, in the presence of Mrs. Wilson, this statue by Gutzon Borglum (standing at the base) is a memorial to a powerful friend of Polish freedom. One of President Wilson's famous "Fourteen Points" urged restoration of Poland's sovereignty and stipulated that the Nation have an outlet to the sea (see text, page 319). In front of the monument is a stone platform upon which the map of Poland is outlined.

The force of character of Polish peasant women is well portrayed by Reymont, and I owe one of my own photographs, taken without benefit of a cicerone, to the independence of a spirited maiden, aroused by tactless objection on the part of her swain.

Dressed in homespun in which at least a dozen tints were arranged in such stripes as suggest the narrow fields of the poorer peasants, this blonde young woman was a pleasing sight. Her natural self-reliance was seconded by that of a flashing-eyed brunette who evidently felt that the recording of such holiday finery could do no harm to anyone. A circular rainbow quickly formed about our group and when the jealous swain tried to remove his girl from so conspicuous a position, he committed the fault of opposing the force of Slavic womanhood with the authority of mere man.

The outcome was inevitable. However little interest these two bucolic beauties had in me, they refused to be humbled before a crowd of witnesses. The brawny peasant, clad in a flat-brimmed hat, broadcloth coat, orange-and-black-striped trousers, and heavy top boots, was quickly ejected, and with keen amusement in their eyes, blonde and brunette turned to me and in unmistakable language invited me to "shoot" (see page 342).

Except on Sundays, Lowicz lacks interest, and my favorite village was the tiny hamlet of Popów, one dusty street flanked by high trees and thatched huts, whose in-

habitants at first preferred to stare at me through glass. On a second visit I provided myself with chocolate, a great luxury in those days of deflated currency, and I now remember Popów as one of the friendliest of places (Color Plates IV, VI).

Suppose a stranger wandered into your tiny village eager to photograph your home life and children. Speaking a strange language and carrying all sorts of mysterious equipment, he would doubtless arouse more curiosity than coöperation. That is a situation the wandering photographer must frequently face.

At Popów a black cat crossed my path. Cats add human interest to many a picture. No child would face the lens, but this white-nosed pussy blinked green eyes at me in utter confidence. So I used the cat as bait, adding chocolate as soon as the youngsters came within reaching distance.

When the cat tired of attention a lad of eight or ten captured it, and, little realizing how small a place the cat played in my plans, held it for me while a tow-headed little girl in head-shawl and apron looked on.

Seldom do I let anyone touch my camera case, but that young lad quietly adopted me, and so well chosen were the places he found for it and so carefully did he handle it that I let him do this proud work, causing him deep but pleasurable embarrassment from time to time by giving him another bit of chocolate. Yes, Popów is another of those welcome oases to which the lone traveler looks back with pleasure. Hospitality was showered upon me in Poland, but that of Popów was the disinterested gift of a black cat (see illustration, page 339).

VILLAGE DANCE IS VIVID DRAMA

Out in the street, one Sunday, there was a village dance. Bright costumes were worn, but the women had laid aside their laced boots and whirled in the deep dust with bare feet. Reymont,* portraitist of the Łowicz region, vividly pictures its peasant dances:

"The musicians had struck up for the greatest performance of all; and forward now came the dancers, and the trampling of many feet was heard. They crowded thickly, couple close to couple, cheek by jowl, moving ever more swiftly as the dance went on. Capotes flew open and flapped wide, heels stamped, hats waved, now and then a snatch of song burst forth, the girls hummed the burden, 'da dana,' and tore on more quickly still, and swayed in measure in the mighty, swirling, headlong rush! No one could any longer distinguish his neighbor in the throng; and when the violins burst forth in quick, sharp volleys of clean-cut, separate notes, a hundred feet echoed on the floor at once, a hundred mouths gave tongue, a hundred dancers, seized as by a cyclone, whirled round and round; and the rustling of capotes, skirts, kerchiefs waving about the room, was like the flight of a flock of many-colored birds.

THE GEOGRAPHY OF RHYTHM

"Those Cracoviennes, with their frolicsome hop-skip-and-jump measures, and the quick lilt of their clean-cut, tinkling, metallic tunes; and the terse ditties, full of fun and freedom, with which, like the spangled girdles of the peasantry who made them, they are so brightly studded.

"And those Mazurs, long-drawn-out as the paths which streak the endless plains, wind-clamorous and vast as the endless plains they streak; lowly, yet heaven-kissing; melancholy and bold, magnificent and somber, stately and fierce; genial, warlike, full of discordances, like that peasants' nature, set in battle array, united as a forest and rushing to dance with such joyful clamors and wonderful strength as could attack and overcome ten times their number.

"And, oh, those Obertases!—short of rhythm, vertiginous, wild and frantic, warlike and amorous, full of excitement mingled with dreamy languor and notes of sorrow; throbbing with hot blood, brimming over with geniality and kindliness, in a sudden hailstorm; affectionate voices, dark-blue glances, springtime breezes, and fragrant wafts from blossoming orchards, like the song of fields in the young year; making tears and laughter to burst forth at the same time, and the heart to utter its lay of joy, and the longing soul to go beyond the vast fields around her, beyond the far-off forests, and soar, dreaming, into the world of All Things, and sing ecstatically the burden, 'Oy dana dana!'"

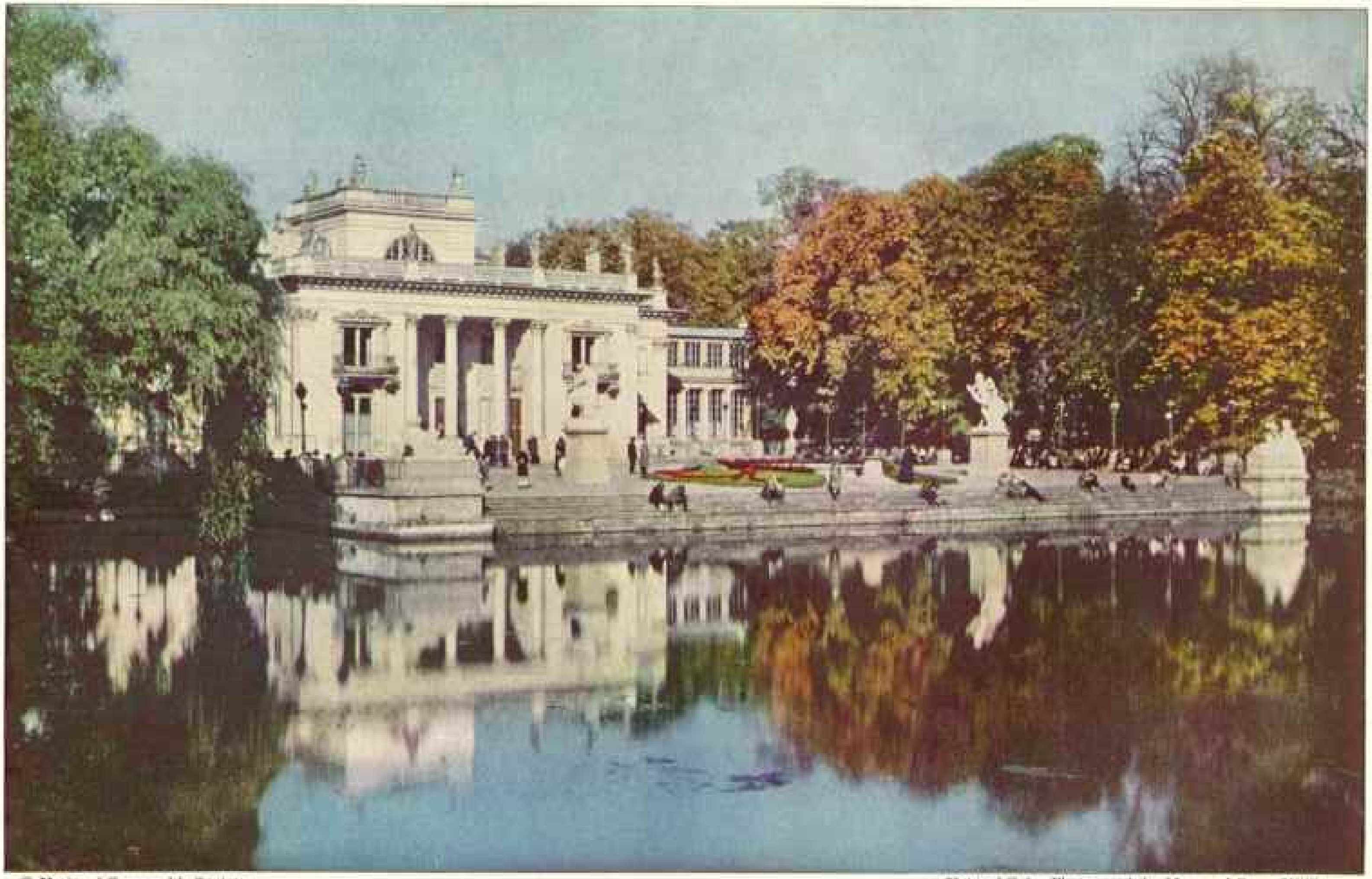
The stately polonaise, set to music by great composers, is the dance of the aristocracy, of huge country estates, of palace

* "The Peasants," by Ladislas Reymont. Alfred A. Knopf, publisher.

 Natural Color Photograph by Hans Hildenbrand

A BRIDE AND BRIDEGROOM OF LOWICZ

"Her striped skirt of rainbow tints; her black highlows, laced up to the dainty white stockings; her corset of velvet, and strings of amber round her throat"—so Ladislas Reymont, Polish Nobel Prize novelist, describes a bridal dress in "The Peasants."



Natural Color Photograph by Maynard Owen Williams

AUTUMN TINTS AROUND THE LAZIENKI PALACE IN WARSZAWA (WARSAW)

This former imperial château, the Versailles of Poland, was decorated under the personal direction of King Stanislaus Augustus, who reigned at the time of the American Revolution. It was set in a pleasure park, provided with a sylvan theater, and was surrounded by villas where guests were lodged.

Natural Color Photograph by Hans Hildenbrand

MOUNTAIN DRESS NEAR ZAKOPANE IN THE HIGH TATRY

Although Poles form nearly three-fourths of the newly united Republic's 32 million population, there is a wide variety of types, costumes, architecture and traditions. The mountaineers of Poland are taller and have bolder features than the plainsmen.

 Natural Color Photograph by Hans Hildenbrand

GEESE "LIKE WHITE SNOWFLAKES" DOT THE POLISH PLAINS

A few miles from Lowicz, color capital of the Land of the White Eagle, thatched homes of Popów flank the one long, dusty street. Out in the fields, goose girls in vivid dress are always seen with their charges, for in the Polish plain fences are almost unknown.

"ALL DRESSED UP IN THEIR SUNDAY CLOTHES"

The abbey church at Lowicz is the focus of bright parades from the surrounding villages. After morning service the country women ride or tramp home with bare feet.

 Natural Color Photographs by Hans Hildenbrand

REAPERS OF TOO-ABUNDANT GRAIN NEAR KUTNO

The low price of grain works hardship on agricultural Poland as on other parts of the world. But the small requirements and great resisting power of these homespun-clad reapers spare them from some of the dire effects of a world economic crisis.

A THATCH-ROOFED TREASURE CHEST OF POPÓW

Poland's rural homes are museums of peasant art and handicrafts. Crowded, and sometimes shared with domestic animals, these humble homes are centers of individual taste and skill in creating textiles, embroideries, and utensils of distinction and beauty (see Color Plate IV).

 Natural Color Photographs by Hans Hildenbrand

WHITE CAPOTES AND STRIPED TROUSERS OF ZDUNY

Peasant dress does not suggest such fire and gay spirits as the Poles show in their dances and holiday gatherings. Boot-heels stamp out wild rhythms, long coat-tails bell out in whirling dances, orange and black-striped trousers move like pistons to the mad measure of violin and lusty song.

WILD STRAWBERRIES FROM THE TATRY MOUNTAINS

On the hillsides of southern Poland near the Czechoslovak boundary are many wild strawberries which peasant children gather and red-kerchiefed women bring to the resort hotels or peddle in open-air markets like this one at Gorlice, formerly under the rule of Austria.

 Natural Color Photographs by Hans Hildenbrand

WORKADAY DRESS IN LOWICZ MARKET PLACE

Trade and barter bring peasants but no gala attire to Lowicz, Poland's mecca for visitors in search of local color. Second-best rainbow aprons and cloaks being worn, the week-day assemblies lack the brilliant display and festive atmosphere of religious holidays.

 Natural Color Photograph by Hans Hildenbrand

GOLD-CROWNED PEASANT GIRLS OF ŁOWICZ

Yagna, heroine in Reymont's "The Peasants" (see Color Plate I), wore a kerchief which "was like a glorious aureole over her light flaxen tresses and made the deep azure of her eyes shine with the joy of it." In the fields the kerchief covers more of the face. Low slippers are displacing the high laced boots, even in the rural districts.

floors polished like mirrors for glistening shoulders and brilliant uniforms. Its tempo is that of manly bow and graceful curtsy rather than the heavy pounding of peasant boots.

Just as rainbow-dresses spring from humble thatch-roofed hamlets circled about Łowicz, so the spirit and gaiety of the city-bred Pole springs from the somber background of the Polish capital.

THE SOLEMN DIGNITY OF WARSAW

Beautified by splendid parks and gardens, furnished with wide avenues and broken by large squares, across which the massive piles of Warszawa (Warsaw) rise in solemn dignity, the Polish capital always seemed to me a dull background for the irrepressible Polish spirit; yet one can still say, as did Napoleon, "Warsaw is always amusing."

Never will I forget the quick cadences and exotic musical intervals of a gypsy band in a gay restaurant not far from Theater Square, but even the most agile measures seem to lag behind the spirited conversation and joyous repartee which enliven Warsaw's restaurants. The aristocratic country life, reminding one of plantation days in our own South, is now rare, but stolid Warsaw is still enlivened by the personal charm of the cultured Pole.

Until one has seen the Polish theater he does not realize the variety and beauty of the modern stage. Poland's romantic poets and dramatists of eighty years ago, such as Adam Mickiewicz, Zygmunt Krasinski, and Juljusz Slowacki, either wrote in exile or were subject to a stifling censorship.

True, to the Poles themselves even strictly censored dramas were packed with thrills, for behind innocuous allegories they sensed the rebellion of the Polish spirit against oppression. But with the coming of freedom Polish drama developed a catholicity of interest and dramatic method unsurpassed in modern Europe.

"Street Scene," "Broadway," and "Anna Christie" have all been admirably presented in Poland, and there is a keen interest in all things American.

Partly this is due to the presence of many Poles in America, but much of it dates back to the days of our Revolution, in which the Poles took a keen interest and in some cases a personal part. To-day one can telephone to Poland from any city in the United States, but in the days of the Thirteen Colonies the American Revolution was physically far away and England ruled the seas.

Poland not only observed the Washington Bicentennial in Poland, but also, on May 3, Polish national holiday and anniversary of the premature Constitution of 1791, praised by Edmund Burke, Poland issued a 30-groszy stamp picturing Washington in the center between Kosciuszko and Pulaski.

In Washington, set amid the huge new structures flanking Pennsylvania Avenue, Casimir Pulaski, clad in the picturesque uniform of the Polish Hussars, sits astride his spirited mount. In Lafayette Square the statue of Kosciuszko occupies a place comparable to that of Von Steuben, Rochambeau, and Lafayette (page 340).

In most modern cities monuments are taken as a matter of course, but Lafayette Square is distinguished by its four statues of foreign friends of freedom. Kosciuszko's real monument was a national tribute, for it is a huge mound at Kraków, built of the good earth of Poland, brought there in the flowing sleeves and multicolored aprons of countless Polish peasants (see page 341).*

President Hoover's much-appreciated efforts in Polish relief were memorialized in a modernistic monument in the Polish capital, and a Gutzon Borglum statue of Woodrow Wilson, presented by Ignace Jan Paderewski, was unveiled on July 4, 1931, at Poznań (Posen), where the National Exposition occupied a part of Woodrow Wilson Park (see page 327).

Nearly a century and a half after Kosciuszko, officer in Washington's Army, made his famous crayon sketch of the Battle of Saratoga, American youth, under the leadership of Lieut. Col. Merian C. Cooper, sought a place in the Kosciuszko Squadron, with headquarters at Lwów (Lemberg). On Decoration Day Lwów decorates the graves of Edmund Graves, Arthur H. Kelly, and T. V. McCallum, "American Heroes Who Gave Their Lives for Poland, 1919-1920," and "The Aviator," standing atop the white pillar in the Square of the Union-of-Lublin, in Warsaw, had nearly a score of gallant

* See "Poland, Land of the White Eagle," by Melville Bell Grosvenor, in the NATIONAL GEOGRAPHIC MAGAZINE for April, 1932.

Photograph by Hans Hildenbrand

A CORPUS CHRISTI PROCESSION IN ŁOWICZ

The rich pageantry of this festival in medieval times was associated with the performances of miracle plays by members of the craft guilds. To-day it is observed by a procession of peasants in colorful and historic costumes (see Color Plates V and VIII).

Photograph by Hans Hildenbrand

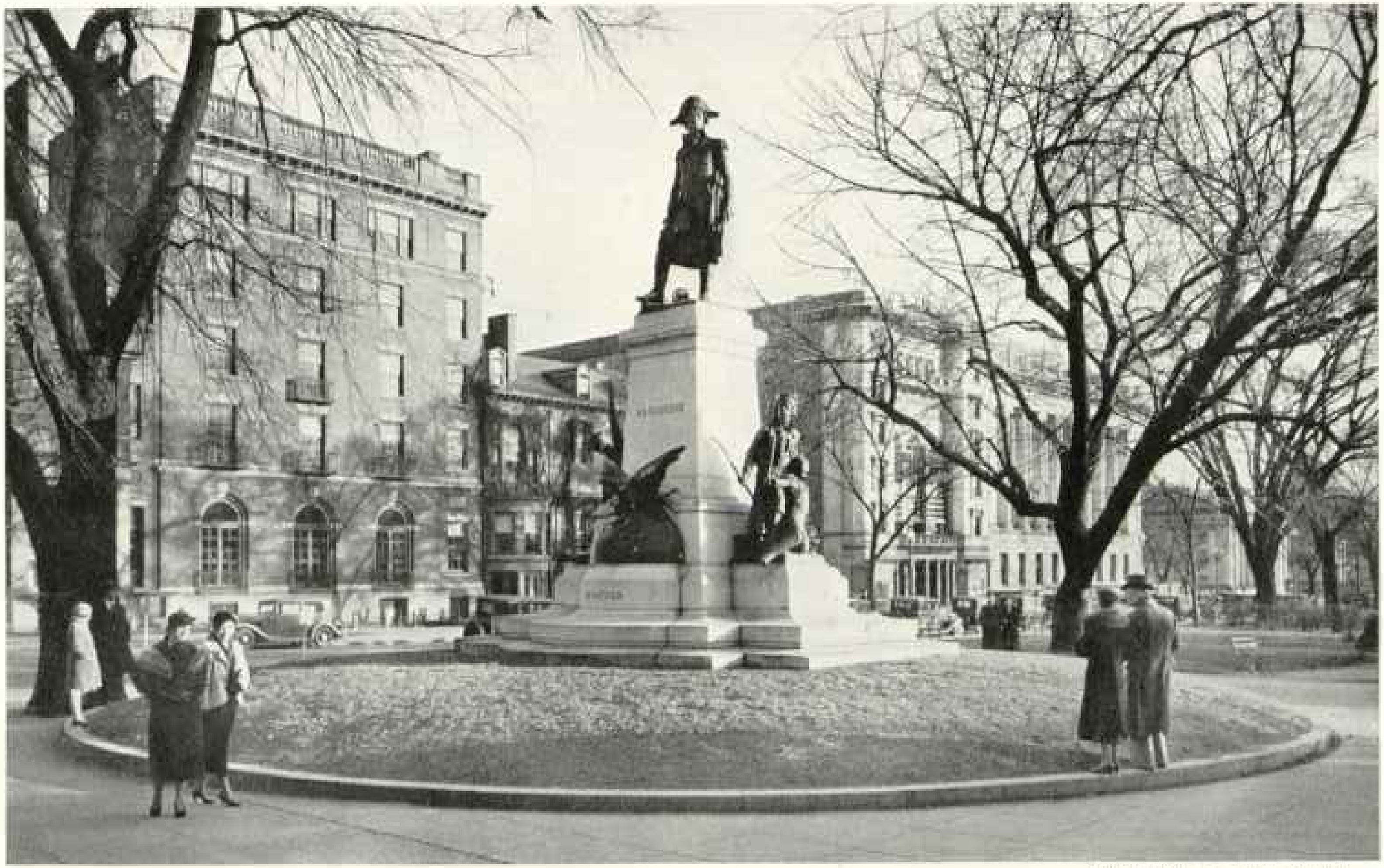
DEVOUT PEASANTS IN A CHURCH NEAR ŁOWICZ

Religion occupies an important place in the life of the Polish people, and church festivals and observances also deeply influence the social life of otherwise isolated farming families.

Photograph by Maynard Owen Williams

TWO FRIENDS—AND A HELPFUL CAT

The boy's intelligent interest so impressed the photographer that he waived an iron-clad rule and let the lad carry his camera. The pet played an unconscious part as a decoy who attracted children (see text, page 328).



Photograph by B. Anthony Stewart

THE KOSCIUSZKO MONUMENT IN LAFAYETTE SQUARE, WASHINGTON

The Polish hero, here seen wearing the Continental uniform, holds a plan of the Saratoga fortifications. This memorial by Antion Popiel, a gift to the United States from the Polish-American Societies of America, was unveiled May 11, 1910, with President Taft in attendance (see illustration, opposite page, and text, page 337).

Photograph from Wide World

A POPULAR MONUMENT TO A NATIONAL HERO: THE KOSCIUSZKO MOUND MEMORIAL AT KRAKÓW

Built of soil transported from Poland's many battlefields, some of it carried thither in the broad sleeves or heavy aprons of the Polish peasants, this simple memorial mound was the work of thousands of unknown artists, following an old Polish model. Formerly the citadel surrounding the mound was used as a barracks, but, in consideration for Poland, Austrian troops were removed even before Poland gained its freedom. Kosciuszko's body lies in the Wawel, at Krakow, faintly discernible against the skyline beyond the summit of the 400-foot mound.

Photograph by Hans Hildenbrand

SNOWY FLOCKS BRIGHTEN THE DARK SLOPES OF THE TATRY

Zakopane is a center from which many visitors explore valleys rich in alpine flowers. In its plans for developing a national park, the Polish Tatry Society is exercising care not to interfere with mountaineers and shepherds who add interest to this mountainous region (see Color Plates III and VII).

Photograph by Maynard Owen Williams

THE HEADDRESSES OF TWO BRIDESMAIDS

The bright headshawls of the women contrast with the polychrome mass of homespun skirts. The conservative swain of the girl on the left objected to having her pose for her picture, but since she was wearing her best she overruled his objections (see text, page 327).

American colleagues among those who spread their wings over Poland during the struggle for freedom.

The Pole, whose horsemanship is admired throughout the world, has taken to the air with spirit and dash. Captain Orlinski linked Warsaw with Tokyo. Colonel Rayski circled Europe in the air. Lieutenant Szalas, landing before dawn, was killed within sight of the minarets of Baghdad.

In an airplane constructed in Poland, Captain Skarzynski and Lieutenant Markiewicz made the tour of Africa in 1931, and Captain Karpinski flew over many of the scenes of the ancient world in his flight from Warsaw to Istanbul (Constantinople), Baghdad, Tehran, and Kabul, with a return by way of Cairo, Jerusalem, and Aleppo.

Photograph by Karol Pecherski

"NOW, JUST BETWEEN YOU AND ME"

This study in expression was caught by the camera near a church door, social center of many Polish communities. These women, as do many other old people, seek alms from the more fortunate worshipers.

With seven hundred airplanes and nearly eight thousand flyers, Poland's military aviation is well advanced, and civil lines centering in Warsaw bring passengers and mail from London, Paris, Berlin, Vienna, Salonika (Thessalonikē), Tallinn (Reval), Gdynia, and Poznań.

London is less than twenty-four hours from Warsaw by air, and many corners of Poland are a mere pleasure dash from the capital. In the mid-afternoon one can leave the airdrome at Warsaw and three hours later be bathing, dancing, or listening to the band at Gdynia.

During 1932, when railway service and shipping were interfered with by bad weather, airplanes kept up a service all winter long and maintained a regularity of 93.5 per cent.

One can leave Paris before dawn, fly over the Black Forest, look down on Prague, and have a late lunch in the "Paris of Poland." After a pleasure ride to Lazienki Park (Color Plate II), where a mirrorlike canal occupies the place of the orchestra pit of a sylvan theater, and a splendid play at any of Warsaw's theaters, he can be off in the morning for the "Paris of the Balkans," arriving there in time to take part in the fashionable 5-to-7 parade along the streets of Bucharest. If the "Paris" habit is still strong, the following evening can find him back on the Grands

Boulevards, of whose "croissants," if the story be true, John Sobieski, Polish savior of Vienna from the Turks, is the godfather, the crescent-shaped roll being the product of a Pole who, because he brought the news of the Turkish flight to Sobieski, was given the concession for Vienna's first coffeehouse.

Monotony is the keynote of Polish geography; yet in the south there are idyllic mountain retreats of rare beauty. Through the obscure but inspiring Kraków Protocol, Poland and Czechoslovakia agreed to turn the whole Tatry mountain region into one splendid national park, shared between the two lands in somewhat the way that Canada and the United States share the beauty of the Rockies (see page 342).

DEVELOPING NATIONAL PARKS

Our own national parks, notably Yellowstone, have been an inspiration to the Poles, and in their efforts to perpetuate beauty and safeguard picturesque areas they have closely studied our National Park Service.

Many forms of wild animals living in the Tatry cross back and forth across the frontier ridge, and to the tourist hotels on both sides of the boundary countrywomen bring the same highly flavored wild strawberries (see Color Plate VII).

Not so long ago Poland and Czechoslovakia were at grips over Cieszyn (Teschen). Now they work together to preserve in the Carpathians a retreat "for the Benefit and Enjoyment of the People."

The Czarnohora group, a range deeply covered with primeval forest and the home of the Huzuls, is another area reserved as a people's playground and health resort.

Not individuals alone are benefited in the sanitaria of these park lands. National sanity is also served when adjoining nations coöperate in beautifying their common boundary rather than fortifying it.

American progress and prosperity have been fostered by ignored State frontiers, while unnatural boundaries, emphasized by political, economic, cultural, or linguistic barriers, are thorns in the flesh of struggling Europe. A buffer park instead of a buffer State is at least original.

Poland, which owes its very being to unceasing race loyalty at home and good will abroad, now quite naturally desires to maintain a *status quo* arrived at when wartime prejudices were still potent. Whether it does so is no longer a problem of words but of deeds.

That amazingly versatile Pole, Paderewski, tells the following story:

"Once upon a time, somewhere in Utopia perhaps, a large sum of money was offered as a prize for the best description of the elephant. Among the competitors there were a Frenchman, an Englishman, a German, and a Pole.

"The Frenchman immediately went to the zoölogical garden, visited the elephants' house, made friends with the keeper, invited him to luncheon, took several photographs, and, after repeating the experience a couple of times, began his work. Within a few weeks a brilliant book was ready under the title, 'Les Amours d'Eléphant.'

"The Englishman proceeded quite differently. He bought a complete hunter's outfit and in that sporting attire, provided with excellent rifles, supplied with plenty of ammunition, cartridges, biscuits, Scotch wine, and pipes, he went to the jungles of India, to the wilderness of Africa, saw thousands of elephants, killed quite a few of them, and upon returning home within six months he wrote a concise, graphic essay, calling it unpretentiously, 'The Elephant.'

"The efficient German acted more thoroughly. He started on a long, extensive journey, visiting all the most renowned libraries of Europe. He read every book, studied every pamphlet, examined every document pertaining to the huge animal, and, after several years of that conscientious work, produced two big volumes under the name, 'An Introduction to a Monograph on the Elephant.'

"As to the Pole, he wrote his book almost as rapidly as the Frenchman. Its title was, 'The Elephant and the Polish Question.'"

The "Polish Question" has been supplanted by Poland, living land of the persistent Poles.

Photograph by Jean Gabereil

WINTER ROBES THE SWISS ALPS IN A GLORIOUS MANTLE OF GLITTERING WHITE

"Frost flowers" replace the blossoms of spring and summer; icicles assume fanciful shapes, and evergreen boughs become giant snowy plumes. To this magic land, sparkling under the rays of a brilliant sun, come lovers of winter sports—skiers, skaters, tobogganers, and curlers.

Photograph by E. Gyger

SMOOTHLY, SWIFTLY, SILENTLY, SKI RUNNERS GLIDE ALONG OVER UNTROBDEN SNOWS

Photograph by Jean Gaberell

MORE THAN HALF A HUNDRED BOYS TAKE PART IN A SKI RACE AT DAVOS

The wide popularity of skiing in Switzerland is due largely to its many opportunities for sport and utility. In the tiny mountain villages boys and girls go to school on skis which sometimes are made of two barrel staves. Postmen in the snow-filled valleys deliver the mail on skis. They are a common means of pedestrian travel in winter. Davos, a modern village, lies at the base of the Schiahorn, an 8,900-foot mountain.

Photograph by A. Klopfenstein

SKIS GIVE ACCESS TO THE MOUNTAINS IN THEIR WINTER GARB

The skilled skier utilizes vast stretches of snow-covered valley, forest, and slope. He can wander to places ordinarily inaccessible, and enjoy to the full Nature's matchless winter beauty. This party is skiing near Adelboden.

Photograph by E. Cyger

Photograph by Jean Gaberell

ONE MUST BEGIN YOUNG TO ATTAIN REAL PROFICIENCY IN THE ART OF SKIING

The bumps and falls that accompany the learning process are numerous, and the best skiers are those who start the sport as children. The man at the left is making a simple descent, and his speed is indicated by the long cloud he has raised in going through the deep, light, powdery snow. The man at the right has been executing a figure known as the "Telemark" swing. This turning maneuver serves to control the skier's speed and enables him to dodge surface irregularities.

Photograph by A. Klopfenstein

FOLLOWING THE EFFORT OF ASCENT COMES THE THRILL OF AN EXHILARATING RUSH DOWN THE MOUNTAIN SIDE

Photographs by Jean Gaberell

A VETERAN SKIER TAKES TO THE AIR

Jumping is a development of skiing which has become so popular in Switzerland that now practically every center of winter sport activity has a jumping hill. The important feature of a ski jump is not the height attained, but the distance traveled through the air. The jumper starts atop a steep incline, gathers speed until he reaches the take-off, then with a spring leaves the ground and sails through the air. A skilled jumper will land from 150 to 200 feet away. This jumper is participating in a ski meet at Gstaad, in the Bernese Oberland.

A GOOD SKIER MUST KNOW MANY TRICKS OF THE SPORT

Among these are the "Telemark" (see Plate V) for making wide turns, the "Christiania" for making sharp turns, and the various jumps for stopping a descent or for leaping obstacles (see below). The turning maneuvers are effected by shifting weight and changing the angle of the skis.

Photographs by Jean Gilbertell

PUTTING ON THE BRAKES

The *Quersprung* or cross-jump on skis is made to effect a quick stop. The man is driving his stock in the snow, and is about to land after jumping and executing a quarter turn to the right.

BALLOONING IN THE STRATOSPHERE

Two Balloon Ascents to Ten-Mile Altitudes Presage New Mode of Aërial Travel

By Auguste Piccard

With Illustrations from Photographs by the Author

YOU will probably want to know what the earth looks like from ten miles up.

The sky is beautiful up there—almost black. It is a bluish purple—a deep violet shade—ten times darker than on earth, but it still is not quite dark enough to see the stars. The sun, however, seems brighter than when seen from sea level.

Forests, rivers, and fields are visible, sometimes through a light mist without any contrast, but on other days with marvelous beauty in striking relief. The towering summits of the Alps from ten miles up assume the aspect of miniature reproductions. Calculation shows that, if there were no mist, a circle of earth having a diameter of 560 miles would be visible. That is equal to a surface of 250,000 square miles.

We went to that height to study cosmic rays.

To what height should we ascend to make interesting studies? A calculation showed me we probably would learn something new by rising so high that nine-tenths of the atmospheric mass would be below us and only one-tenth above us. At sea level the atmosphere has a pressure equal to that of a column of mercury of approximately 30 inches. If nine-tenths of the atmosphere is underneath an observer, the barometric pressure must be 3 inches. So it was to that height we had to ascend (see diagram, page 355).

From the standpoint of cosmic rays, the exact altitude is unimportant, but it is interesting to know to what height we had to go to find that pressure of one-tenth of the atmosphere.

From the aëronautic standpoint, we faced the problem of constructing a craft in which a pilot and his assistant and many instruments could be lifted ten miles into the sky and be permitted to work there. This height surpassed by a great deal any that had been attained previously.* So a new craft had to be constructed to overcome many difficulties, of which none, despite their numerical importance, impressed me as insurmountable.

Our problem, then, was to find conditions that would permit two men to live up there in more or less normal working order, and a means of getting them to the desired height. Men can survive at certain altitudes, varying according to persons: these altitudes are usually between 3 and 4½ miles. In order to go higher, it is necessary to carry oxygen. Even if the aëronaut breathes in an oxygen mask, he cannot go beyond a certain height without suffering from the reduced pressure.

The Problems of an Aërial Laboratory

You may have seen what happens when a bottle of beer or champagne is rapidly opened. The gases dissolved in the liquid are suddenly set free, forming a quantity of little gas bubbles, so that the liquid is transformed into foam. Well, if the external pressure is reduced too quickly, human blood acts the same as champagne, and the gases liberated obstruct the blood vessels that supply and nourish the brain and heart. It is evident that the victim does not continue to observe cosmic rays.

To avoid this danger, there was only one thing to do: to transport from below the portion of our atmosphere surrounding the aëronauts and to maintain this atmosphere in its original state, preventing its dilation during the ascent. That could only be accomplished by constructing an air-tight cabin in which the aëronauts would be inclosed during the entire exploration of the high altitudes (see illustrations, pages 356, 360).

The second part of the problem consisted in getting this cabin and all its contents into the upper atmosphere.

* See "Exploring the Earth's Stratosphere," by Lieut. John A. Macready, in the National Geographic Magazine for December, 1926.

READY FOR THE COMMAND, "LET GO EVERYTHING!"

To eliminate their weight while in flight, the handling ropes were run double through eyelets in the upper belt, so that, by letting go one end, each rope slipped easily through its eyelet. Motion-picture cameramen worked in the bright glare of the floodlights, while many among the hundreds of spectators wept to see the father of five children embark upon so perilous a voyage.

What kind of craft should we use? Three possibilities offered themselves: balloon, airplane, or rocket. None of these three had ever risen ten miles. The rocket will do so one of these days. Eventually it will go far higher, even; but the earth will turn many times around the sun before the rocket becomes a practical means of travel. The plane will certainly go up ten miles in a few years, but it is not yet adapted to that altitude.

If I had been an aviator, I would have tried to perfect the plane so as to make it usable for my researches, but that problem would have been excessively difficult and we would not have been able to calculate everything in advance. The balloon had been surpassed by the plane; still, I was tempted to modify the balloon and restore its former supremacy.

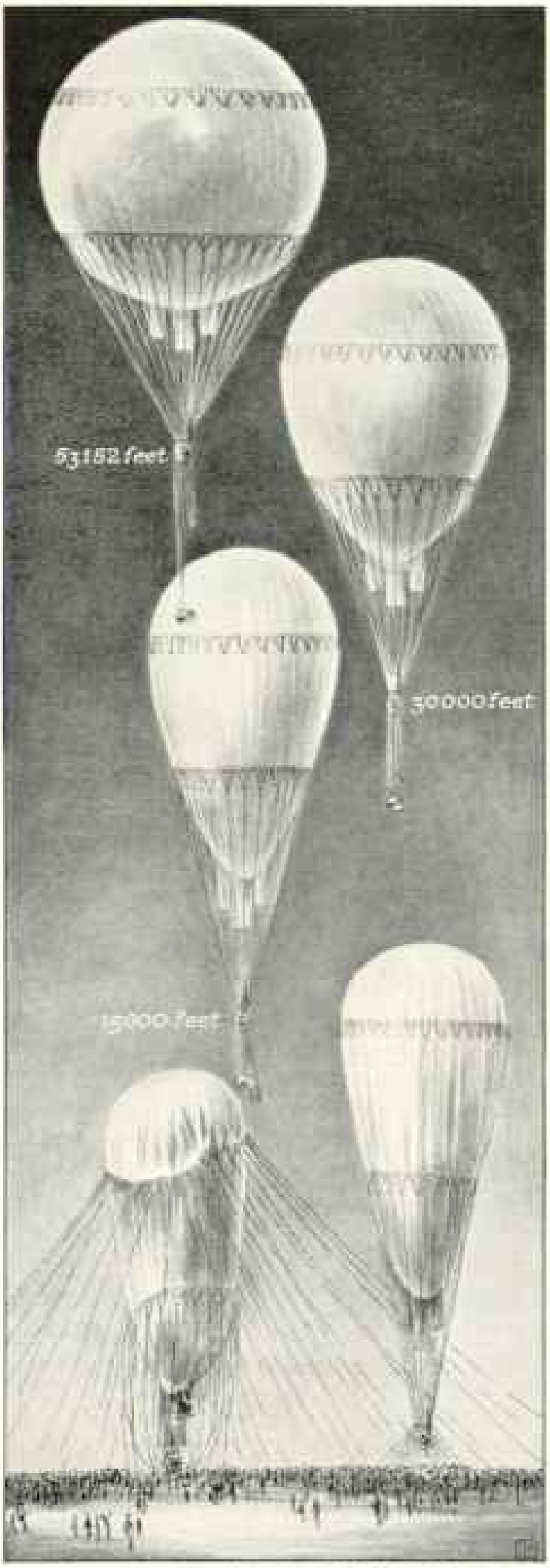
The balloon, being entirely amenable to theoretic calculation, offers a big advantage over the plane. For research purposes the balloon presents the tremendous advantage of not being exposed to the vibrations and magnetic effects of a motor. A number of delicate instruments can be employed in a balloon that could not survive an airplane voyage. My task as engineer was to construct the air-tight cabin and the balloon.

AN AIR-TIGHT CABIN OF ALUMINUM

After examining various possibilities of construction, I decided upon a cabin, or gondola, of aluminum. Picture a sphere 7 feet in diameter, constructed of aluminum .138 inch thick. The most important thing about my preparations was that the welding be solid and air-tight. Fortunately, the technique of aluminum welding has recently made enormous progress, thanks to the European industry that employs tremendous numbers of aluminum vats for the manufacture of beer.

The cabin was provided with two manholes and eight little portholes about three inches in diameter. It was just large enough to contain the two observers and the circular instrument boards that ran all around. When you face the possibility of shutting two men up in an air-tight space of such small dimensions, you must study very carefully the problem of their respiration.

If nobody had yet discovered the usefulness of the submarine, I believe I did, for the submarine is indirectly useful for



Drawing by Hashime Murayama

GAS EXPANDS AS BALLOON ASCENDS

At the take-off the balloon was only one-fifth filled with hydrogen, which, gradually expanding as altitude was attained, distended the enormous sack to the shape of a sphere (see text, p. 356).

GROUND TRANSPORT OF THE 300-POUND GONDOLA IS A TICKLISH PROBLEM

The aluminum cabin is emerging from the laboratory of the University of Brussels, where Professor Piccard designed it, supervised its construction, and invented or adapted many of the instruments for controlling the ascent and for cosmic-ray observation. The unwieldy sphere was taken by truck to Zürich.

exploring the stratosphere. Because of the submarine, breathing conditions of human beings in air-tight inclosures have been studied, and I was able to profit by those studies in providing my cabin with an apparatus for regenerating the air.

We had under one of our tables a Draeger apparatus giving us by the minute approximately two quarts of pure oxygen and making circulate some 20 gallons of air from the cabin over alkali to absorb the toxic gases of respiration, especially carbon dioxide. This means we had about 20.5 gallons of air each minute without losing any oxygen.

This method is much more economical than the one usually employed in airplanes, where the air is entirely renewed instead of being regenerated.

Now consider the balloon. It is evident that it must be enormous in order to be able to carry the heavy cabin and its contents into the very rarefied air of the stratosphere. If, before taking off, it were completely filled with hydrogen, its ascensional force would be terrific, quite sufficient to lift an entire railway car. In order to resist such great effort, the material of the balloon and the ropes should have been very solid and consequently very heavy—so heavy, in fact, that the balloon would never have been able to rise to the height desired.

BALLOON PARTIALLY INFLATED TO ALLOW FOR EXPANSION DURING ASCENT

Therefore we had to foresee that we would only partially inflate the balloon before the take-off. During the ascent the gas expands and gradually inflates the whole balloon. We calculated that it was sufficient to fill the balloon to only one-fifth of its volume with hydrogen to make it ascend rapidly to the high altitudes where it would become spherical. From that moment on the excess gas escapes through the appendages until the balloon is balanced (see diagram, page 355).

The envelope of a spherical balloon is usually surrounded by a net, and it is to this net that the gondola is suspended. The net presented a tremendous additional

Photograph from Wide World

THE KING AND THE QUEEN OF THE BELGIANS INSPECT THE BALLOON

The royal visitors and Professor Piccard are inside looking out through the manhole of the gondola. The scientific institution financing Professor Piccard's flight (see text below) was founded through the personal initiative of King Albert. Both King Albert and Queen Elizabeth favor aerial travel, and King Albert has gone by plane to the Belgian Congo.

burden that could be avoided, and in our case this construction would have been very dangerous. Also, there was the risk of folds catching in the net when taking off, and tearing the envelope.

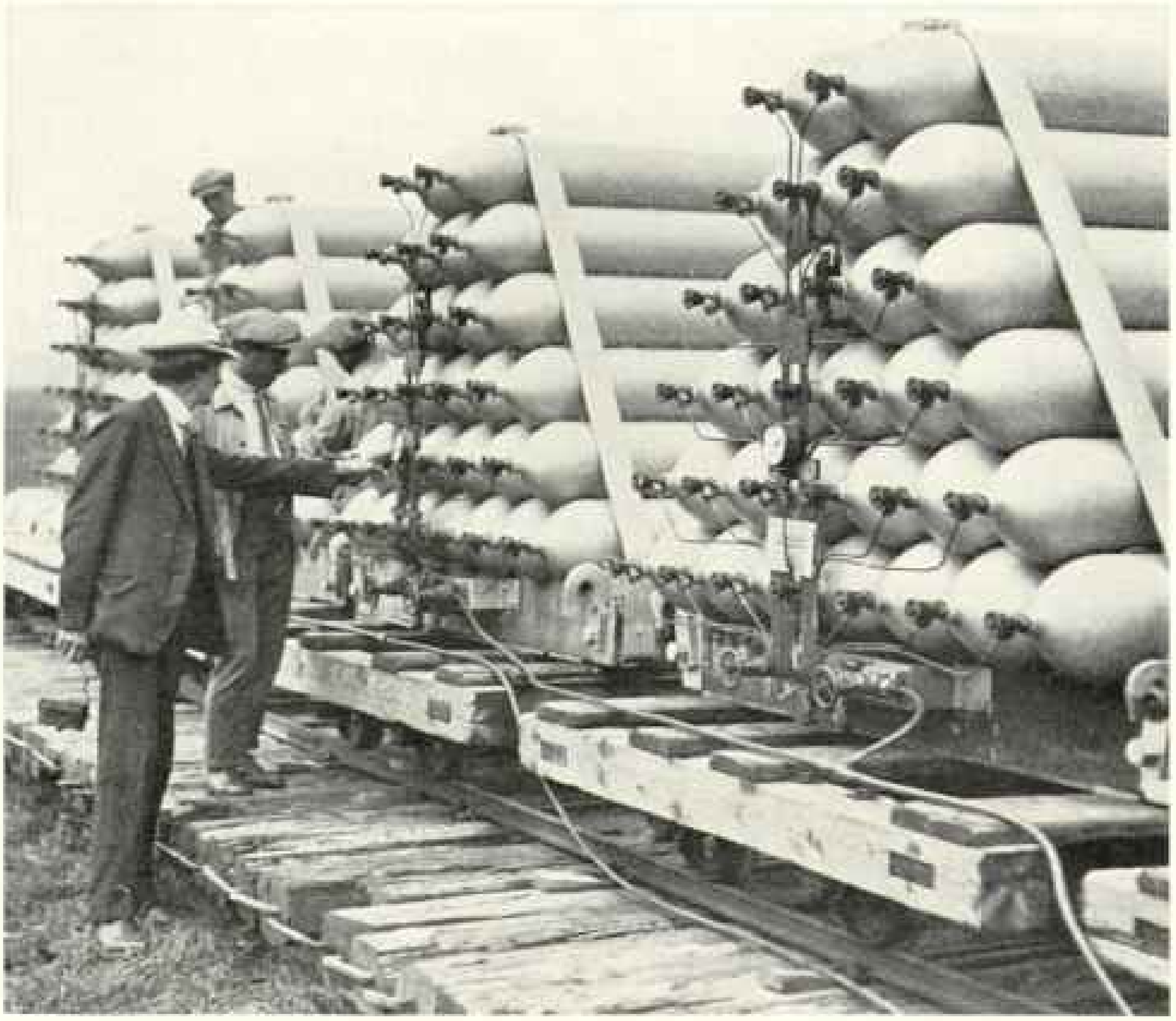
The way to avoid all possibilities of such an accident is to abandon the net and attach the suspension cords directly to a belt sewed to the envelope a fourth of the way up. For holding the balloon during inflation, I provided a second belt placed midway between the equator and summit of the spherical sack. It was through the eyelets of this second belt that the 32 double ropes passed to hold the balloon until the take-off (see illustration, page 354).

The construction of the cabin and balloon as well as the preparations cost a lot of money, much more than the budget of a university laboratory can pay; so it was fortunate that we have in Belgium an institution to promote researches in the various branches of science. It is the Fonds National de Recherche Scientifique, created a few years ago through the personal initiative of King Albert I. I applied for a credit of $14,000, and this sum was quickly placed at my disposal for the construction of the balloon. This balloon was named *F. N. R. S.* to recall the institution which financed the expedition.

The *F. N. R. S.* has a diameter of 33 yards and the envelope, together with the ropes, a weight of about 1,600 pounds. The aluminum gondola weighed about 300 pounds empty, and, with occupants and instruments, about 850 pounds.

AUGSBURG BASE OF FIRST FLIGHT

For the first ascension I chose Augsburg, Bavaria, as a starting place, using the flying field of the company which manufactured the balloon. Augsburg offered many advantages, but the chief one, perhaps, was its distance from large bodies of water, which is much to be desired for a long ascension in a non-dirigible balloon. Absolute safety from a sea landing cannot be had in Europe, and from that viewpoint an ideal place for such a balloon flight would be America.



HYDROGEN TO INFLATE THE BALLOON

Tanks containing about 100,000 cubic feet of hydrogen were used; this content expanded to some 300,000 cubic feet when the bag, at an altitude of seven miles, was fully distended to a spherical shape (see text, page 356, and diagram, page 355).

Early in September, 1930, I had all my equipment at Augsburg: the balloon, the cabin, and the instruments we had made for studying cosmic rays. Everything was ready and we had only to wait for favorable weather conditions. We had planned to take off very early in the morning, just before sunrise. I knew that the huge dimensions of my balloon would make the take-off a delicate matter, and that the slightest gust of wind might be dangerous. So we had to choose the time when there was least probability of having wind. That time is in the last hours of the night or the twilight that precedes dawn.

On September 13 the weather looked good. We decided to attempt the ascension the next day, and that afternoon the immense balloon was brought out. The handling ropes (see page 360) were attached and we waited for the great moment of the next morning. Under a starry sky we opened the valves of the hydrogen bottles, and the envelope, undergoing inflation, began to rise.

Then, when all the gas was in the balloon, the barometer dropped suddenly, the heavens became cloudy, and not a star was visible. But everything was calm and the balloon stood erect in the darkness, like a giant mushroom. Its top was sixty yards from the ground (see page 376).

If we could have taken off then, all would have been well; but there still remained a score of details to be carried out. Soon we began to feel the effect of the barometric depression; a light wind started, shaking the balloon, and we made every effort to hasten the take-off; but that was no longer possible.

PROFESSOR PICCARD SUPERVISES THE PLACEMENT OF THE GAS-ESCAPE VALVE

This instrument is affixed to the top of the balloon and regulates the release of the hydrogen, thereby enabling the aeronauts to control the time and place of descent.

The balloon was inclining strongly to the side, and, if we had persisted, the cabin would have dragged on the ground, making an accident inevitable. So we decided to empty the balloon.

There are always some people on hand to make light of every effort that is not altogether successful. They followed their usual custom of trying to turn everything into ridicule, even pretending to have foreseen that at the last minute the flight would not take place; and, as their explanation was not altogether devoid of charm, it quickly traveled around the world.

THE "ABSENT-MINDED PROFESSOR"

They concluded that I was the typical absent-minded professor and I was the target for derisive stories. What happened, they explained, was quite natural: the absent-minded professor had made an error in his calculation, and consequently the balloon, instead of ascending ten *miles*, rose only ten *feet!* The story was so funny that it was published and republished.

It is useless to contradict a false report. To do so only increases its credit. I just waited patiently all winter, biding my time until the trump cards were in hand for the second attempt. The morning of May 27, 1931, everything was ready once more.

Again the winds disturbed our project. The cabin was thrown from its vehicle and sustained damages from whose consequences we later suffered, but still I insisted on making the ascension.

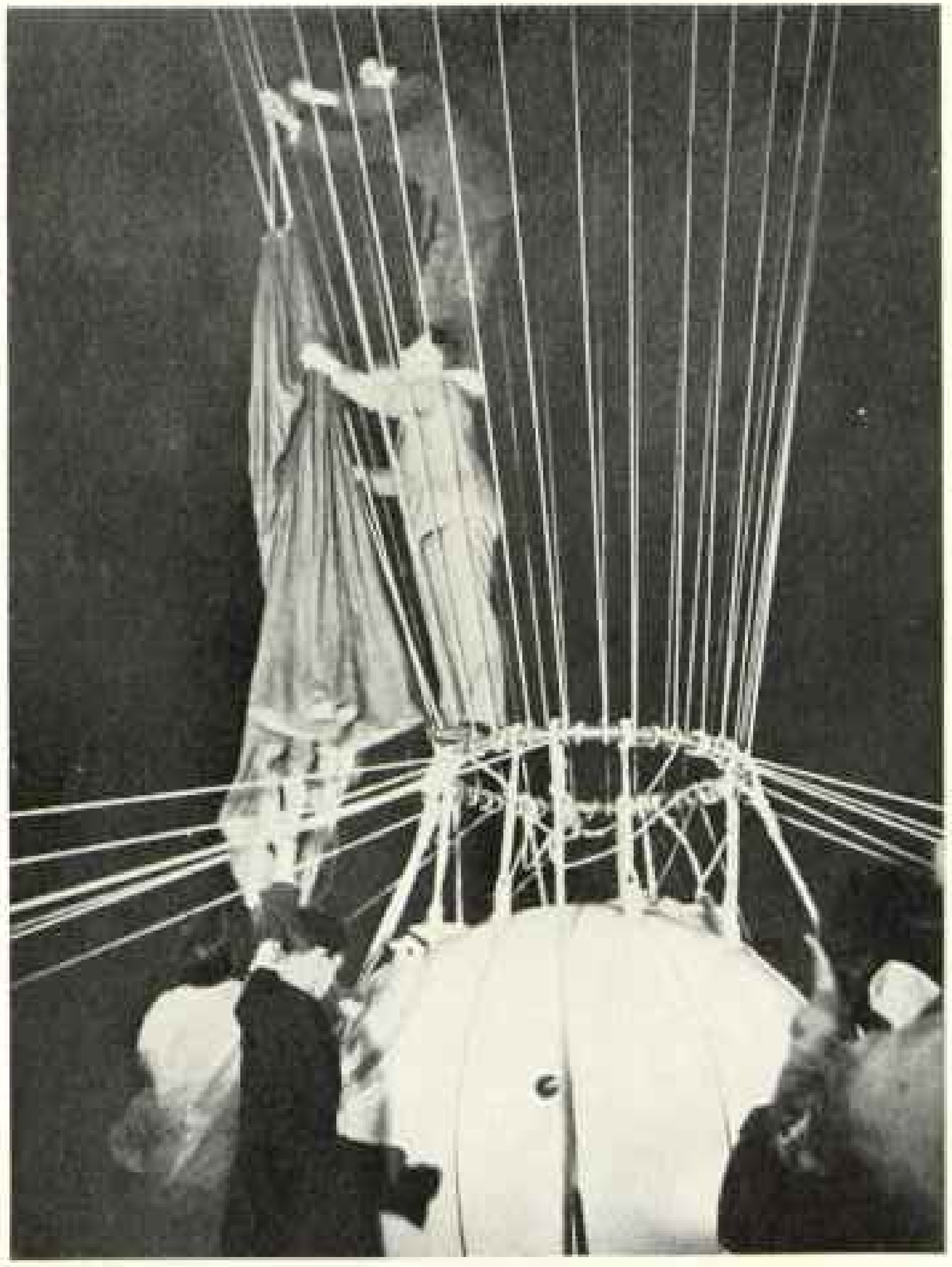
Mr. Paul Kipfer, my assistant, and I enter the cabin. The manholes are closed. While we are at work putting our instruments in order, men are around us making the last preparations for the command, "Let go everything!" More play

A MINIATURE TRACK WAS LAID TO CONVEY THE GONDOLA FROM ZÜRICH HANGAR TO FLYING FIELD

The handling ropes and suspension ropes are ready to be unrolled by a crew of waiting helpers. To the upper right is seen a manhole; on the side is a glass-covered porthole. The initials "F. N. R. S." are those of the Belgian scientific society that financed the ascension (see text, page 357).

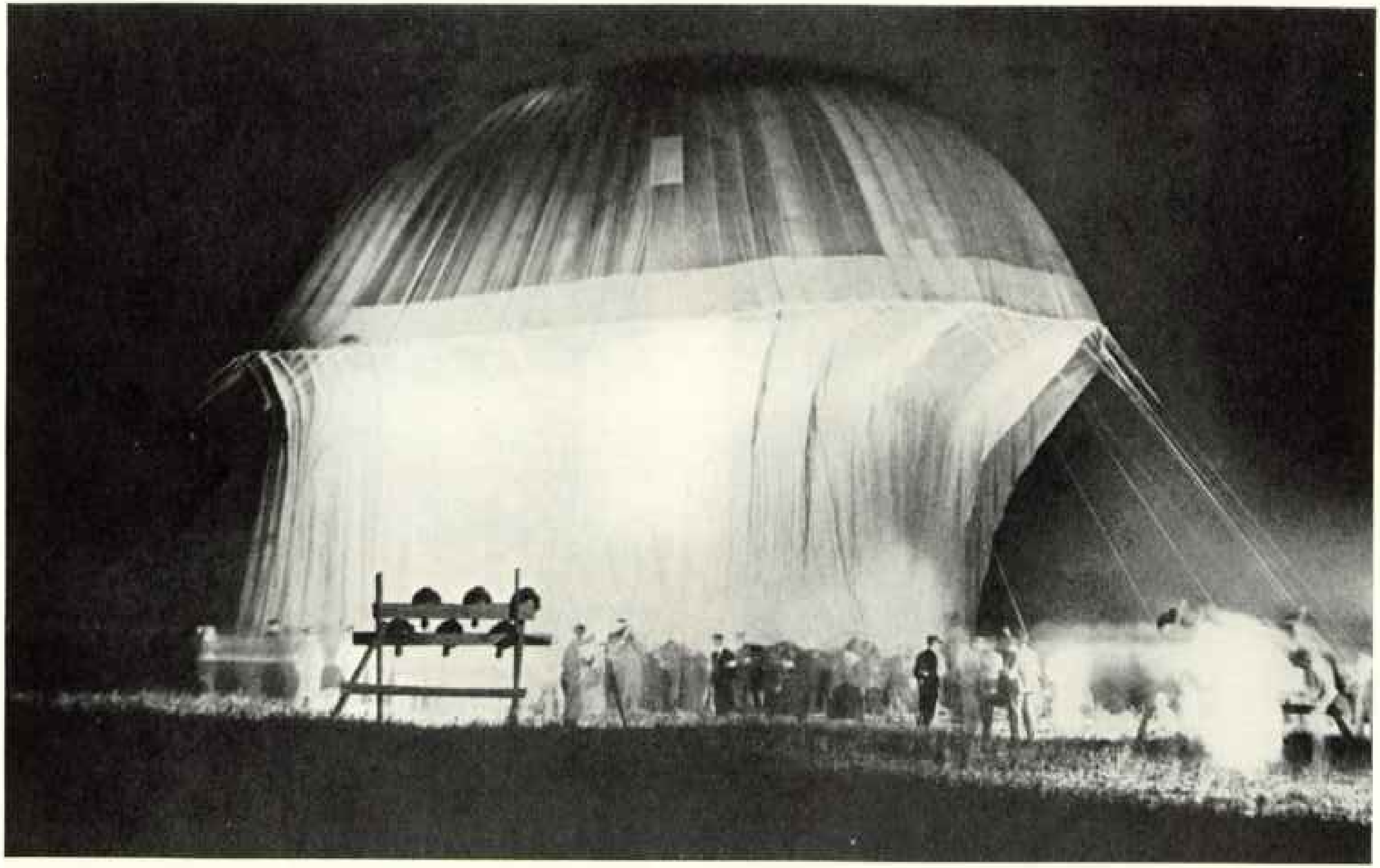
PAINT CONTROLS THE AIR TEMPERATURE WITHIN THE GONDOLA

Color was applied by air-brush in the factory at Liége. On the first flight Professor Piccard had one side painted black, the other white, and a mechanism was devised to turn one side or the other toward the sun to regulate the interior temperature. Unluckily, this turning device did not work. The black side remained toward the sun and the absorption of solar radiation drove the temperature up to 104 degrees, Fahrenheit (see page 372).



ATTACHING A PARACHUTE, THE LIFEBOAT OF AËRIAL NAVIGATION

Professor Piccard is standing on the shoulders of an assistant while he affixes the special parachute which is designed to retard the fall of the gondola should the balloon burst at a high altitude. Such retardation would give the occupants of the aluminum gondola time to attach their personal parachutes for a jump when they reach a level where life is possible without artificial aids to respiration (see text, page 353).



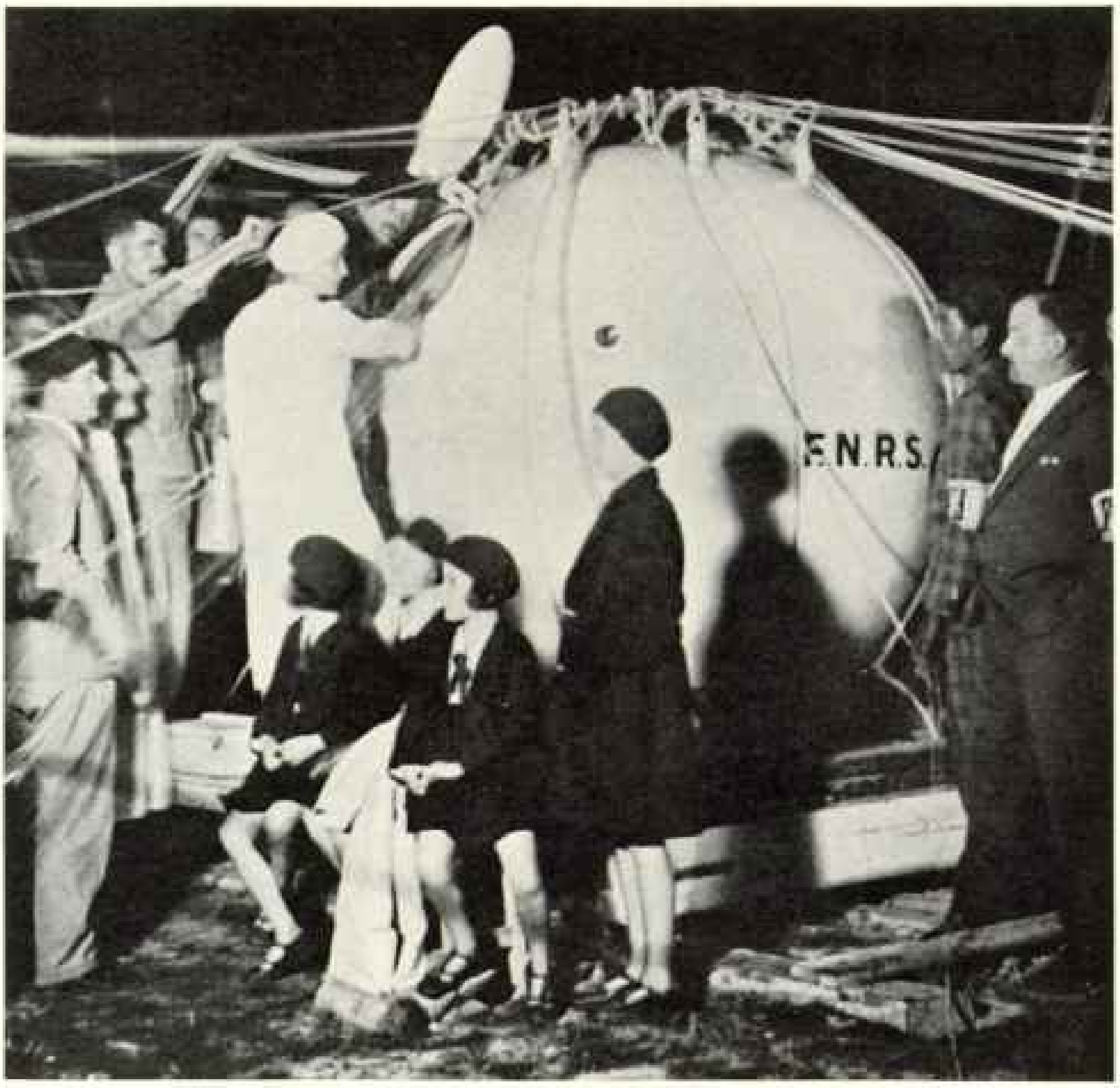
THE RESTIVE BALLOON, PARTIALLY INFLATED, TUGS AT ITS MOORINGS

The giant bag is filled with hydrogen to the upper belt, attached to which are the handling ropes. Because the hydrogen tends to rise in the domelike top, the bag looks like a magnified mushroom. The bag is not inflated further before the take-off. Not until the stratosphere is reached does the carrier become a perfect sphere (see diagram, page 355).

WHEELING THE GONDOLA INTO POSITION FOR THE TAKE-OFF AT ZÜRICH

CARRYING OUT THE ENVELOPE OF THE GIANT BALLOON

The rubberized cotton material was heavy (see text, page 357), as the expressions on the faces of the helpers show. If the cloth were spread out it would cover about two-thirds of an acre.



MADAME PICCARD INSPECTS HER HUSBAND'S AËRIAL "DEN"

The explorer's wife is looking into the manhole, and between her and the lifted cover of the aperture stands Professor Piccard, wearing a béret. Four of his five children are seen beside the gondola.

is given the ropes. The balloon rises several yards.

The cabin strains at its ropes, swinging softly in the air, and we wait for the signal telling us they are letting go (see page 354).

By chance Mr. Kipfer glances through one of the portholes and, surprised by what he sees, exclaims: "There is the smokestack of a factory beneath us!"

They had let us loose and forgotten to tell us anything about it. The workmen had only one desire and that was to see us go. No doubt they had said to themselves: "If only they would go and leave us in peace!"

Anyway, there we were, bound for the stratosphere. This had been my dream for many years.

This was the moment I had spared no effort to live. This had happened while we knew nothing about it.

Thousands of people looked on from below, as the balloon left the ground; but Kipfer and I saw nothing.

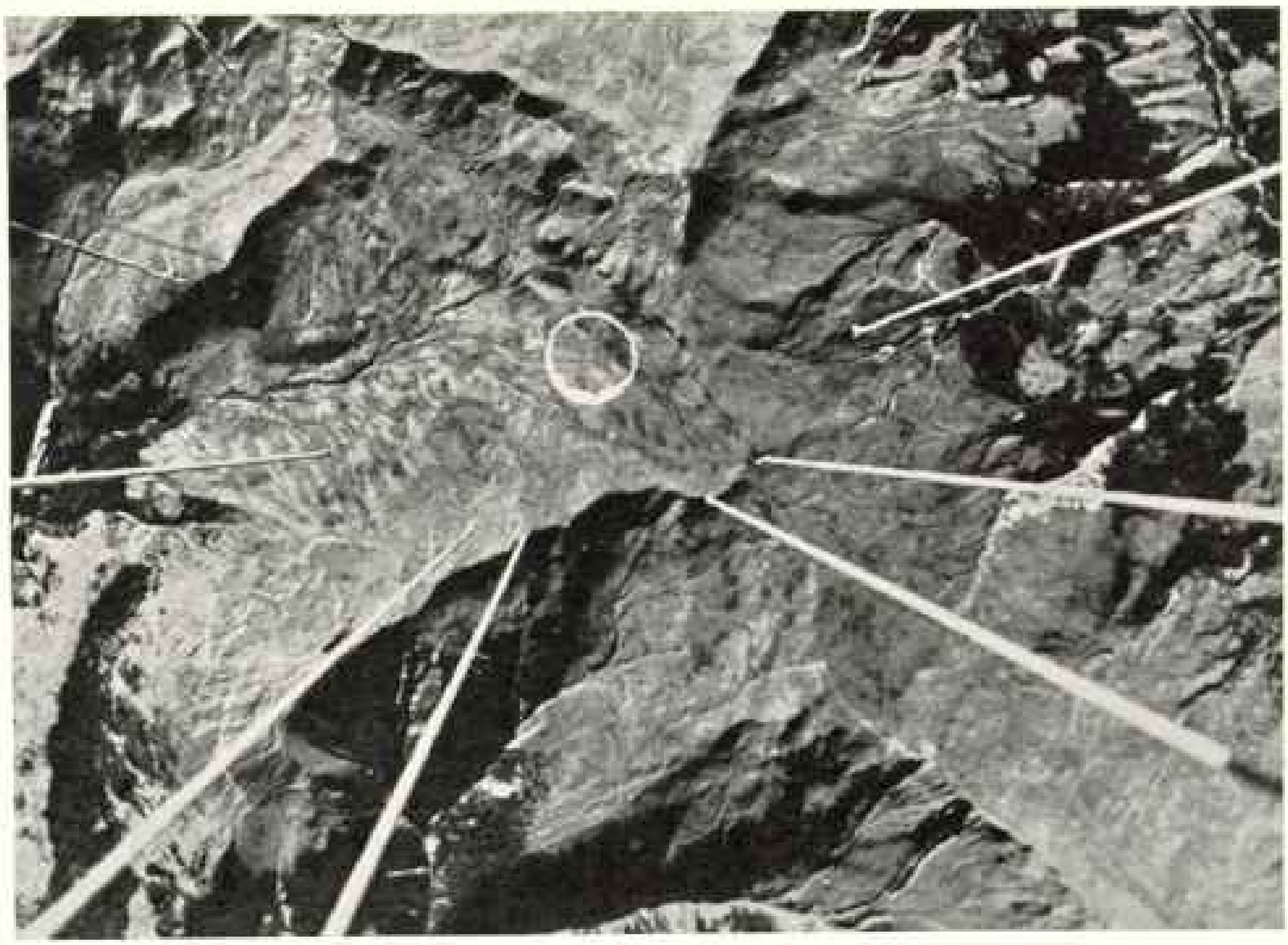
CRUSOES OF AN AIR-TIGHT SPHERE

Once aloft, we had only our program to concentrate upon. The first thing I had to do was to close the last hole that linked the interior of our cabin with the outside world—just a tiny hole one inch in

Photograph by Wide World

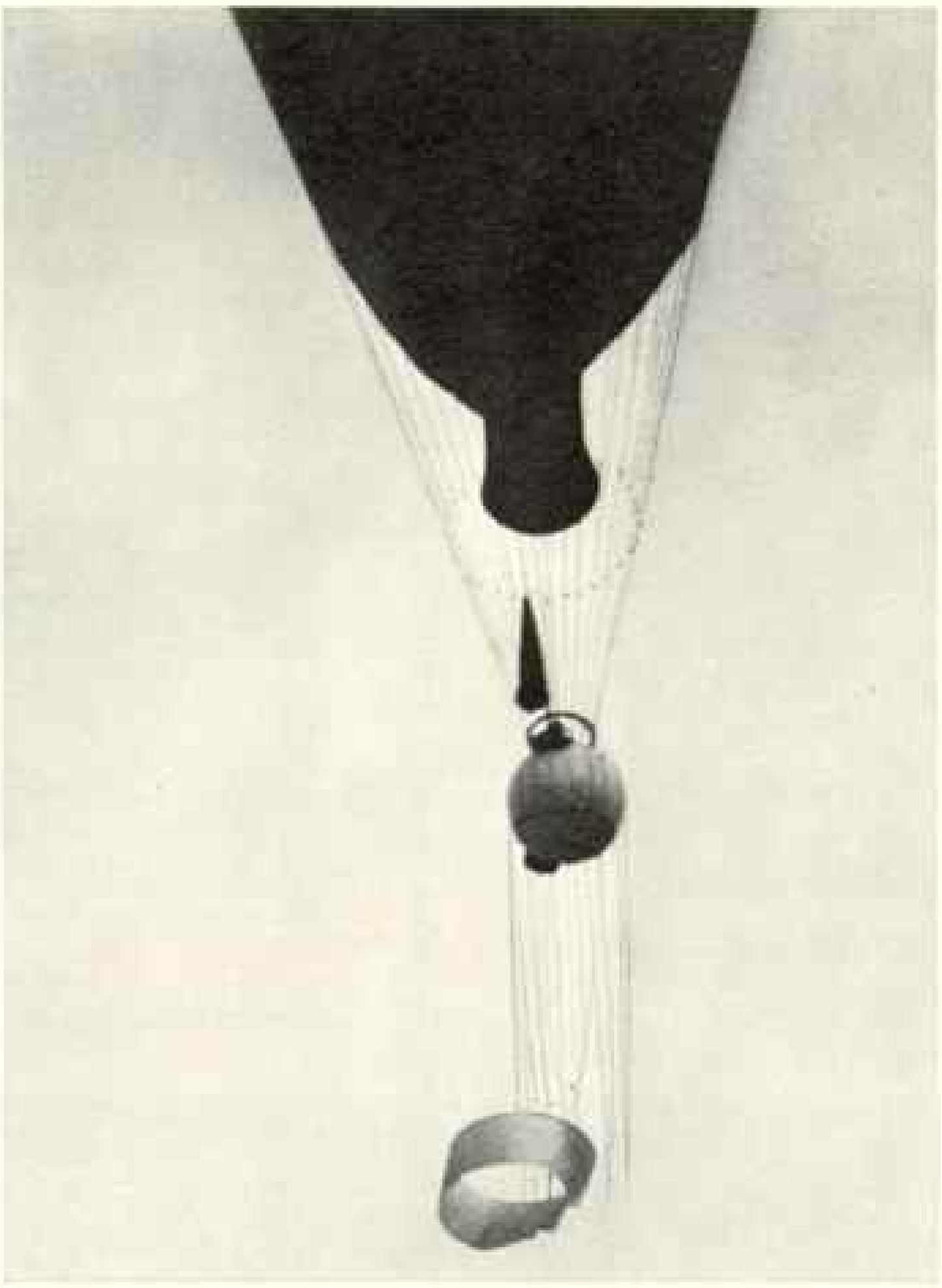
SHOCK ABSORBERS SERVE DUAL PURPOSE

Professor Piccard and his companion of the first flight sat on two cushions and kept certain delicate instruments in two baskets. These baskets and cushions were designed also for head protection against a bump in case of a sudden landing.



A CAMERA INVADES THE STRATOSPHERE

The radial lines are the free ends of handling ropes from the gondola. In the center is the metal ring which is supported by the antennæ and also serves to sight the drift of the balloon.



Photograph by Keystone-Underwood

A FLOATING LABORATORY OF THE SKIES

The circular object suspended from the spherical gondola is carried by radio antennæ and provides a sight to determine the drift over the ground. It was lowered still farther when more altitude was attained (see diagram, page 355).

diameter. I had to get an electrostatic sounding instrument into this hole, an operation that could not be carried out while we were on the ground, for the hole was in the bottom of the cabin.

I exerted myself to place this sounding instrument, but the fall sustained by the cabin had slightly deformed it and my task seemed impossible.

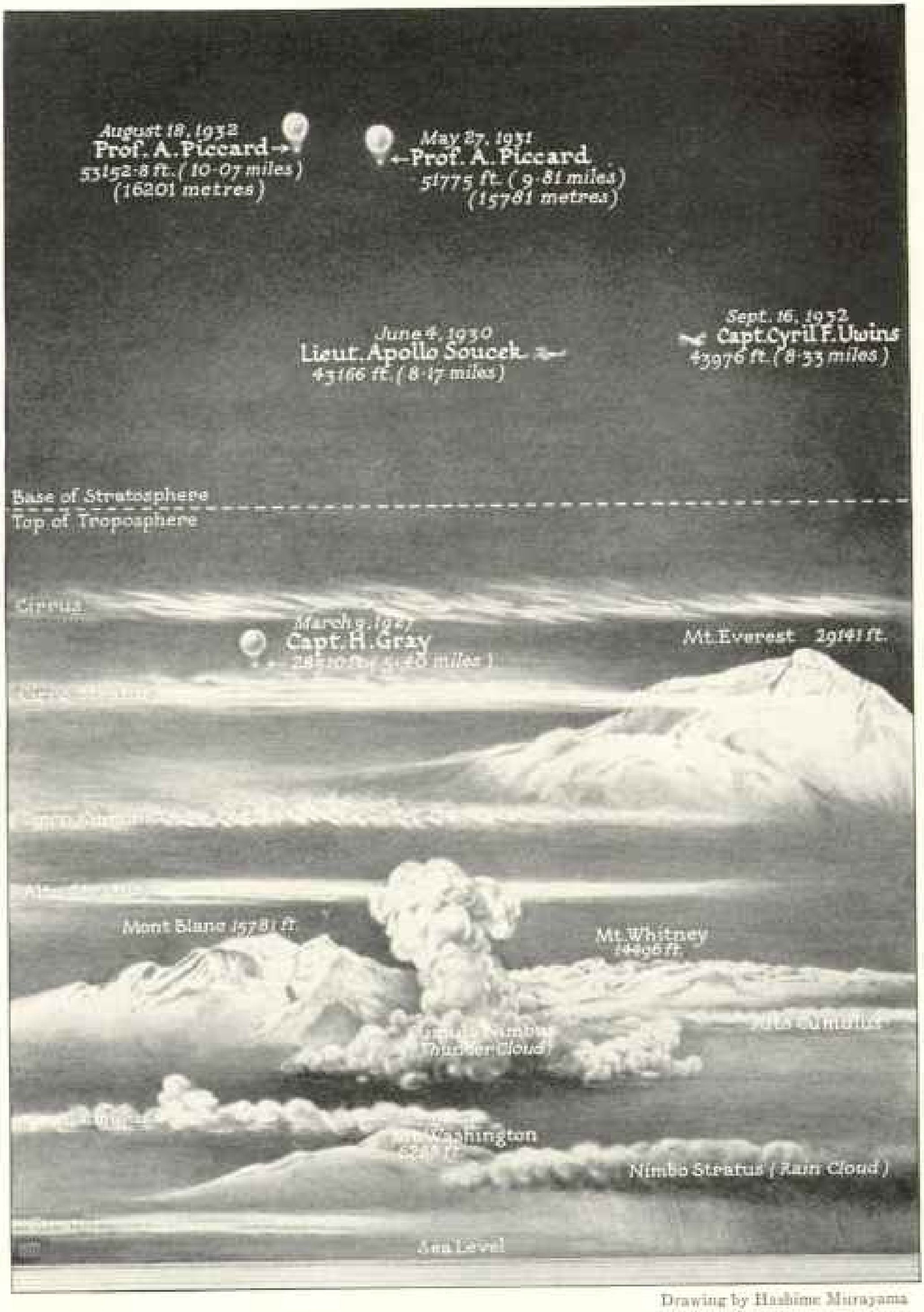
During my hopeless efforts the balloon continued to rise. The exterior air became rarefied, and the air in the cabin escaped through the hole. Kipfer told me we were at 15,000 feet altitude, and that the interior altimeter marked the same height. There was my beautiful air-tight cabin, absolutely of no use. We would have been quite as well off in a gondola of wickerwork.

But we had to do something. Kipfer came to my rescue and by a vigorous effort finally succeeded in inserting the instrument, but at what a price! The tube of quartz forming an insulation was broken and the air of the cabin escaped, whistling. I had a reserve of liquid oxygen in insulated bottles. By pouring small quantities of this on the floor of the cabin, we caused evaporation of the oxygen, which compensated for the escaping gas, and the internal pressure dropped no more.

During this time I undertook to repair the leak. Luckily we had foreseen the possibility of an accident of this sort. I had carried a considerable quantity of a mixture of oakum and vaseline. I thought that the threads of the oakum would keep the vaseline from going through the holes, and that the vaseline in its turn would prevent the air from escaping. I had not had an opportunity, however, of trying out my invention. Now came the chance to test its worth.

In great haste I smeared the mixture around the ailing instrument. The work was not easy. All this was taking place under a board in an almost inaccessible place. I said to Kipfer, "If we do not rapidly succeed in stopping up the hole, I shall be obliged to pull the valve and land."

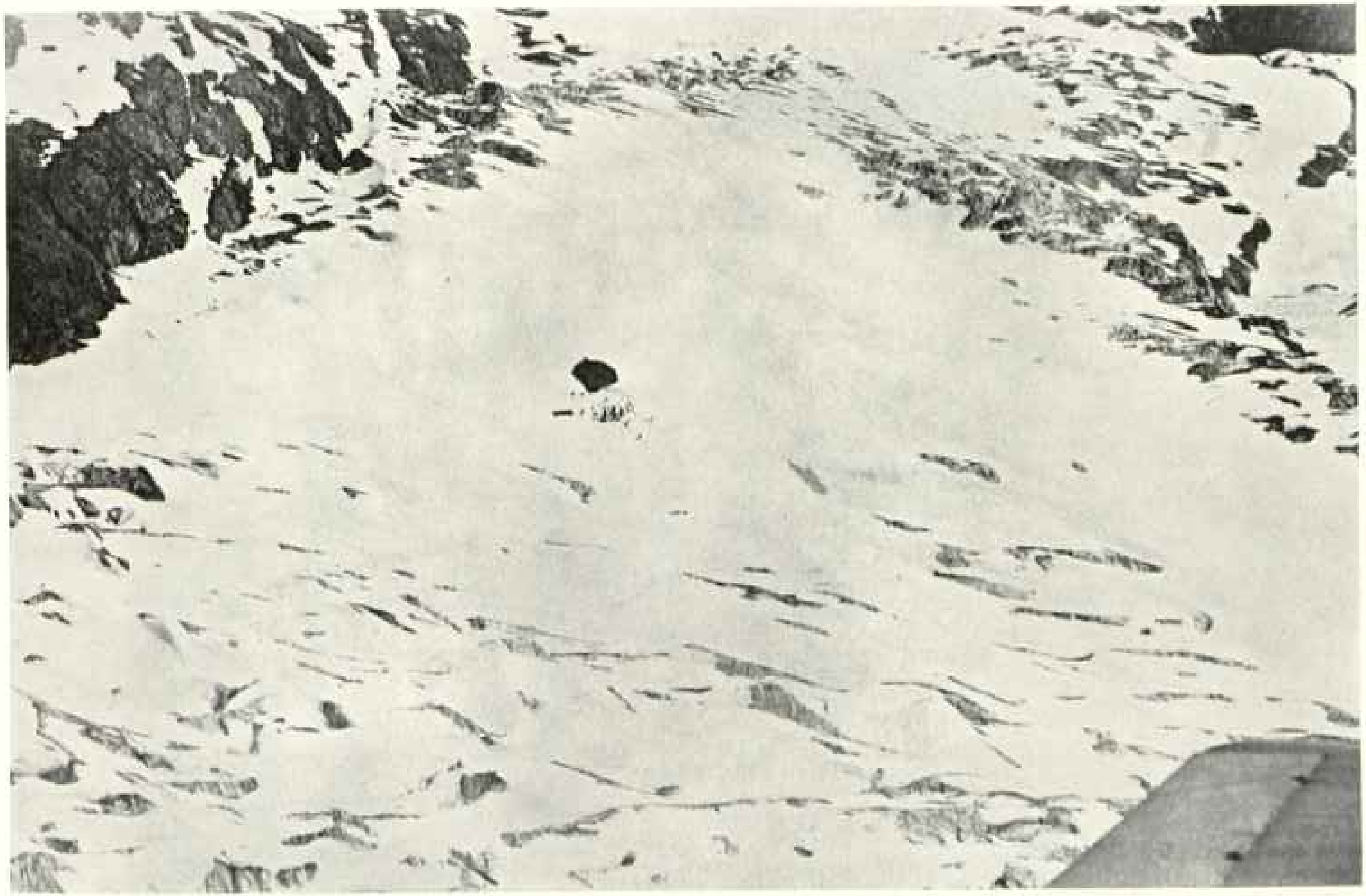
It is lucky that I did not then know that I could not pull the valve and release some gas, and that it would be impossible to come down before nightfall; for, confident in that



Drawing by Hashime Murayama

MILESTONES IN MAN'S CONQUEST OF THE AIR

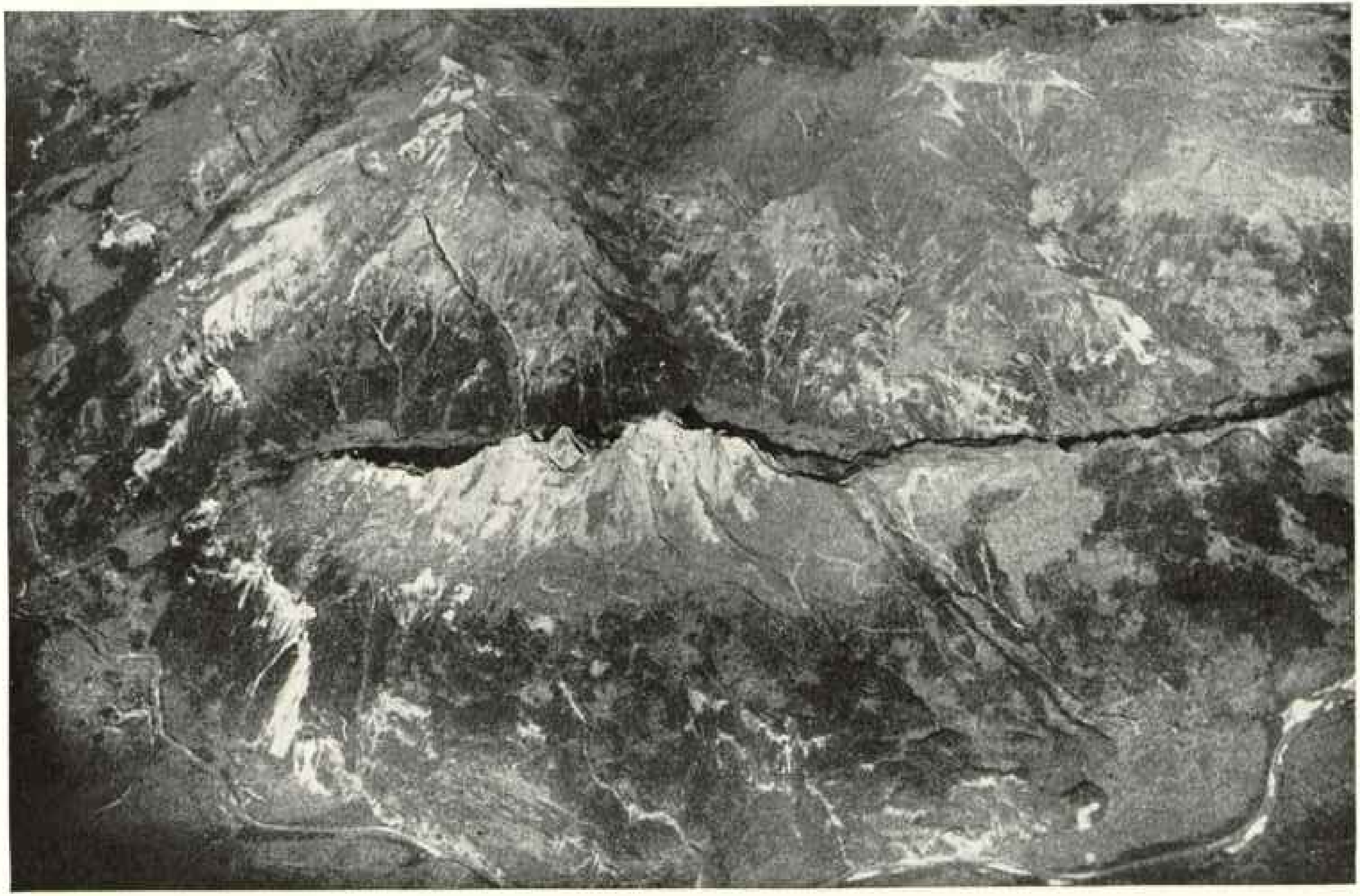
Twice Professor Piccard has ascended to an altitude never before attained by man, exploring the outer sheath of the earth's atmosphere, the stratosphere, which is free from snow, rain, tempest, clouds, or frost. There, he believes, will be the routes of swift aërial travel in the future (see text, page 384).



Photograph by Keystone-Underwood

AËRIAL VIEW OF THE BALLOON ON GURGL GLACIER, NEAR INNSBRUCK, AUSTRIA

Fortunately, the huge craft did not scrape sharp precipices on either side or fall in deep crevasses in the glacial ice (see text, page 373). The large envelope covering was rolled up, sent back to Augsburg, and used for the second ascension.



AMID RUGGED GRANDEUR THE MIGHTY RHINE IS BORN

After its two main branches unite, the river (lower left and right) begins life as a single stream and flows past the white-topped Calanda, Switzerland (9,213 feet), in the center of Professor Piccard's panorama, taken at a 10-mile altitude. The dark line beyond the jagged Calanda marks the Valley of the Tamina, noted for its hot springs.

Photograph by Keystone-Underwood

TIROL ALPINISTS FIND A NEW SPORT

Scores of skiing enthusiasts parked their skis and stocks to tow the bulbous gondola from its glacier port to Ober-Gurgl village (see illustration, page 368). The drum by which the valve rope is pulled and the black-and-white painting (see page 372) are clearly shown. Souvenir hunters rushed to carry off parts of the strange aerial cabin and scrawled their names on its painted surface. This gondola now is on exhibition in the hall of the physics laboratory at the University of Brussels.

last resource to fall back upon in case all else failed to rescue us, I worked feverishly to fill the hole through which our air continued to escape with a whistling noise. Bit by bit I succeeded. The whistling decreased and finally I heard nothing more.

THE JOY OF AN ABSOLUTE SILENCE

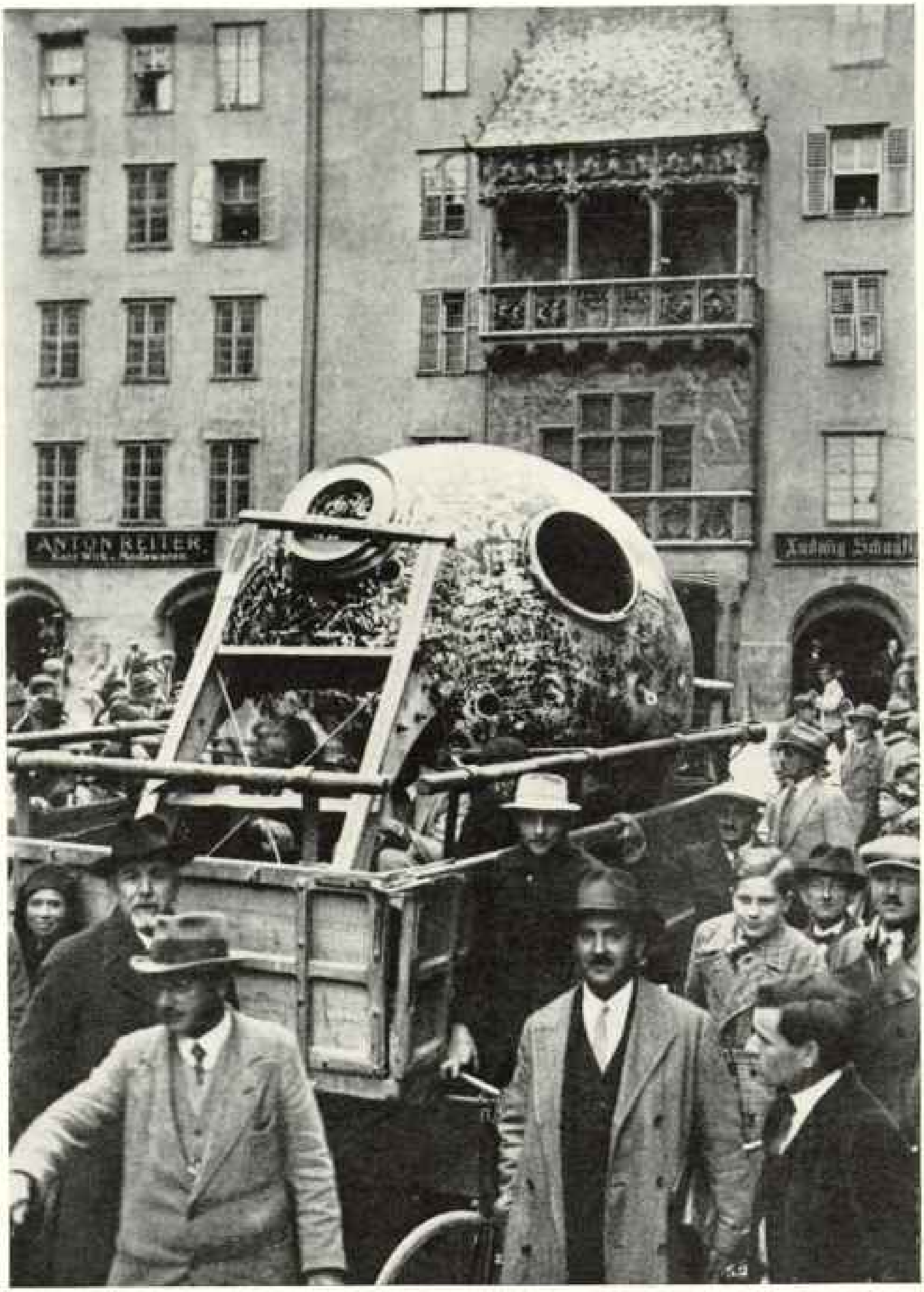
Ah, that wonderful silence, what a relief it was! Never have I felt so keenly the satisfaction that can come from perfect silence. We were now air-tight. I glanced at the watch; it was 4:25. We took off at 3:57. We had been in the air 28 minutes.

I glanced at the altimeter. We had risen to an altitude of 9.65 miles. This was an average speed of approximately 20 miles an hour. For an automobilist on the road, that would not be much, but ascending straight into the air is quite different. We were right in the stratosphere. What a change! A half hour ago we were wondering if the ascension would be made. Now we were in a world absolutely new.

Unfortunately, we were not able to make any measurements during the ascension. Kipfer had been busy all the time putting back in order the instruments that had been scattered when the cabin turned over, and I had been busy doing something still more important.

Now for a look through the portholes to see what the stratosphere was like.

Meteorologists divide the atmosphere into two parts. Below is the *troposphere*, that portion of the atmosphere which is



Photograph from Keystone-Underwood

AN ALUMINUM SPHERE IS THE SYMBOL OF A GREAT ACHIEVEMENT

A procession accompanies the gondola through the streets of Innsbruck, Austria. Already the surface is covered with initials. In the background is the famous "Golden Roof" which Emperor Maximilian added in 1500 to the house of even earlier date.

Photograph by Keystone-Underwood

THE EXPLORER GRANTS A FINAL INTERVIEW

Newspaper men are busy taking notes, a description of the successive stages of the take-off is being broadcast through the microphone in the foreground, and motion-picture operators are working feverishly with the aid of the floodlights. The time is just before dawn on the day of the take-off at Zürich for the second flight (see opposite page).

exposed to the vertical currents caused by differences in the earth's temperature. In rising, the air cools and this is the cause of various meteorological phenomena: clouds, rain, snow, storms, and the various obstacles for the aviator. In rising and cooling, these currents lose their force. When a temperature of from 58 to 76 degrees below zero, Fahrenheit, is attained, they are exhausted. They do not rise any higher.

Then begins the stratosphere, where temperature is fairly constant, from 58 to 76 degrees below zero, Fahrenheit.

The stratosphere is the region of eternally fair weather, but also the region of very cold weather.

From 10 miles above the earth I gazed around. First I looked up at my balloon that, at the take-off, had not been so beautiful, with all her folds. But now she was superb, a perfect sphere, illumined by the sun that was just rising (see diagram, page 355).

Later on in the morning when we tried to pull the valve, the rope broke because of an oversight at the moment of taking off. So we were unable to descend then.

Slowly we were pushed toward the Bavarian Alps. We arrived there at 5 o'clock in the afternoon, at slow speed; luckily, because one of our chief dangers was the possibility of going over the sea. That day seemed very long.

What heat! What thirst! What uncertainty!

"The heat?" you will say. "Since the temperature of the stratosphere is some 60 degrees below zero, Fahrenheit, you could not be too hot."

But we *were* too hot. To protect myself against the cold, I had painted one side of the gondola black, so as to absorb the solar radiations and thus provide heat. The other side of the gondola was shiny. I had an arrangement for turning the gondola around, black to the sun if it grew too cold, and shiny side to the sun if it became too hot.

The black side absorbed the sun's rays perfectly; but when we wanted to turn the gondola, the mechanism provided for this purpose would not work, on account of a short circuit caused in the motor

line when taking off. So the temperature in our gondola continued to rise.

Seventy-seven or 86 degrees, Fahrenheit, would have been pleasant, but 95 to 104 degrees, Fahrenheit, was too much. This torrid heat was rendered all the more painful, as our supply of drinking water was soon exhausted.

There was something else still graver: the excessive heat had deformed the rubber joints of the manholes, and these began to lose air, so that the internal pressure of the gondola was again slowly dropping. There was only one thing to do, and that was, to wait. So we decided to wait and see what would happen.

In the afternoon the balloon started to descend about a hundred feet an hour. At that rate it would have taken us three weeks to get down to earth. But at sundown we knew the balloon would descend rapidly as the cooled gases contracted. At 8 o'clock we felt we were quite low. We were then seven and a half miles up. Here we remembered other aëronauts who had been to this height, some of whom survived, and this was comforting (see diagram, page 367). More comforting was the fact that the sun was setting and the balloon started down rapidly.

At 8:50 we were two and a half miles up, and there opened the manholes. We were above high mountains, but that made no difference. At least, the sea and asphyxiation had been avoided.

Happily luck was with us, for if we were ourselves unable to pick our landing place, the balloon appeared to have the power of avoiding the surrounding crevasses and peaks, and calmly settled down on a flat part of a glacier, the most suitable of all visible spots (see illustration, page 368). We landed at an altitude of a mile and three-quarters, near Ober-Gurgl, in the Innsbruck region, and camped there that night in an improvised fashion, going down to Ober-Gurgl village next morning to resume our contact with mankind (see page 379).

SECOND ASCENT YIELDS SCIENTIFIC DATA

The following year another ascension was planned, and this time Max Cosyns went with me instead of Mr. Kipfer. We chose Zürich for the take-off.

The balloon was the one used previously, but a new gondola replaced the one damaged in the first flight (see illustration, page 382). The date was August 18, 1932.

The first and second ascensions were very different. The first was full of dramatic incident, but less important from the scientific standpoint. The second was almost commonplace, lacking adventure, but was of greater scientific importance because of the studies made of cosmic rays and the measurements taken.

The most amusing incident was the planet Venus being mistaken for me! Some friends were following my balloon in an automobile. Venus, being visible in broad daylight, was taken for my balloon, and the friends followed Venus instead of me.

This time, able to choose our landing place, we came down in Italy, in a clearing among young trees, near Lake Garda, delighted with the scientific results of the ascension (see pages 379, 381, 382).

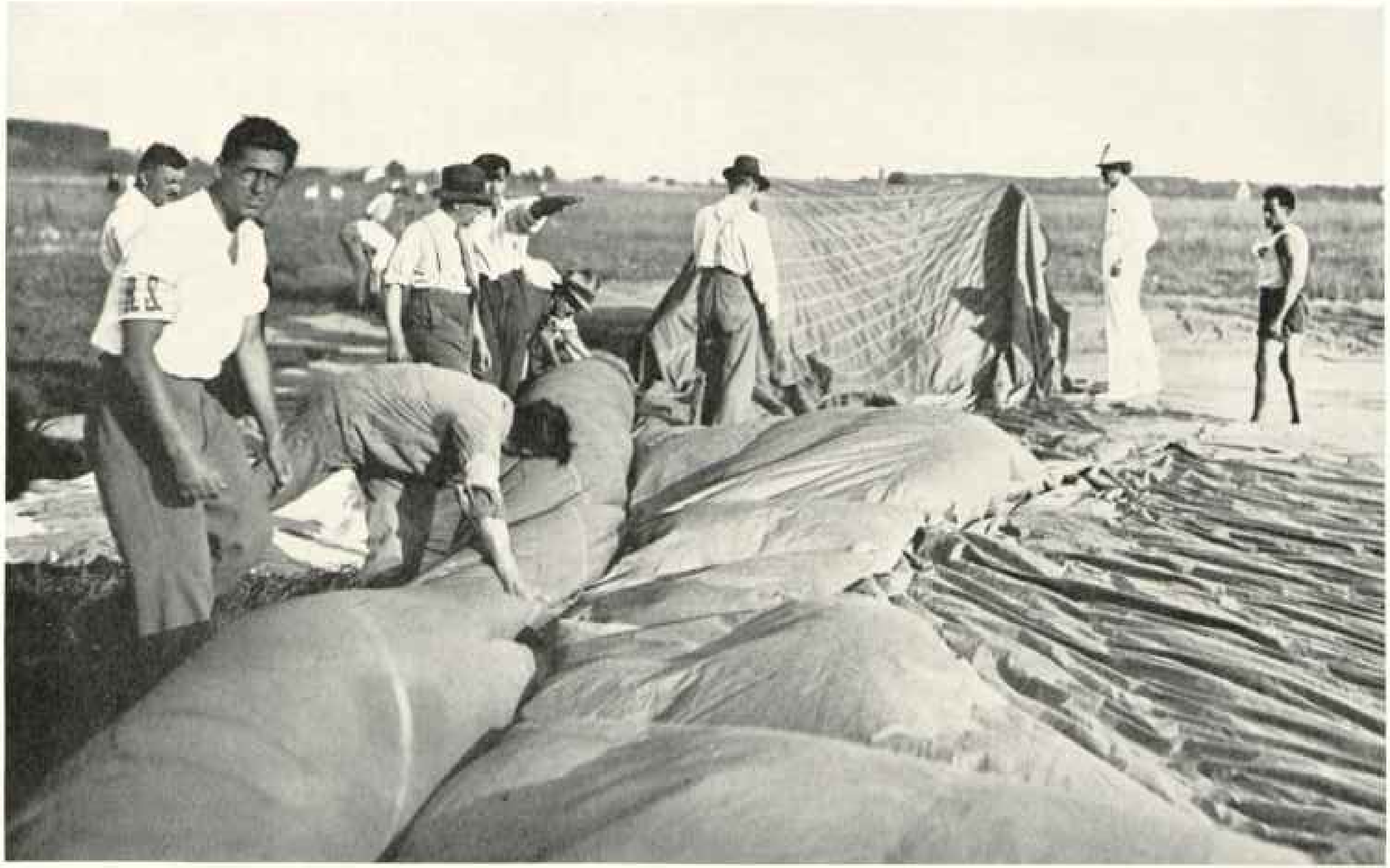
THE MYSTERY OF COSMIC RAYS

We observed cosmic radiation and were able with great precision to measure the ionization process. A few days before this experiment, Professor Regener, of Germany, succeeded in sending up an unmanned balloon to 28,000 meters (17.4 miles) altitude with recording instruments, an exceedingly difficult feat. It is an excellent thing to have the two results to verify each other.

The two results, from the standpoint of intensity, are identical, as high up as our measurements were taken. At first there was a slight difference, but I subsequently received a letter from Professor Regener, of the Stuttgart Institute of Technology, telling me that, after making all necessary corrections, he obtained exactly the same results as I did. So we can say that we have contributed to a precise knowledge of the measure of cosmic rays up to approximately 18 miles altitude. We gathered further data about the nature of cosmic rays that could not have been obtained with an unmanned balloon.

You will ask immediately, "What *are* cosmic rays?"

We know much about the properties of cosmic rays and our knowledge in this domain widens every day, but we do not yet know either the origin of these rays or their nature. Are they produced in the far-off nebulæ, in the stars, in the mysterious

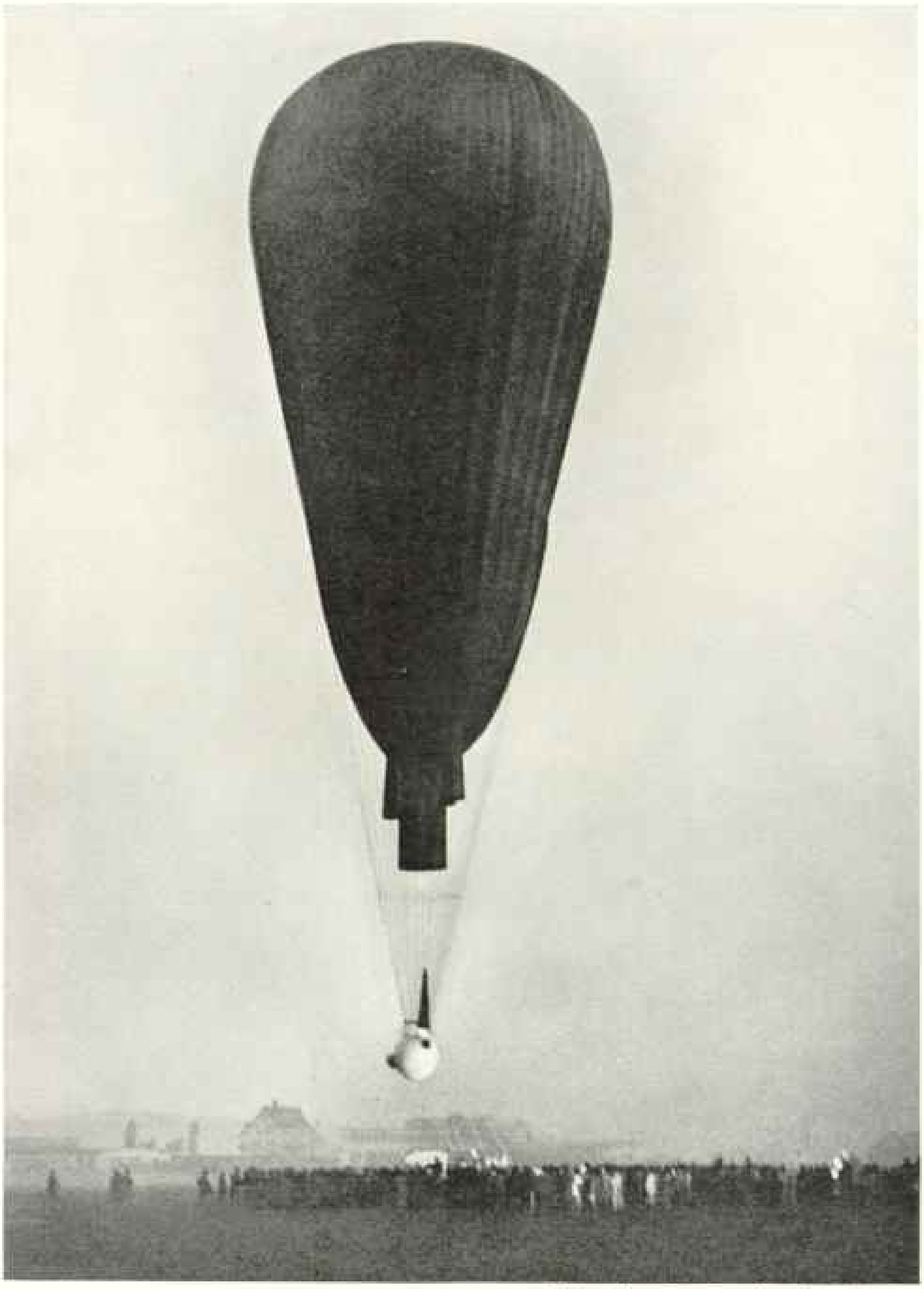


UNROLLING THE ENORMOUS SACK OF THE BALLOON

The heavy yellow cloth was machine-stitched. Handling this enormous fabric required greatest care at all times to avoid ripping or tearing.

FROM TEN MILES ALOFT THE RHINE LOOKS LIKE A RIVULET

Professor Piccard's camera encompassed the sector of the stripling stream flowing east of the Walen See (Lake of Wallenstadt), Switzerland, visible in the upper left-hand corner. Just beyond the river in the center foreground a black splotch marks Sargans, a village dominated by a 12th-century castle. North of Walen See are the Churfirsten, a group of seven rugged peaks. The flaky white patches to the upper right mark the Santis peak. The white bars along the river show how sand is banked on alternate sides of its curving course.



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READY FOR THE TAKE-OFF

The instant the ropes were released the balloon glided swiftly and silently skyward. The enormous height of the elongated, partially filled bag, approximately that of a 15-story building (see text, page 358), is emphasized by the pygmy appearance of the people and the toylike aspect of the houses.—Above the gondola is the cone-shaped parachute (see illustration, page 361); the appendages for releasing gas are visible below the huge bag, and protruding from the sphere is the coil of the guide rope provided for use in landing.

PREPARATION FOR INFLATING THE BALLOON WAS A DELICATE TASK

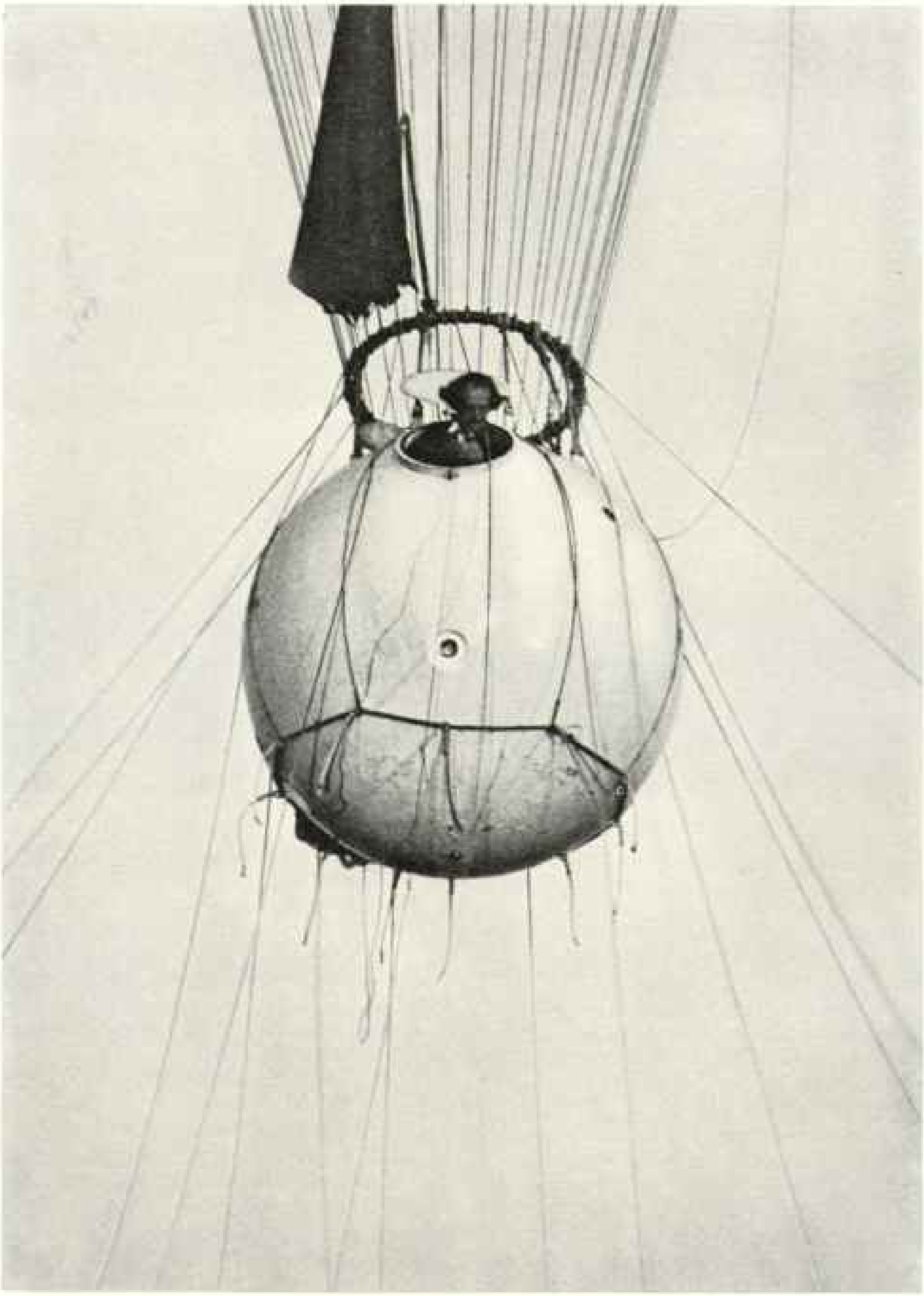
No smoking was permitted because of the ever-present danger of fire from the highly inflammable hydrogen (see illustration, page 374).

depths of infinite space, in the upper layers of our atmosphere, or are they, perhaps, indirectly produced by the sun? Are they composed by a corpuscular emission of flying particles, or do they belong, like the rays of wireless telegraphy, light rays, and X-rays, to the great class of electromagnetic rays?

On a mountain, at a height of nearly 12,000 feet, this cosmic radiation was more effective. It was capable of passing through great layers of ice. Steadily there grew the impression that this radiation came from above our earth.

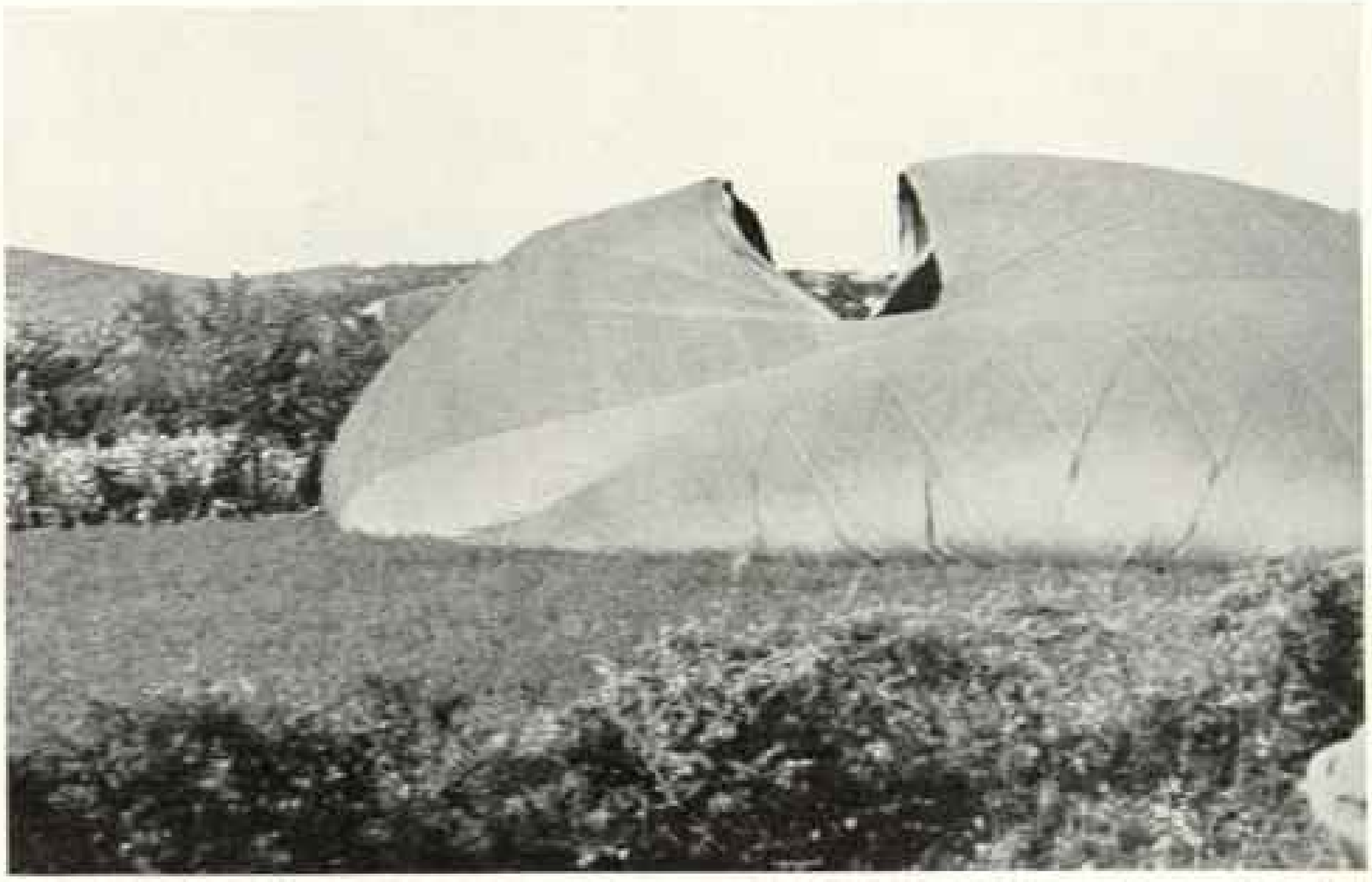
Among the many physicists who by their researches have contributed to increasing our knowledge in this new domain, I will cite only Gockel in Switzerland, who was the first to make ionization measures in a free balloon; Hess in Austria, Kolhörster in Germany, who ascended in a balloon to about 5½ miles, and Millikan in America, who determined with admirable precision the absorption of the rays in the waters of lakes in the Rocky Mountains, and Compton, with his methodical survey of cosmic rays on the whole earth.

Cosmic rays present a number of problems of highest interest to physicists. I wish to discuss only one of these problems at present: the mystery of the production of these rays. I have said that we do not know where this production takes place, but we *can* say what are the reactions that produce them. We can determine approximately the energy contained in each individual cosmic ray. This energy is very great, much greater than that of any other ray. The most violent chemical reactions produced between molecules or atoms only furnish individually energy a million times less.



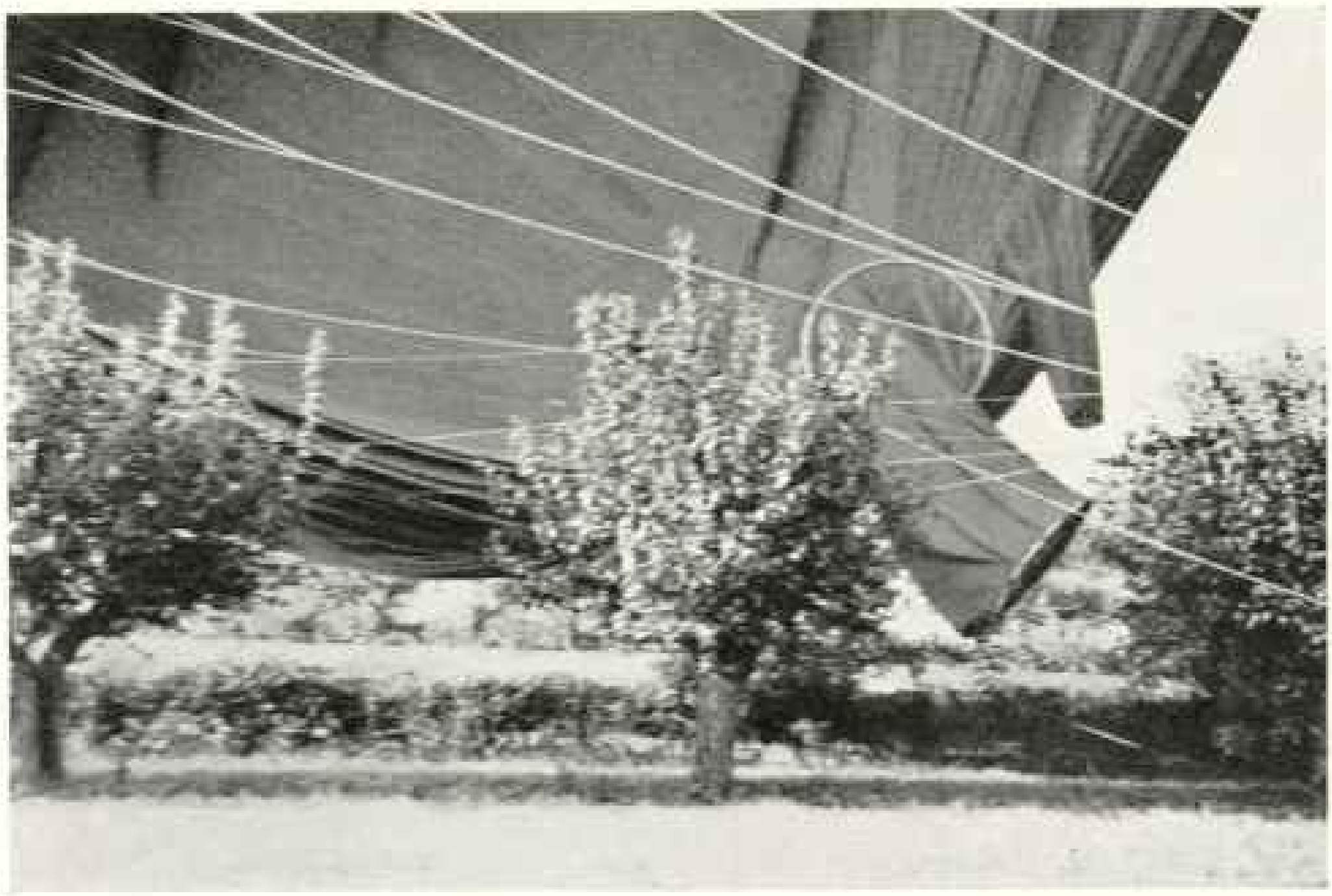
"GOOD-BYE TO ALL THAT!"

The explorer of the stratosphere gives his final commands to his ground helpers and says farewell to the milling throng of friends, as he starts soaring for lone reaches of the stratosphere, with its bluish-purple tinge and its uncanny silence (see text, page 370). Soon the manhole cover will be clamped down to preserve the precious cargo of terrestrial atmosphere in the rarefied air of a 10-mile altitude.



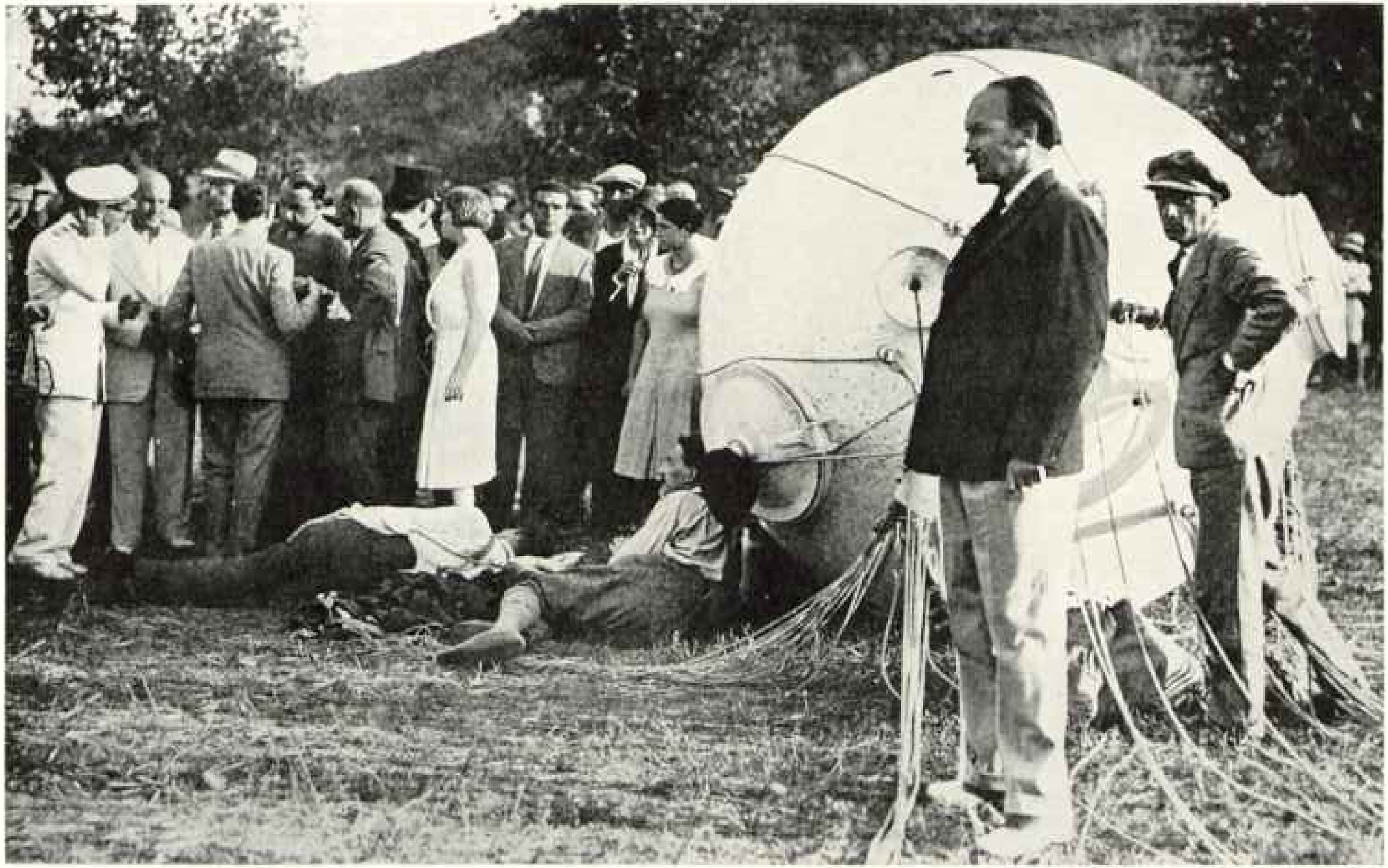
BREATHING ITS LAST AFTER A NOBLE FLIGHT

The yawning aperture, opened by a rip cord, is exuding the hydrogen which enabled the balloon to soar to a record altitude. The deflation took less than a minute. In that interval Professor Piccard leaped from the gondola and snapped the two pictures on this page and that on page 382 (lower.)



AT REST IN A CLUMP OF TREES

The gondola touched ground in a field near Lake Garda, Italy. The circular metal band keeps open the neck of the larger appendage, which lets out gas and admits air at various stages of the flight.



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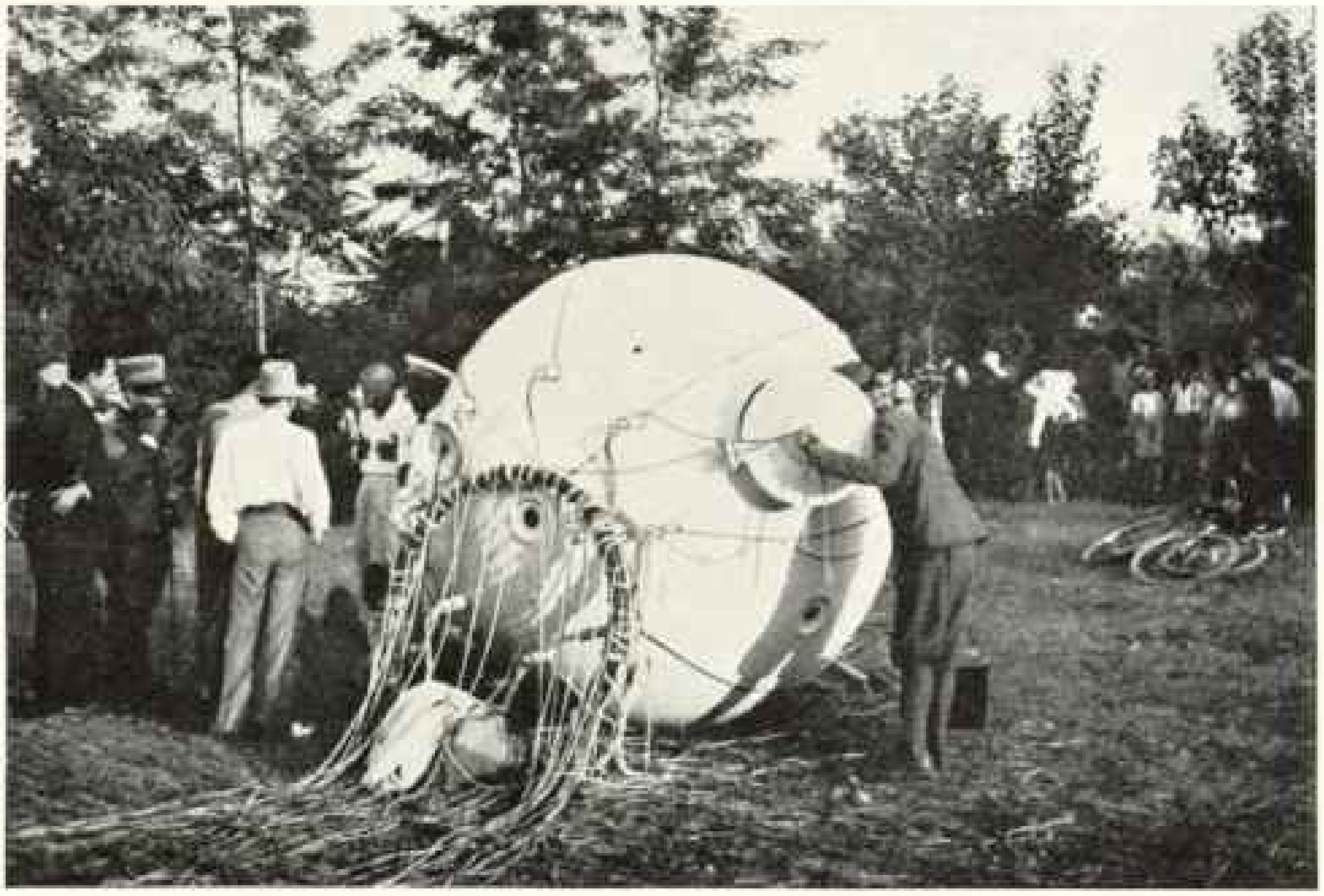
EXHAUSTED, BUT REJOICING OVER THE SUCCESS OF THE ASCENSION

Professor Piccard and Max Cosyns (right) are reclining to recuperate after the sudden change from extreme cold of the stratosphere to the heat of the Lombardy plain (see text, page 373). At the left, beside an Italian officer in white uniform, is the soldier-poet Gabriele D'Annunzio.

CROWDS INSPECT STRANGE CABIN AFTER THE STRATOSPHERE EXPLORATION

Beyond the trees is the balloon bag stretched out after its swift deflation was completed (see page 379).



"PACKING UP" THE GONDOLA AFTER THE SECOND FLIGHT

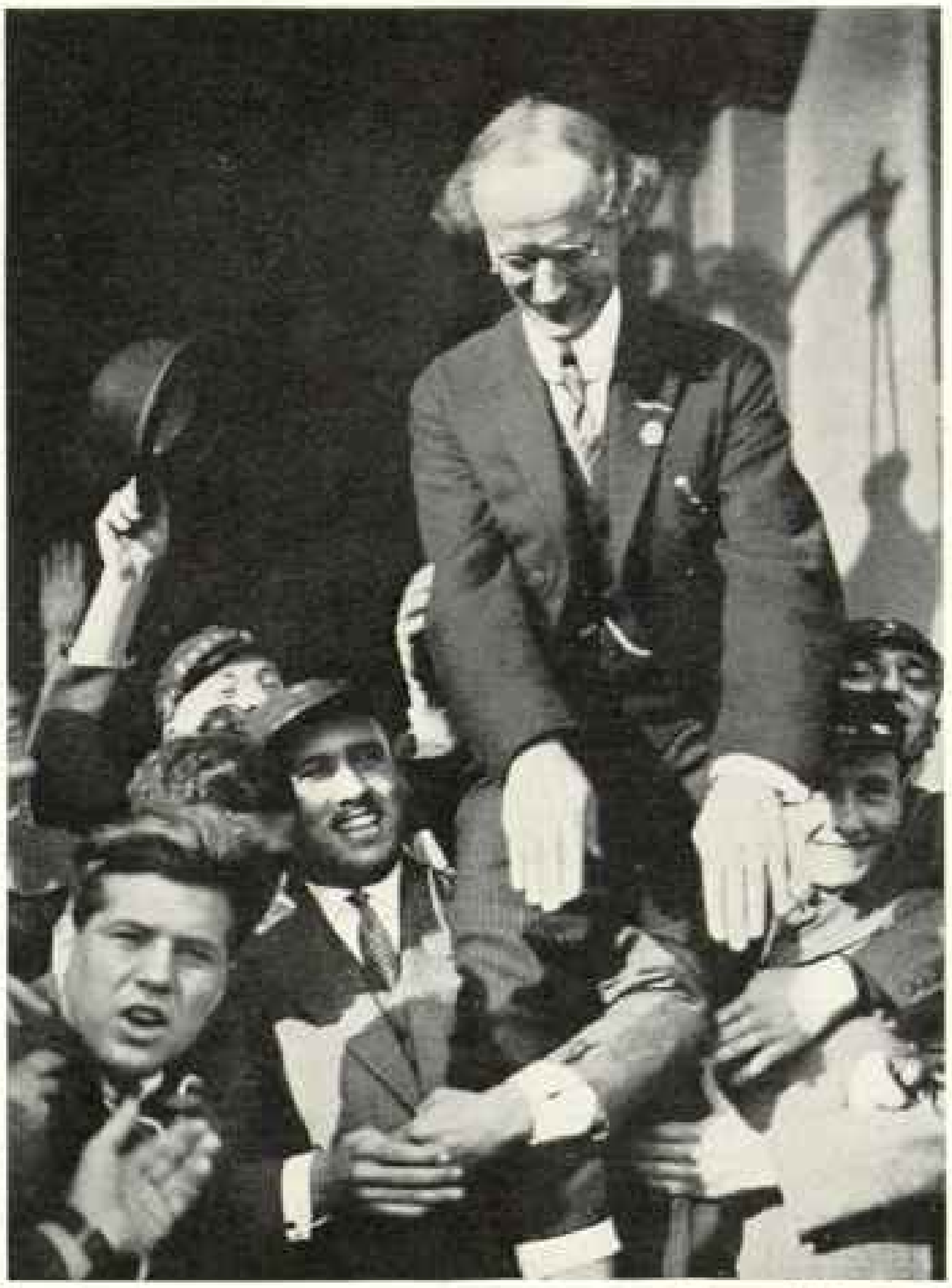
This sphere, now temporarily at Brussels, where the first is permanently kept (see page 370), will be shipped to Chicago to be exhibited at the Exposition.

THE HUGE BAG SETTLES DOWN AMONG TREES (SEE PAGE 381)

Modern physics can calculate with precision what energies would be liberated by certain transformations of light atoms, for example, by the formation of an atom of helium by four atoms of hydrogen, or by the neutralization of the positive and negative charges of an atom of hydrogen.

This kind of reaction has never been observed, but this does not keep the calculation I have mentioned from being above suspicion. Those very reactions, this calculation shows, would be capable of generating cosmic rays.

You see already something of what this means for the engineer. Inasmuch as these reactions take place somewhere in the world, it is highly desirable to produce them artificially for industrial purposes. The raw materials cost nothing—water, for example. The result is energy that can be transformed into heat and motive power.



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"THREE CHEERS FOR THE PROFESSOR!"

Students of Professor Piccard, at the University of Brussels, where he teaches physics, are carrying him on their shoulders in a triumphant procession. The aërial explorer is a native of Switzerland and formerly was associated with the Federal Institute of Technology at Zürich.

Calculations show that the energy liberated from the modification of atoms contained in six drops of water would suffice to light up one of the world's great cities for several hours.

We must not expect modern science to find to-morrow the means of executing this transformation. The resultant crisis would be too violent for mankind; but later on, when our deposits of coal and oil are nearing exhaustion, humanity will, perhaps, find in the reactions now being discussed a means of saving our civilization. The problem is so difficult and the road to travel so long, however, that the work cannot be undertaken too soon.

Across the successive stages of civilization, one age, while exhausting natural deposits, has looked ahead toward a substitute. When wood became relatively scarce, coal was discovered; and as the ultimate exhaustion of coal and oil deposits is inevitable, though remote, we look toward the liberated energy from artificial "cosmic rays" for the energy of the future.

In the presence of such problems, everything should be attempted that has the slightest chance of increasing our knowledge of cosmic rays. They had been studied on the earth in lakes and on mountain tops, and in balloons to an altitude of five and a half miles.

It was then necessary to continue these observations in the higher parts of the atmosphere; for cosmic radiation, in crossing our atmosphere, is not only weakened by absorption, but radically modified in structure. The less penetrating parts of this radiation are completely absorbed by the atmosphere, and other rays—secondary ones—are produced in the atmosphere by the penetrating rays and commingle. What we observe on earth is, therefore, far from resembling the primitive ray as it exists in cosmic space; but it is in its primitive state that this radiation is most likely to furnish enlightenment concerning its origin.

All question of cosmic rays put aside, our ascensions demonstrated the practical possibilities of the air-tight cabin for future rapid travel through the stratosphere. Stratoplanes are already being constructed in various countries. Soon they will be droning through the purple darkness of the upper atmosphere, going three times faster than present-day planes, because of greatly diminished resistance, and with greater security.

Constructors have been encouraged by our expedition, and before long you may witness the opening of this intercontinental highway that will make Europe and America next-door neighbors, as the crossing from New York to Paris will take only from six to eight hours.

AN IMAGINARY TRIP IN THE STRATOSPHERE

We are now able to imagine what a trip in the stratosphere will be like in the future. Visualize a New York business man seated in his dining room at breakfast time reading the morning paper. The telephone bell rings. It is a friend in Paris asking him to drop in for dinner a few hours later. The New Yorker rushes to the airdrome and takes the stratoplane that carries him rapidly to the upper atmosphere. The take-off is unpleasant because of bad weather. A fierce wind is blowing against the plane, shaking it about in all directions and it is pouring rain. "Don't mind a little thing like that," says the porter; "we will be above all this in a few minutes. We are already more than 12,000 feet high."

"But I did not have any buzzing in my ears," says the passenger. The porter explains, "As we are in an air-tight cabin, we do not feel the change of altitude."

"Do you think we will have a good crossing?"

"Without any doubt. All crossings via the stratosphere are good. You will soon see the sky dark blue, but the weather up there is always fair. There is no snow, or rain, or fog, or frost, and there can be no deposits of ice on the plane."

The passenger is still uneasy, because it is his first stratoplane trip. "We can not see the earth any longer; so how can the pilot verify our position and estimate to what extent the winds will make us deviate from our course?"

FUTURE FLYING AT 500 MILES AN HOUR

"As we fly at an average speed of 500 miles an hour, all the winds, even those having a speed of 50 or 60 miles an hour, have only a slight hold on us. What is more, thanks to our wireless set, we cannot possibly miss our airport."

At that moment the conductor happens to be passing through the cabin and puts an end to all the passenger's anxiety.

"We have three motors," he assures him. "If one of the motors fails, we would only have to go down a few thousand feet lower and would arrive safely at our destination all the same, and without using more fuel. It would even be possible to make the crossing with only one motor."

"But have we enough reserve of oxygen?" asks another passenger.

"We have no reserve at all," the conductor tells him, "but the compressors. Each of the motors uses a hundred times more air than all of us together, and a small part of that compressed air passes through the cabin before going to the motor. That air, heated by compression, is so regulated in its admission to the cabin that the temperature desired by the passengers is obtained."

With majestic calm the stratoplane pursues its course high above all fogs and tempests. Fifty thousand feet below, a mighty transatlantic steamer battles against a terrific gale. By radio its passengers are notified that the stratoplane is passing overhead.

"Next time I shall travel by stratoplane," affirms a man on board the ship. "Steamers for rapid traveling are a thing of the past."

And he will be right. The stratosphere is the superhighway of future intercontinental transport.

NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDINGS

SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON, D. C.

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

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

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by addressed return envelope and postage.

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 waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and contributed $35,000 to Admiral Byrd's Antarctic Expedition.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society's notable expeditions to New Mexico have pushed back the historic horizons of the Southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region The Society's researches have solved secrets that have puzzled historians for three hundred years. The Society is sponsoring an ornithological survey of Venezuela.

TO further the study of solar radiation in relation to long range weather forecastings, The Society has appropriated $65,000 to enable the Smithsonian Institution to establish a station for six years on Mt. Brukkaros, in South West Africa.

A NEW WATCH AT A NEW PRICE BY HAMILTON

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To produce this tiny new Hamilton we had to invent new instruments of precision, introduce methods of manufacture new to the watch industry, and use newly devised metals and alloys.

We present this new watch as an important achievement made possible by the devotion, skill and painstaking research and invention of the Hamilton technical staff.

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But here it is. It is very small—a beautiful ornament for the feminine wrist and providing a new standard of accurate timekeeping in small watches.

Examine the six models shown here: Drexel, Glenwood, Mayfield, Virginia, Rondeau, Quadrille. Note the low prices. Only new watchmaking methods make such low prices possible.

See your jeweler and ask for these Hamiltons by the names given above. Also write to us for a folder showing these models in colors and fully describing each one. Consider the happiness one of these beautiful time-keepers would give wife or daughter.

★ ★ ★

Watches pictured. DREXEL. (*Above*) Cord model. 14k two-tone white and natural yellow gold, $79; (*Below, from left to right*) GLENWOOD, filled gold, $55; MAYFIELD, filled gold, $55; VIRGINIA, cord model, solid gold, $70; RONDEAU, solid gold, $65; QUADRILLE, solid gold, $95. All are 14 karat, solid or filled gold, white or natural yellow. Each has 17 ruby and sapphire jewels. Other Hamiltons in many attractive models for both men and women, from $45 to $500. Hamilton Watch Company, 882 Columbia Ave., Lancaster, Pa.

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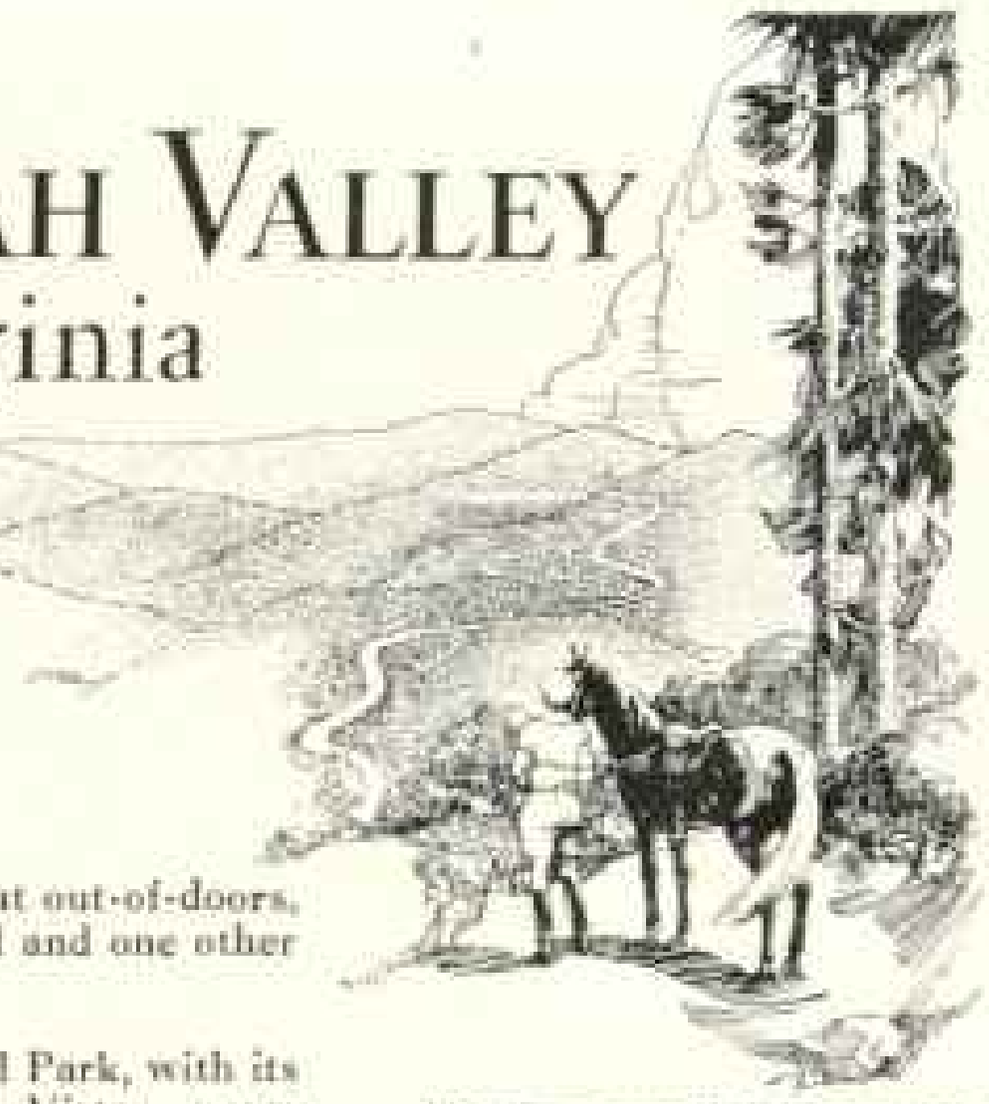


The Land of a Thousand Lures

ARE you beginning to think about the 1933 call of the great out-of-doors, with its motoring, its fishing, its golf, and the hundred and one other joys of vacation time?

Then turn your eyes toward the great Shenandoah National Park, with its magnificent new mountain-height Parkway of a Thousand Vistas, unapproached in America and unrivalled in Europe.

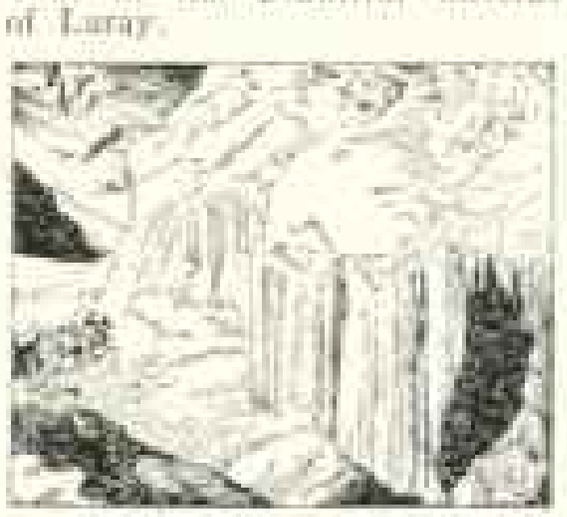
And from that inspiring vantage-point look down on the loveliest Valley in all the world. A thousand mosaics, each a hundred thousand acres broad, made up of field and forest, mountain and stream, town and country, wild areas, and well-tilled farms, will stir your soul.

History, hospitality, gorgeous scenery, and glorious recreational advantages in this wonderland of Eastern America never fail to bring the glow of joy and the thrill of rapture to the souls of those who go there.

And the climax of it all is that great quartette of Natural Wonders, unmatched in beauty, unapproached in splendor, unequalled in charm, and unrivalled in grandeur—the beautiful *Caverns of Luray*, the enchanting *Endless Caverns* at New Market, the historic *Grand Caverns* at Grottoes, and the sublime *Natural Bridge*.

These great Caverns are as different as Bagdad and Rio, as contrasting as Rigoletto and Lucia, and none of them more than half an hour's ride from the Parkway of a Thousand Vistas.

Titania's Veil and Saracen's Tent in the Beautiful Caverns of Luray.



The Snowdrift, one of the rare formations in the famous Endless Caverns at New Market.

The historic Natural Bridge, with its sublime music and pageantry, has stirred the souls of millions of visitors.

The Natural Bridge was once owned by Thomas Jefferson, and was pronounced by John Marshall "God's greatest miracle in stone." Science has now made its walls ring, as never a cathedral built by man has rung, with the sublimest music in the world. A splendid hotel on the grounds accommodates those who desire to see the nobly conceived night pageantry.

Whether you are looking for the supreme in vacation joy, wanting to become a resident of one of the finest areas in all America, or desiring to discover the perfect way to Dixie, write for information.

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The Lindbergh Bridge, one of a multitude of noble formations in Grand Caverns, which include the historic Weyer's Cave.

The Lee Highway, the Valley Pike, and the Boulevard of a Thousand Vistas are unrivalled roads through America's "Land of Pure Delight."

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TALK to any Plymouth owner! Ask him how he likes his car! You'll find the same enthusiasm everywhere you go.

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Rainbow in morning ...Sailors take warning?

YES AND NO!

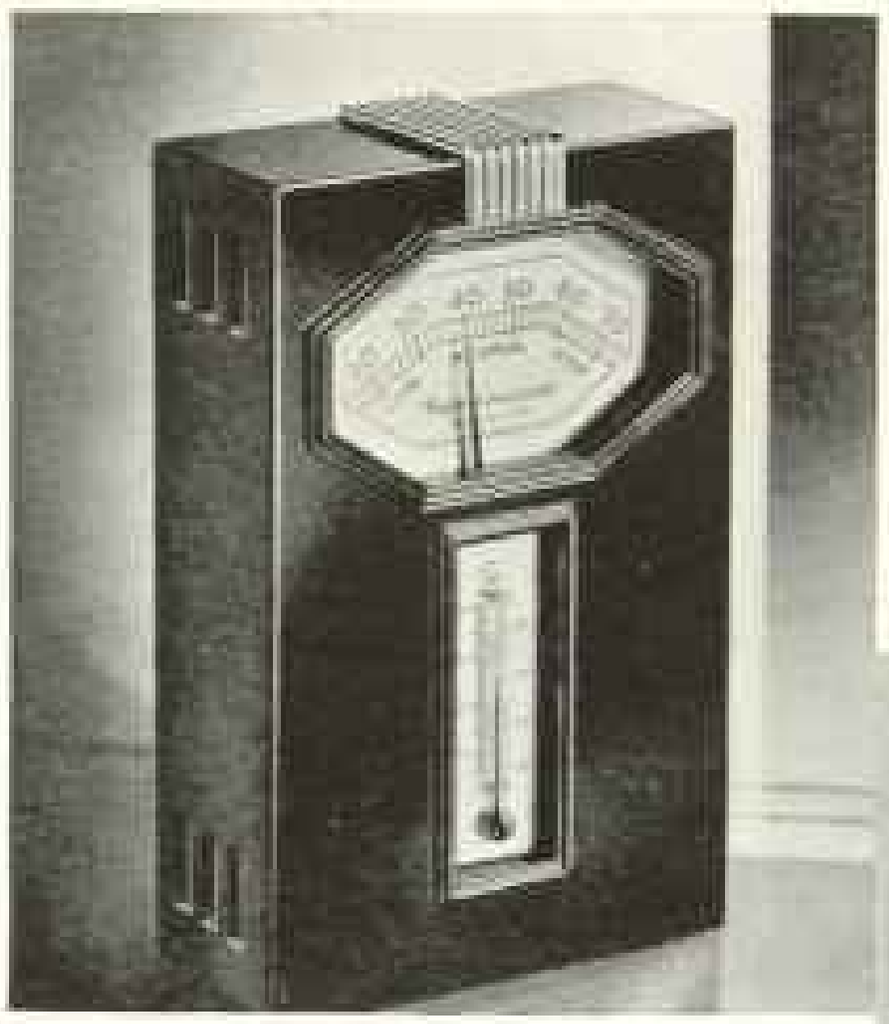
Morning rainbows do mean East Wind, BUT your Stormoguide may be rising and that means Good Weather.

THIS venerable old saying goes back to the day when a squint at the sky and a "feel" of the wind was the only way to guess the day. But now, if you plan to do anything outdoors or go anywhere you need only look at the trim Taylor Stormoguide and you KNOW what weather tricks nature has up its sleeve.

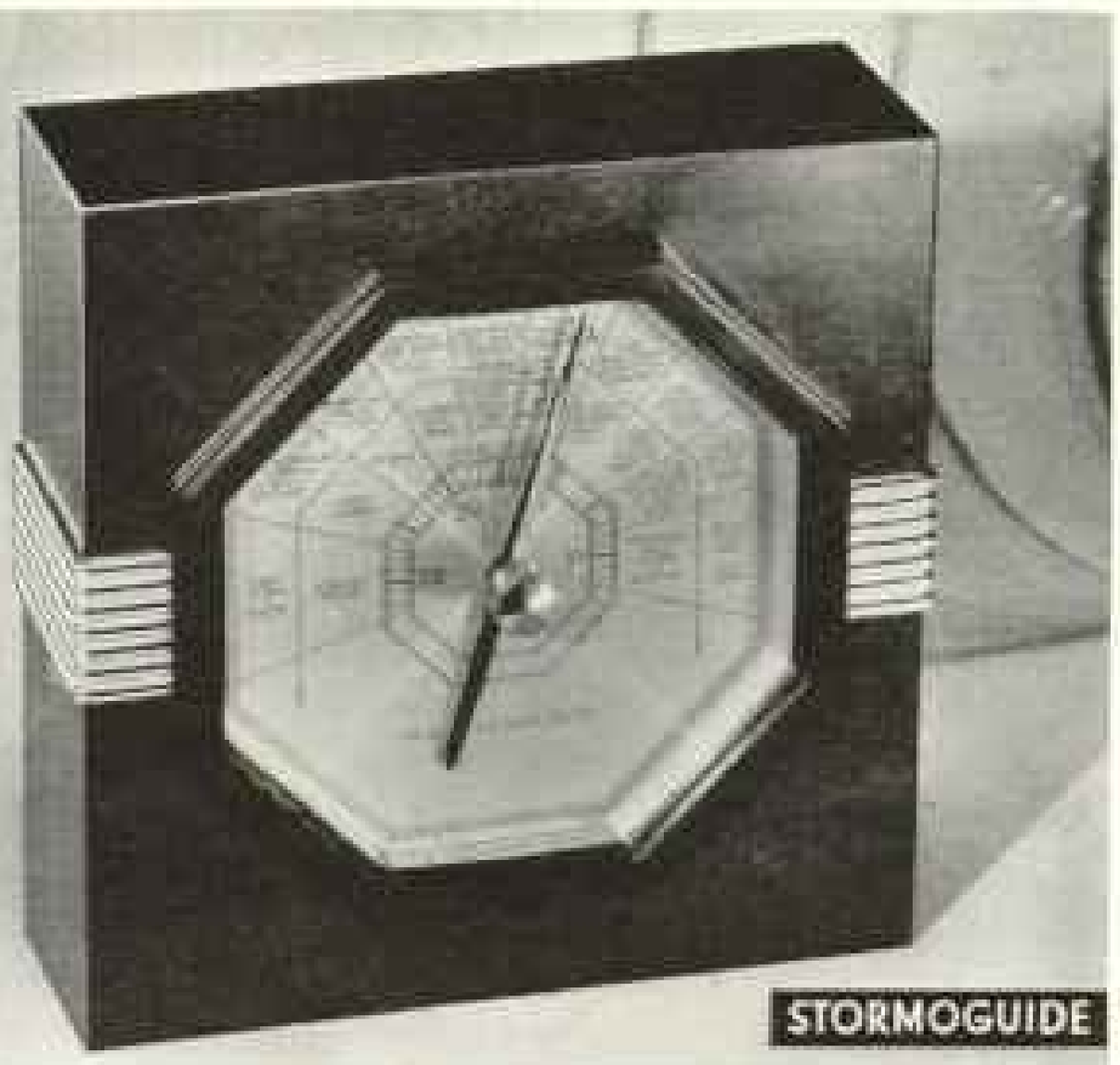
This fascinating little instrument tells you just what to expect from the weather. Its reading is taken at the moment you are wondering whether to dress warm or light—and not from a weather report printed hours earlier in the day.

Notice that the Stormoguide has the name "Taylor" on it. That is the name found on temperature and humidity instruments that are standard throughout the scientific and industrial world. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

TAYLOR STORMOGUIDE. Fairfax Model No. 2257, combining accuracy with beauty. Tells what you need to know about the weather. In satin black, has revolving altitude adjustment, aluminum dial and chrome trim. Size 5" x 5". Price $10.00.

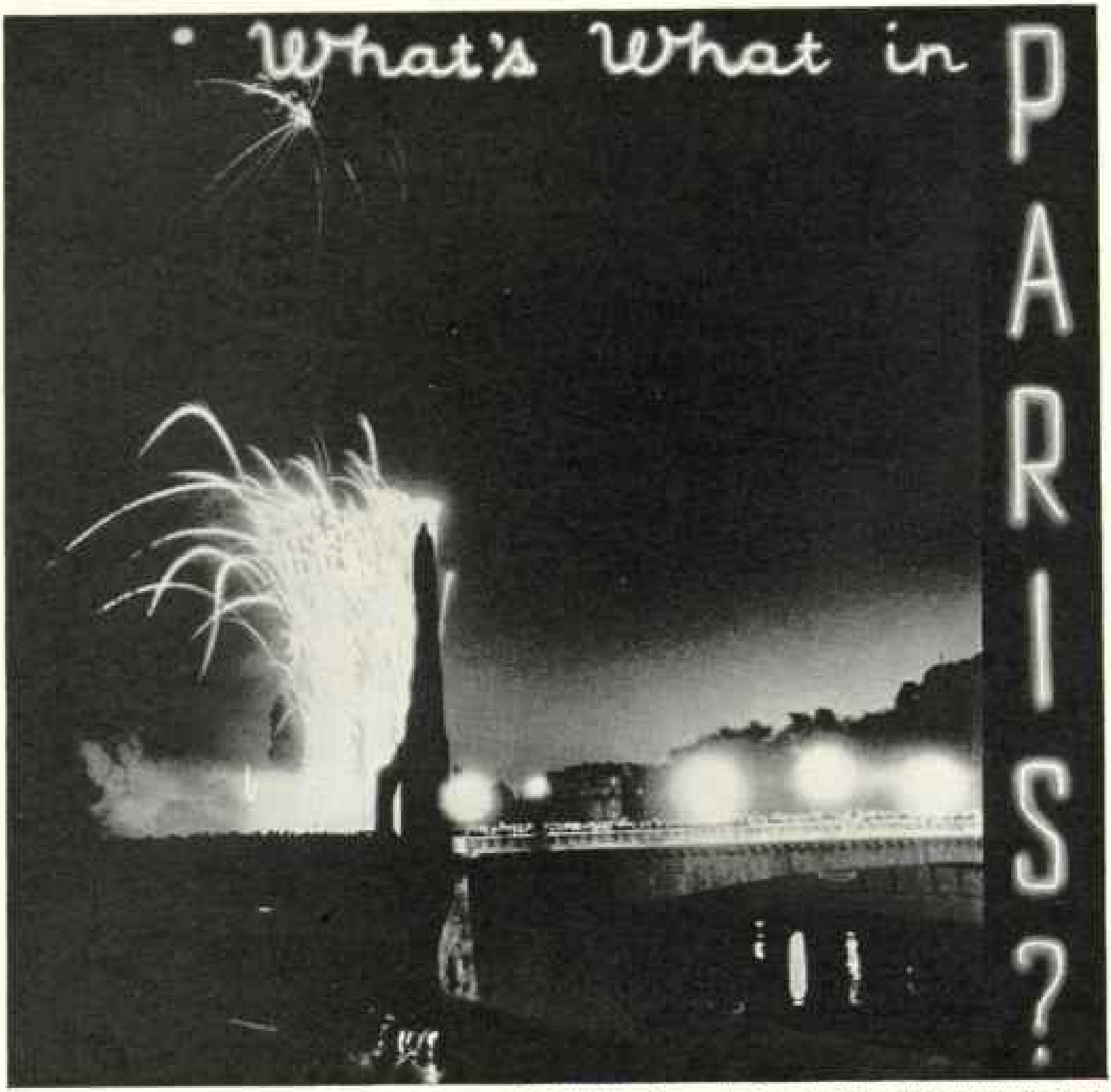


TAYLOR HUMIDIGUIDE. Hampton Model No. 5528. Direct reading dial tells just how much humidity there is in the air. Satin black case with aluminum dial and chrome trim. 6 inches high. Price $5.00.



Taylor INSTRUMENTS

Prices slightly higher west of the Mississippi and in Canada



Bastille-Day fireworks, from le Ponte de la Tournelle, Paris

First the top of the Eiffel Tower, and then the white domes of *Sacre Coeur* come into view from the boat-train. Whether you are seeing them for the first or the twenty-first time, they present the same question: What is new on those "glittering boulevards . . . of fair fantastic Paris?"

There is always up-to-the-minute information about Paris that will be *news* to you. And, miles from the *Arc de Triomphe*, your travel agent is "Paris Headquarters." . . . Paris is the gateway to Europe. Switzerland, Germany, Holland, Italy, Spain . . . all lie within a day's journey. And your travel agent can arrange scores of inexpensive tours into these friendly neighboring countries.

If it is your first trip, you have no idea how helpful his advice can be. You wish to take your own car? He'll arrange it. . . . The best itinerary? He'll list suggestions. . . . The most reasonable hotels? He'll engage rooms. . . . *And your travel agent makes no charge for this expert service.*

French Line passage is handled only by authorized agents whose ability harmonizes with the luxury and security of the French Line. The superb French cooking . . . skilled seamanship . . . modern equipment . . . the perfectly trained, English-speaking stewards . . . all are present on the French Line. Why not make full use of this travel service? French Line, 19 State Street, New York.

French Line

ILE DE FRANCE, April 8 and 29 • PARIS, March 4 and 24, April 15 • CHAMPLAIN, March 11, April 1 and 22 • LAFAYETTE, March 18 • ROCHAMBEAU, March 25

THERE IS

no winter

in an IRON FIREMAN *home*

● AN IRON FIREMAN Automatic Coal Burner, installed in your present furnace, will give you automatic home heating with *economy*. Iron Fireman coal heat is soft, mellow, healthful. Even when the machine is temporarily idle, there is a continuous flow of warmth from the glowing bed of coals in the furnace. This heat is abundant, and inexpensive as well, for Iron Fireman burns small-sized, low-priced coal. Fuel reductions from 15% to 50% are typical when Iron Fireman replaces hand-firing; savings are usually greater when other automatic fuels are supplanted.

Economy is important, but Iron Fireman's great source of satisfaction is its ability to do a firing job *automatically*. No fires to build in the morning. No monotonous basement trips to feed a fire. No worrying about cold rooms while away from home. Day and night, Iron Fireman is on duty, giving you exactly the degree of warmth you desire. If you want the modern convenience of automatic heat with old-fashioned thrift in fuel bills, investigate Iron Fireman *this winter*. You can buy on easy time payments. Installation is quickly made. Ask your dealer for free survey of your home heating plant or write for literature.

Iron Fireman is made in a range of sizes for homes and commercial boilers up to 250 horse-power.

IRON FIREMAN

Automatic Coal Burner

IRON FIREMAN MANUFACTURING COMPANY
3150 W. 106th Street, Cleveland, Ohio

☐ Send Literature ☐ Please survey my heating plant
☐ Residence Type of Business

Name

Address NG-8

SOUTH SEAS

NEW ZEALAND ⁂ AUSTRALIA

via Hawaii, Samoa, Fiji

The Play-ground of the Sun

HAWAII

FARTHEST from winter—nearest to Paradise—these glamorous mid-Pacific isles offer every vacation joy! Here you may swim, play, rest, explore a land brocaded with flowers—and sample the languid magic of the South Seas!

Live in luxury as you explore this nomadic treasure! Cleaving a sunny sea-way, the "Mariposa" and "Monterey"—new sensations in trans-Pacific travel—express superb life at sea in the language of today.

The gayest of ocean voyages is their less-than-five-day passage from California to Hawaii. The gayest of cities—San Francisco and Los Angeles—are their famed ports of departure. . . No holiday is comparable to this in Value. Costs cut to the cloth-of-the-times—while the service, diversion and *new* experience surpass all records of the past.

NEW ZEALAND AND AUSTRALIA

The "Mariposa" and "Monterey," continuing beyond Hawaii, open a rich NEW travel-field! Scenic wonderland of New Zealand just 16 days from California, the great empire of Australia but 19 days away! Enroute are fascinating stops at exquisite Pago Pago in famous Samoa, Suva in Fiji.

New low rail fares in connection with tickets to Hawaii! Reduced rates at Royal Hawaiian Hotel.

Secure details at all travel agencies, or . . .

MATSON LINE ⁂ OCEANIC LINE

New York . Chicago . San Francisco
Los Angeles . Seattle . Portland

The most delicious

BEEF BROTH

you've ever tasted

BEEF BROTH of true old country Scotch style with barley, vegetables and meat is now made by Heinz. Here is a hearty soup—full of flavor—that tempts jaded appetites and satisfies hungry mouths.

Heinz Beef Broth comes to you fully prepared—perfectly seasoned—ready to heat and serve. It is simmered slowly in small batches, just as you would make it in your own kitchen. Every spoonful is as delicious and appetizing as it is wholesome and nourishing.

Take advantage of the convenience and economy of Heinz Soups by serving them frequently. There is a generous assortment from which to choose—each as tasty and good as soup can possibly be. Serve these tempting, fully-prepared Heinz Soups often, at less than the actual cost of home-made soup. There are convenient sizes for every home.

SOME OF THE NEW 57 VARIETIES

Vegetable (With 12 Vegetables) · Beef Broth (Scotch style with Barley, Vegetables and Meat)
Cream of Green Pea · Cream of Tomato
Pepper Pot · Noodle · Gumbo Creole
Cream of Asparagus · Cream of Celery
Mutton Broth · Mock Turtle
Cream of Oyster

H. J. HEINZ COMPANY
PITTSBURGH, U. S. A.
TORONTO, CAN. LONDON, ENG.

HEINZ *homemade style* SOUPS

Bear on hard—here's a colored pencil that can "take it"!

IS your desk a graveyard for old-fashioned colored pencils—the kind with fat, clumsy leads that break and crumble under ordinary writing pressure, and have to be constantly resharpened? Then try the new Mongol Colored Pencil. It will surprise you! It has a thin, strong lead no larger than that of the ordinary black lead pencil and is just as smooth writing and durable. Its color is clean and brilliant. It can be sharpened to a needle-point and you can bear down plenty hard without fear of breaking the lead. Yes, the new Mongol is a big step forward in efficiency and economy. Try it and see.

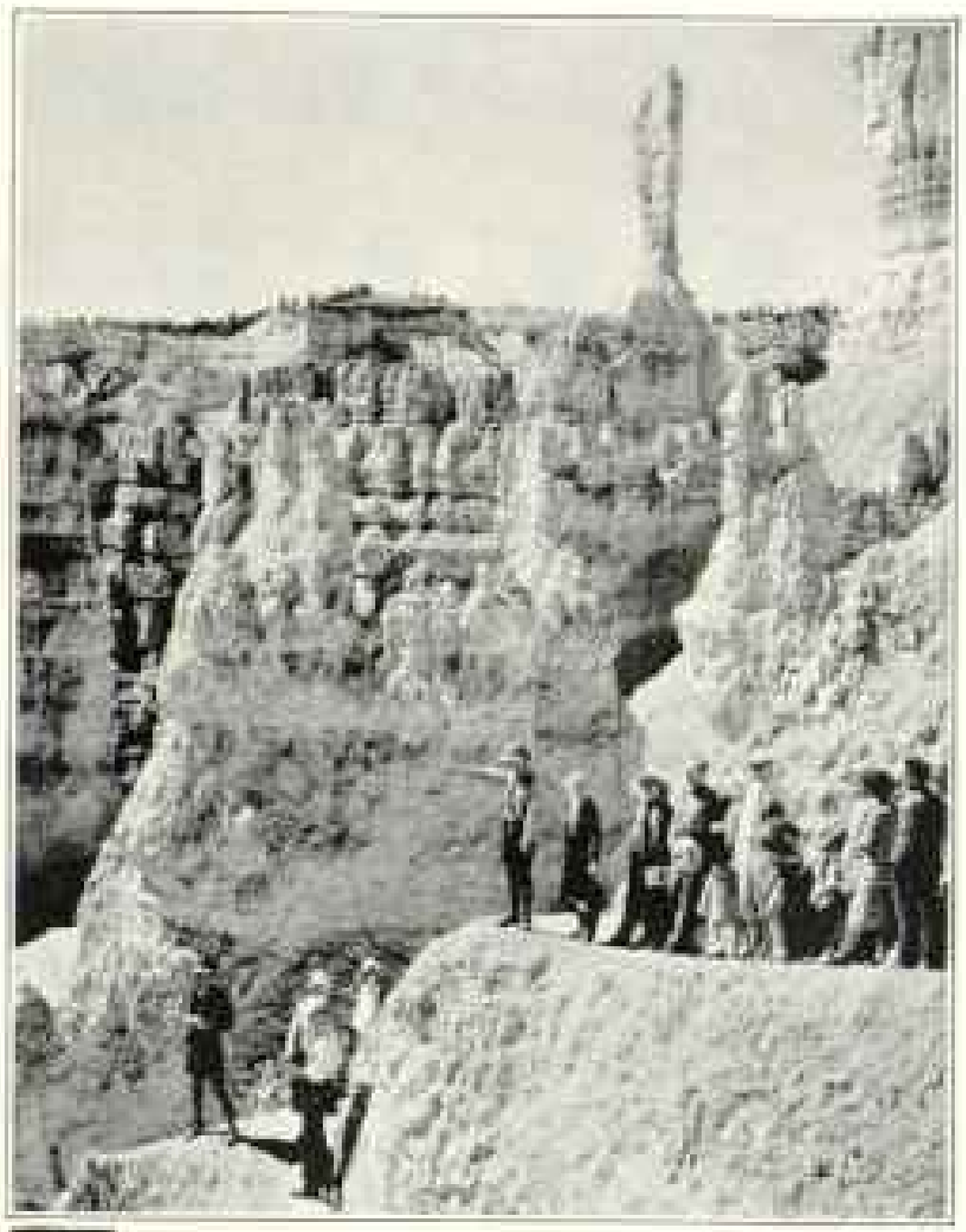
At up-to-date stationers everywhere—10¢ each.

Artists, Designers, Statisticians—anyone using color at home or in the office—write for Folder telling how you can PAINT with Mongol Colored Pencils, brush and water. Address Eberhard Faber Pencil Co., Dept. G, 37 Greenpoint Ave., Brooklyn, N. Y.

write, draw or paint with

MONGOL
COLORED
PENCILS

EBERHARD FABER



In Bryce Canyon

The trail to "Wonderland"

Union Pacific serves 15 of our National Parks and more of the famous scenic wonderlands of the West than does any other railroad. Plan now to see the West this summer. We suggest:

Zion-Bryce-Grand Canyon
Yellowstone-Grand Teton
Rocky Mountain National Parks
Colorado
California and Hawaii
Pacific Northwest and Alaska
Western Dude Ranches
Hoover Dam

All costs are down. Rail fares are the lowest ever offered. Sightseeing rates, hotels, meals—in fact, all expenses are reduced.

UNION PACIFIC

W. S. Basinger, Pass'r Traffic Mgr., Room 385
Union Pacific Railroad, Omaha, Nebr.

Please send complete information about.....

.....

Name ..... Street .....

City ..... State .....

☐ Also tell me about economical all-expense tours

It's a long time between vacations

Make yours a real one this summer

Part of U. S. Fleet at anchor. (Visitors welcomed aboard every Saturday, Sunday and holiday.) Long Beach's $1,000,000 Municipal Auditorium project in foreground.

TWO WEEKS of play to fit you for the coming year's work—and opportunities! No ordinary vacation can do it this year. You need complete *escape* from everything that's familiar and humdrum.

You Can Do It in 2 Weeks

Come to Southern California, where there's every kind of summer play! From most U. S. points even a two-weeks vacation gives you at least eleven days actually here. And in this year 'round vacationland you escape the "peak prices" necessary in one-season resorts. Costs here are normally about 16% under the U. S. average. Recent further cuts make them the lowest in fifteen years!

From inland peaks to pleasure islands in the blue Pacific . . . from gay Old Mexico's border to the eternal ice of Palisade Glacier (a day's drive north from Los Angeles) this land seems made for play alone. Rediscover your favorite sports 'mid thrilling settings, cool Pacific breezes, and total absence of humid "sticky" days or sudden rains to spoil your plans.

Nights are gay in Hollywood and big, cosmopolitan Los Angeles. Days are unforgettable as you follow palm-lined boulevards past orange groves and ancient Spanish Missions, down to the friendly Pacific, or up to a mile-high, pine-fringed lake. In famous Pasadena, Glendale, Long Beach, Santa Monica, Beverly Hills, Pomona and other storied cities are experiences you'll remember all your life.

FREE — New Vacation Book

To help you plan, we offer *free* one of the most complete vacation books ever published . . . just off the press . . . 72 pages, 150 interesting gravure photographs, map, information about routes, itemized costs and day-by-day details of everything to do and see here. Send coupon today for your free copy. Or for further authoritative, unprejudiced information, write us your own questions about a Southern California vacation.

Come to California for a glorious vacation. Advise anyone not to come seeking employment, lest he be disappointed; but for the tourist, the attractions are unlimited.

ALL-YEAR CLUB OF SOUTHERN CALIFORNIA, LTD.

All-Year Club of Southern California, Ltd., Dept. S-Q, 1151 So. Broadway, Los Angeles, Calif.

Send me *free* illustrated book giving complete details (including costs) of a Southern California vacation. Also send *free* booklets about counties checked.

☐ Los Angeles ☐ Orange ☐ San Diego
☐ Santa Barbara ☐ Kern ☐ Riverside

Name _____

Street _____

City _____ *State* _____

(Please Print Your Name and Address)

VACATION COSTS MAY NEVER BE SO LOW AGAIN IN

SOUTHERN CALIFORNIA

We couldn't remember···What we came to Forget

Fort De Russy's gun salutes the sunset. Five o'clock on Oahu. The sun drops down for its dip in the southern sea. A moon rises behind Diamond Head. Purple shadows begin to tint the sea about us.

Five o'clock now . . . dinner at eight. Time for one more flight down white wavecrests. Then a shower, tingling against sun-warmed skin. Dressing leisurely with the sounds of tinkling glasses and laughter coming from a nearby lanai. . . . Outside the window, dusk. Waikiki's lights twinkling to the early stars, and away on the coral reef the puff of white surf, the mystic flare of torches where natives fish with spears.

Here surely is the place where you can forget! Forget . . . Forget what? We can't remember . . . It doesn't matter.

$220 Roundtrip

The finest, fastest ships that sail from the Pacific Coast ports of Los Angeles, San Francisco and Vancouver will carry you to Hawaii and back for $220, First Class. Comfortable and spacious Cabin Class accommodations, $150 roundtrip. A railway or travel agent in your own hometown can arrange your trip.

HAWAII

HAWAII TOURIST BUREAU
(HONOLULU, HAWAII, U. S. A.)
1523 RUSS BLDG., SAN FRANCISCO

Send for FREE *booklet. For special book, illustrated with picture maps, in full color,* SEND TEN CENTS.

BRING HISTORY TO LIFE IN ENGLAND

Visit ancient York with its 1300-year-old Minster; and Durham where lies the Venerable Bede, who died as he dictated the last words of the first translation of the Bible. Wander through the historic streets of Lincoln —headquarters of a Roman Legion during the Occupation — and Norwich, once the second city of England and still preserving many relics of medieval times. Visit Lichfield Cathedral renowned for its three beautiful spires, and put yourself back in the Middle Ages at Warwick Castle. See the old walls and picturesque streets of Chester. Look down from the battlements of those mighty castles that Edward I built at Caernarvon and Conway, and see what a task he had to conquer heroic Wales.

Every county of Great Britain speaks to you of your own ancestors. Travel through those counties by L M S and L N E R to the places you must have longed to see ever since you first read a history book.

Illustrated Pamphlets from T. R. Deter—Vice-President, Passenger Traffic, (Dept. A 34.) L M S Corporation, 200 Fifth Avenue, New York City; H. J. Ketcham, General Agent, (Dept. A 34.) L & N E Railway, 11 West 42nd Street, New York City, or from your own ticket agent

L M S
LONDON MIDLAND & SCOTTISH RAILWAY OF GREAT BRITAIN

LONDON & NORTH EASTERN RAILWAY OF GREAT BRITAIN
L·N·E·R

...DON'T
clip the coupon
(. . . *if you are over 55!*)

Since the first announcement of the **Provident Providor** we have had many thousands of requests for information about this comprehensive retirement plan...We do not want anyone to be disappointed. The **Provident Providor** is not offered to men over 55 or to women. We have other policies or annuity contracts more suitable to their needs. Nor is the **Providor** available to men in poor health or hazardous occupations. It is distinctly a selective contract, and those who obtain it get the full advantage of this selection. Here's what the **Provident Providor** guarantees to pay:

IT WILL PAY

$200 A MONTH commencing at age 55, 60 or 65 and continuing as long as you live. A cash sum may be taken instead if you prefer.

$20,000 IN CASH to your family in case you should die before the income begins.

$40,000 IN CASH, or double the face amount of the policy, to your family, in case death results from accidental cause.

A MONTHLY INCOME—Under certain conditions a guaranteed monthly income is payable in case of prolonged total disability. Furthermore, no premium deposits will be required during the course of such disability, and you will continue to receive the regular annual dividends under the policy.

(NOTE: The **Provident Providor** is flexible. The above figures can be increased or decreased to meet YOUR particular needs.)

FOR MARRIED MEN

The **Provident Providor** will take care of you and your wife if you live; it will take care of your wife if you do not live. An especially attractive feature of the **Providor** is that you may select a somewhat reduced income at age 55, 60 or 65 with the guarantee that the company will *pay an income to your wife and yourself* as long as either shall live.

TODAY let us send you our booklet describing this increasingly popular contract. Just clip the coupon—if you are under 55!

Provident Mutual
Life Insurance Company of Philadelphia, Penna.
Founded 1865

Mail *coupon*
no obligation

PROVIDENT MUTUAL LIFE INSURANCE CO., PHILADELPHIA, PA.

Please send free booklet and quote premium rates at my age for the Provident Providor, with the understanding that it places me under no obligation.

My name _____

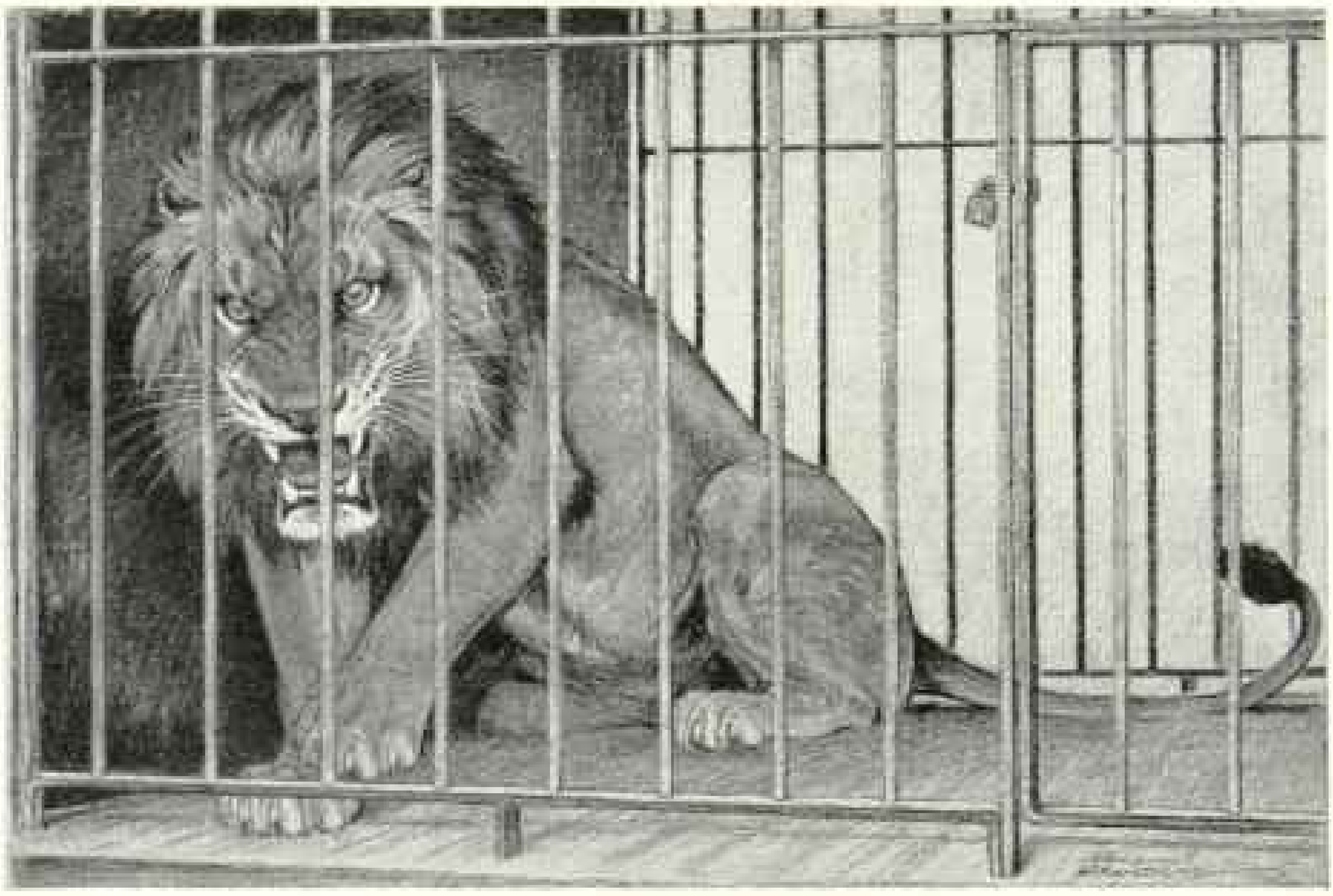
Home address _____

Business address _____

I was born _____
Month Day Year

MGM-12X

DIABETES—the Lion Caged

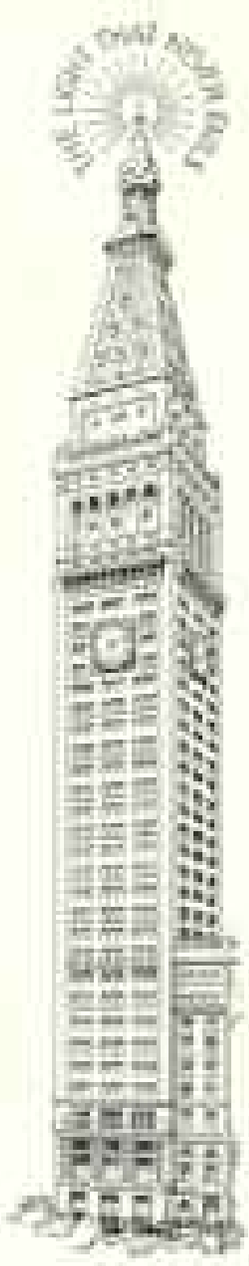


DIABETES, under control, might be likened to a safely caged lion. Out of control, it strikes with a lion's speed and crushing power.

The discovery of insulin and its application to the treatment of diabetes is one of the great triumphs of medical science. It has saved many thousands of lives.

Insulin has not only rescued children who would have been doomed without it, but it has enabled them to grow and to live the normal, healthy lives of their playfellows. It has lifted chronic diabetics out of the invalid class, making it possible for them to carry on industrious, useful careers.

Before this great discovery, a victim of diabetes was forced to adhere strictly to a wearing and often spirit-breaking diet—if he would live. Suffering from a constant and almost unbearable craving for rich food and sweets, he struggled to obey his doctor's orders—"No starches, no sugars." The dining room was a dreary place for a diabetic.



What a contrast between the old, half-starved, hopeless days and the present time when the majority of diabetics are allowed many of the things they like to eat. A goodly percentage of them will live out the expected span of life for their ages.

Diabetes is by far most frequent among overweight persons. It may be largely prevented by correct diet and proper exercise. New cases of diabetes appear with almost mathematical regularity — tens of thousands each year in this country. But a person who showed no trace of the disease last year and now finds unmistakable symptoms has little cause for anxiety. In all probability his case can be fully controlled by proper diet, exercise and the use of insulin.

Still a grave danger remains. Insulin has such a tonic effect on a diabetic that he sometimes makes the mistake of regarding himself as cured. He must be reminded that if he lets his lion, Diabetes, get out of control he runs a risk which may be fatal. As long as he keeps his lion caged he is safe.

New! Different!

PHILCO LAZY-X

The easiest, laziest way to listen in. Relax, enjoy and change programs without moving from your chair.

Sink deep into your most comfortable chair. A radio of glorious tone begins playing softly across the room.

Would you prefer it slightly louder? A touch of your finger and the full volume of the orchestra sweeps into the room. As the program ends—tune in another station if you wish—adjust the volume—control the tone—all without getting up from your chair.

That's Lazy-X convenience—made possible by PHILCO Electrical Remote Control! All the glorious beauty of PHILCO tone—the tone quality only the Patented Inclined Sounding Board makes possible—comes to you at its best from the separate Sound Cabinet across the room. But the controls are in a Queen Anne Table Cabinet right beside your chair!

With Lazy-X convenience you use radio much more than you ever did before. You listen to a far greater variety of programs—because changing stations is so easy, so simple, and all the controls are right beside your chair!

Almost automatically Lazy-X doubles the number of stations you hear and enjoy—by doubling the ease with which you change the dial setting. A whole new world of radio entertainment is opened up for you and your family!

PHILCO offers the great new Lazy-X in two models—the superb 14LZX at $150 and the smaller 19LZX at $100 for those who do not require quite so much power and distance. The height of radio luxury at less than half the previous cost of remote control!

See Lazy-X at the nearest PHILCO dealer's. Hear it. Buy it. Relax and enjoy the last word in radio performance and convenience.

PHILCO · PHILADELPHIA · TORONTO · LONDON

Sound Cabinet

GLORIOUS TONE HERE

TUNE HERE

Control Cabinet

The glorious tone of the PHILCO Inclined Sounding Event X Models is available also in conventional cabinets.

150X		$250
23X	Radio Phonograph	$195
13X	(Illustrated)	$150
91X		$100
43X	All Wave	$100
47X	Direct Current	$100
71X		$ 80

Federal Tax Paid

$18.75 to $250

FEDERAL TAX PAID

PHILCO REPLACEMENT TUBES IMPROVE THE PERFORMANCE OF ANY SET

A musical instrument of quality

ED WYNN says -

SO-O-O-O-O

. . . he filled up

with Texaco Fire-Chief

and drove happily ever after'

Every day more motorists are ending their winter starting troubles with *quick-starting* Texaco *Fire-Chief* Gasoline.

Texaco *Fire-Chief* is actually a fire-engine gasoline. It was developed to meet U. S. Government specifications for—"a grade of motor fuel suitable under adverse conditions of starting and acceleration." That's *your* guarantee of sure-fire action in any weather!

Try a tankful today. *Quick-starting* Texaco *Fire-Chief* is available at Texaco Stations in every one of our 48 States—at *no extra price.*

THE TEXAS COMPANY . *Texaco Petroleum Products*

Tune in on

ED WYNN

(THE FIRE-CHIEF)

Tuesday Nights, Coast-to-Coast, N.B.C.

TEXACO *FIRE-CHIEF* GASOLINE

Developed for fire engines - - - Yours at no extra price

Only the world's greatest soup kitchens could produce it!

In every spoonful of Campbell's Tomato Soup you detect a finish and a perfection of flavor that sets a standard for you in Tomato Soup. You realize that it is by far the finest you have ever tasted. You decide to have it always.

Of course there are very good reasons behind that special deliciousness you admire so much. For this soup is made in the greatest kitchens of their kind in the world, by soup chefs famous as the leaders in their art.

LOOK FOR THE RED AND WHITE LABEL

21 kinds to choose from . . .

Asparagus	Clam Chowder	Pea
Bean	Consommé	Pepper Pot
Beef	Julienne	Printanier
Bouillon	Mock Turtle	Tomato
Celery	Mulligatawny	Tomato-Okra
Chicken	Mutton	Vegetable
Chicken-Gumbo	Ox Tail	Vegetable-Beef
		Vermicelli-Tomato

Campbells' Tomato Soup

WITHIN THE REACH OF MILLIONS

THE most valuable things on earth are the commonest things. Gifts of Mother Nature—air, rain, sunlight and colors in the sky, grass underfoot and foliage overhead. Gifts of human nature—love, loyalty, handclasps and friendly speech.

Then, of material things, some of the most useful are the commonest and cheapest. These we take almost for granted. There is no way to reckon their worth.

It is a great tribute to the value of the telephone that within a few short generations it has come to be ranked among these common things. Its daily use is a habit of millions of people. It speeds and eases and simplifies living. It extends the range of your own personality. It offers you gayety, solace, security—a swift messenger in time of need.

Daily it saves untold expense and waste, multiplies earning power, sweeps away confusion. Binds together the human fabric. Helps the individual man and woman to triumph over the complexities of a vast world.

You cannot reckon fully the worth of so useful and universal a thing as the telephone. You can only know that its value may be infinite.

AMERICAN TELEPHONE
AND TELEGRAPH COMPANY

Maine
Lakes and Woods

Fifteen million acres of "big woods"—7,500 lakes, rivers and streams. No wonder Maine is the nation's playground. Come this year for a vacation you'll never forget.

Maine air is clean and invigorating—summer days are pleasantly warm and nights cool for sound sleep. Enjoy your favorite outdoor sports or quiet rest and relaxation.

Transportation service to Maine is comfortable and convenient. Maine motor roads are good. The cost of a Maine trip is less than you think. Mail the coupon for full information—and come!

MAINE DEVELOPMENT COMMISSION

MAINE PUBLICITY BUREAU

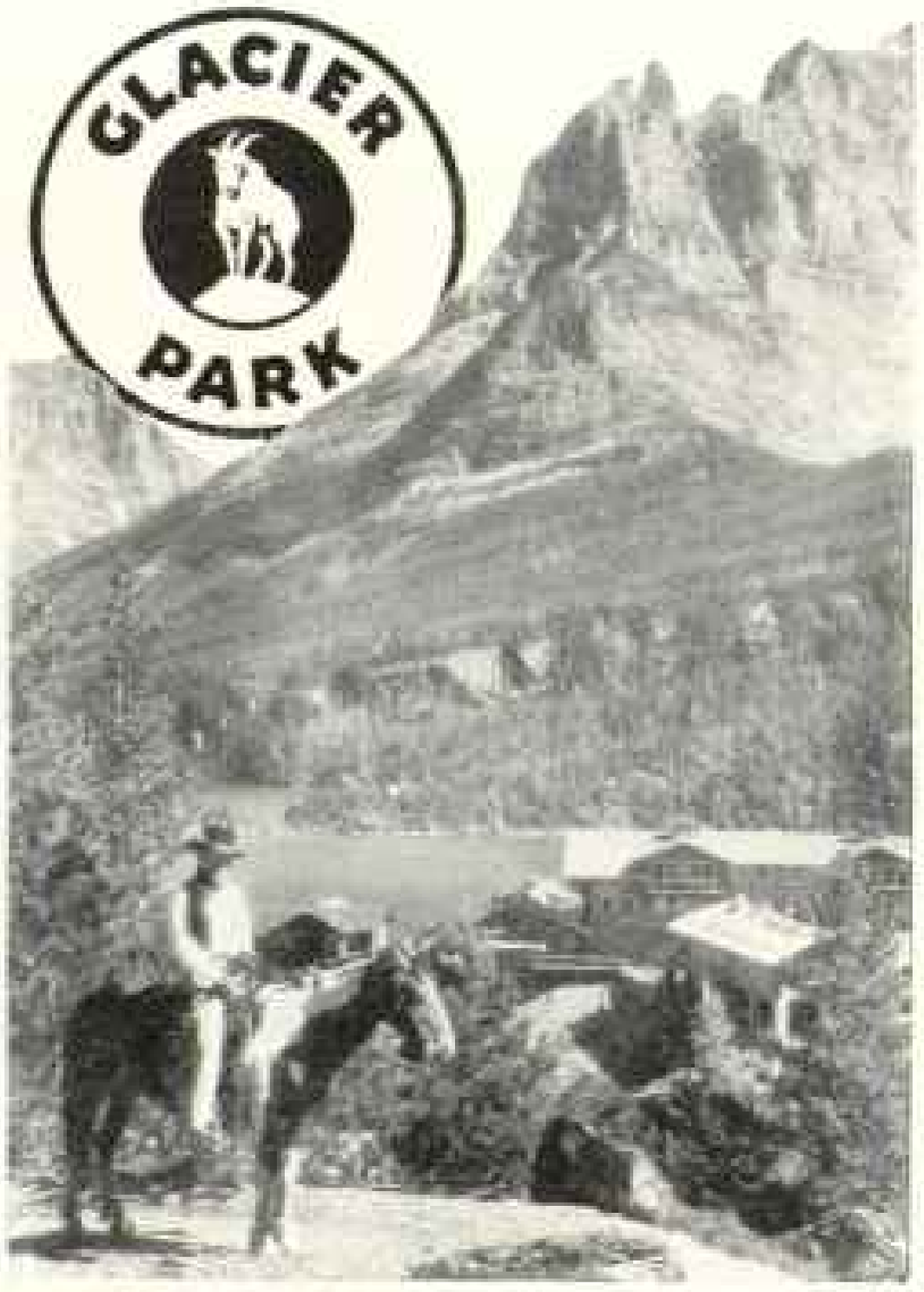
10 Longfellow Square, Portland, Maine.

Please send free copy of Official State Pamphlet, giving all information on Maine vacations.

Name.....

Address.....

City..... State.....



● *Going-to-the-Sun Chalets*

See America . . . it costs less

● It costs less this year than ever before to see Glacier National Park—the land-of-shining-mountains. And this vacation begins the moment one steps aboard the luxurious Empire Builder—transcontinental train that takes you direct to Glacier Park Hotel.

● Glacier Park hotel rates are reduced but high quality of service will be maintained. Ask about low-cost, all-expense tours.

● Write A. J. Dickinson, P. T. M., 704 Great Northern Railway Bldg., St. Paul.

● *Going-to-the-Sun on good ship St. Mary*

GREAT NORTHERN

"I bought my first Dodge nearly twenty years ago

. . . and this new '8' is the finest car Dodge ever built!"

No MATTER what kind of car you've been driving . . . no matter what price you're used to paying, the new Dodge "8" will be a revelation to you.

122-inch wheelbase . . . 100-horsepower—it's big, powerful, fast! And it is ultra-modern in appearance, in comfort, in driving ease.

Floating Power engine mountings give you unbelievable smoothness . . . freedom from vibration. A new feature—"inertia ride control"—automatically adjusts the shock-absorber to all types of road conditions. Oilite springs with metal covers are squeak-proof.

Driving is easy . . . effortless. Shifting is quiet in all speeds, including reverse. Starting is simple . . . turn on the ignition, step on the accelerator and presto! the engine is running.

This new Dodge "8" is speedy . . . and safe! Mono-piece steel body. Hydraulic brakes, with centrifuse drums. Double-drop X bridge-type frame. Low center of gravity. Duplate Safety Plate glass in windshield.

Go to a Dodge dealer and take a look at this new Dodge "8". You'll see why most Dodge owners, when buying a new car, unhesitatingly buy another Dodge!

NEW DODGE "8"

WITH FLOATING POWER

An Aristocrat from bumper to bumper

Dodge "8": Coupe with Rumble Seat $1115 . . . Sedan $1145 . . . Five-Passenger Coupe $1145 . . . Convertible Coupe $1185
Convertible Sedan $1395 . . . Dodge "6": $595 to $695 (All Prices F. O. B. Factory, Detroit)

New Low Price

Now Only

$18.75

THE FAMOUS PORTABLE

MIXMASTER

The only non-radio-interfering food mixer made

Get this sturdy, expert helper and let it do all the tiring arm work of preparing meals. It's the famous, powerful, EASY-TO-USE food mixer with the multi-speed, tilt-back motor, self-clamping beaters, juice extractor, two lovely green SELF-TURNING mixing bowls, automatic mayonnaise oil-dropper. Portable, too—use anywhere right at the stove or let them mix by themselves on the stand. Food chopper-mixer grinder, automatic can opener and power knife sharpener attachments, etc., at small extra charge. **Never before such a complete food preparer at such an amazing price.** If not at your electric light company or dealer's, write Chicago Flexible Shaft Company, 5611 Roosevelt Rd., Chicago. (Western price, $19.50.) 43 years making QUALITY products. MIXMASTER is one of

THE BEST ELECTRIC APPLIANCES MADE **Sunbeam**

Mixes
Mashes
Whips
Shreds
Juices
Grates
Chops
Grinds
Beats
Slices
Peels
Potatoes

Go abroad ENROUTE TO CALIFORNIA *or* NEW YORK

Follow the foreign route which includes Havana, Colombia* (*Eastbound), Panama, Costa Rica, El Salvador, Guatemala, and Mexico. Sail on one of the four beautiful new "Santa" ships, and enjoy the luxury of an outside stateroom with private bath at the minimum first-class fare. Glorious days at sea are combined with sightseeing trips in romantic Spanish ports. 16 days between New York and California. Minimum first-class fare $225. Next sailings: from New York March 18, April 1, April 15; from San Francisco March 17, March 31, April 14. Consult your travel agent or Grace Line.

New York: 10 Hanover Sq.; Boston: Little Bldg.; Chicago: 230 N. Michigan Ave.; San Francisco: 2 Pine St.; Los Angeles: 548 So. Spring St.; also Philadelphia, Seattle, and Victoria.

Write

"Bon Voyage" on this Sheet

Then watch its columns of black and white become grey castles on the Rhine, silvery Alpine peaks, the shifting colors of the seven seas!

Make a John Hancock Budget your confidant in your plans to see the world some day. It will help you to manage your trip financially and will increase the thrill of anticipation. Worth a trial. Is it not?

John Hancock
MUTUAL
LIFE INSURANCE COMPANY
OF BOSTON, MASSACHUSETTS

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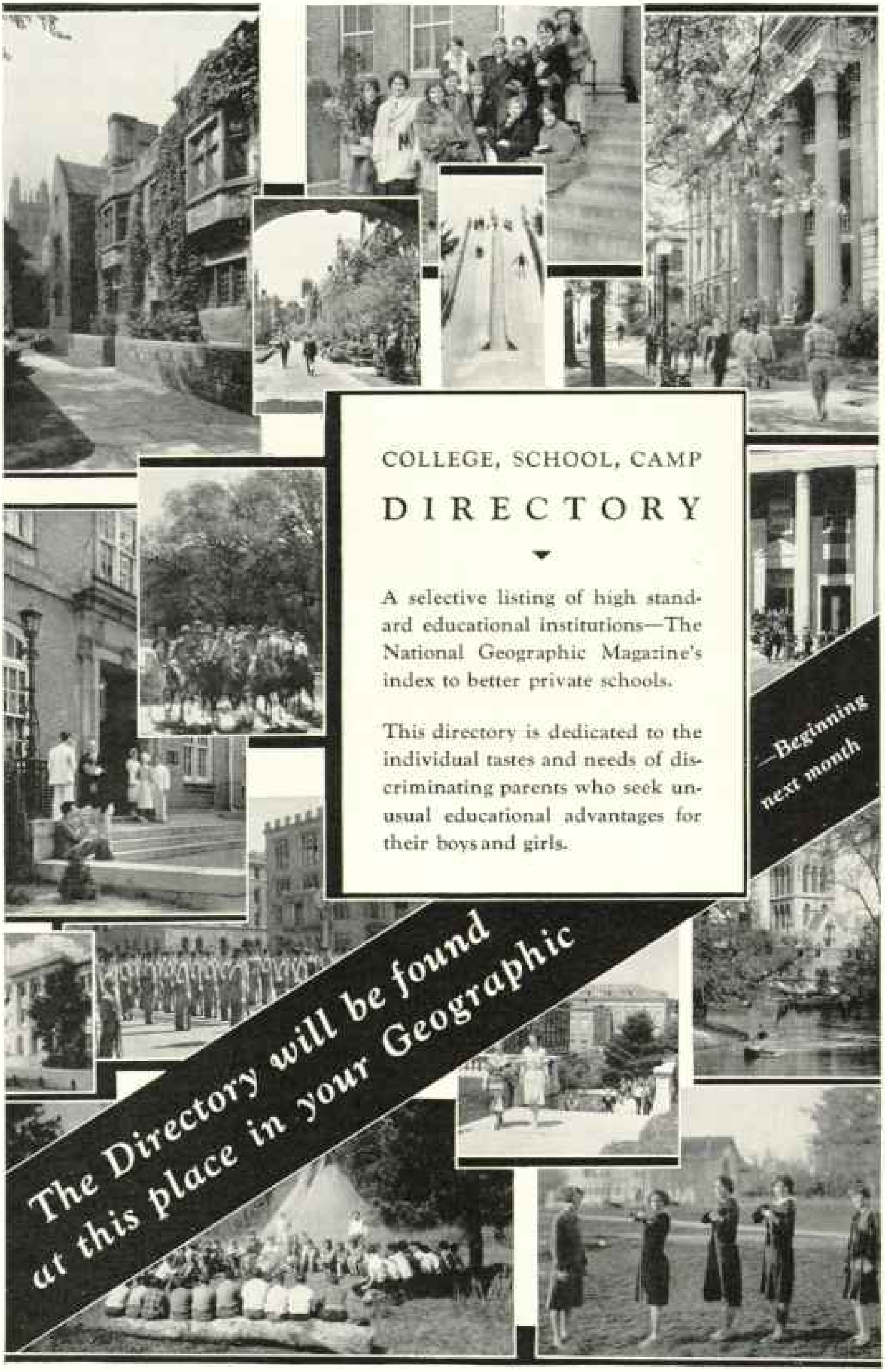

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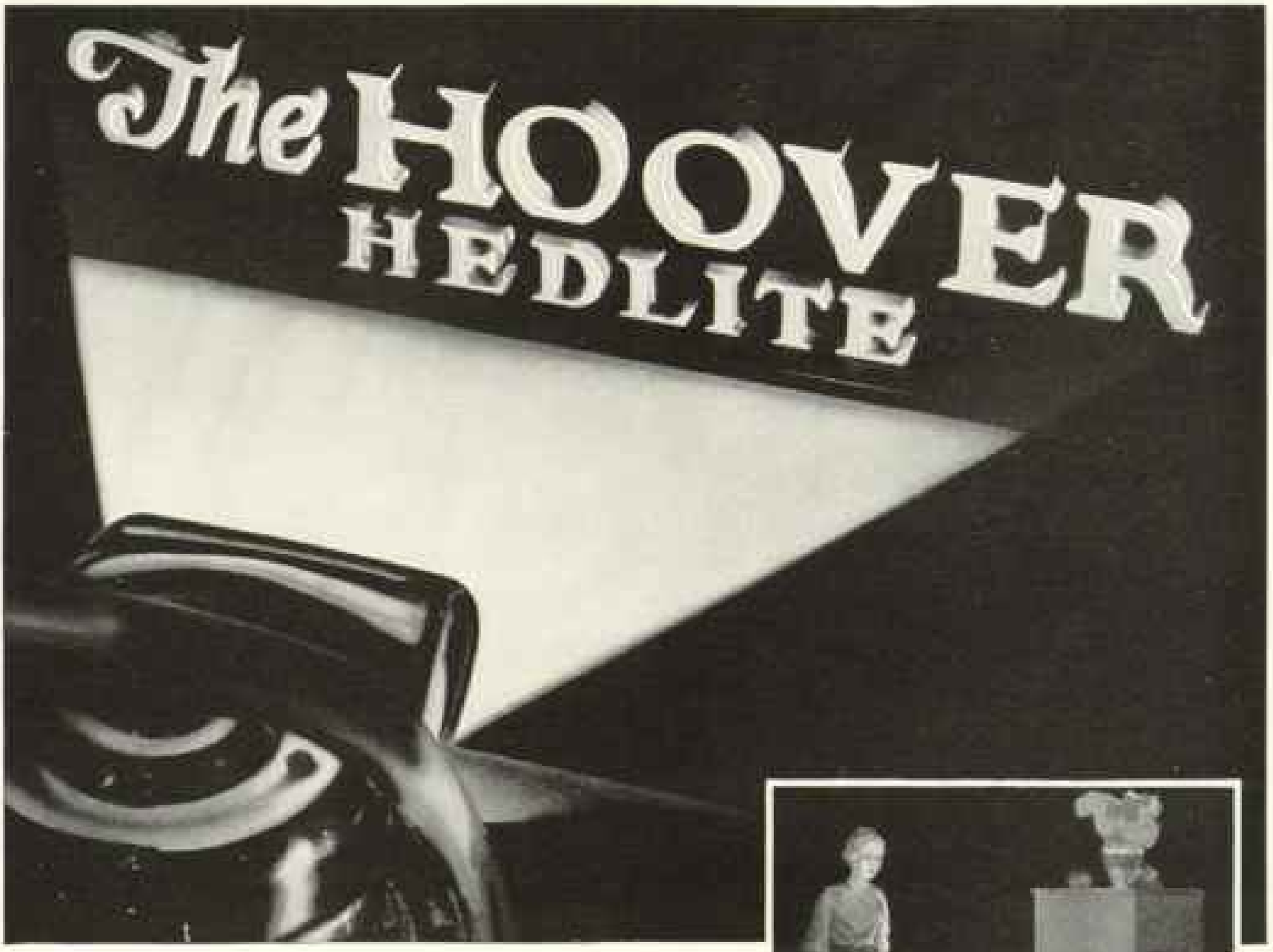

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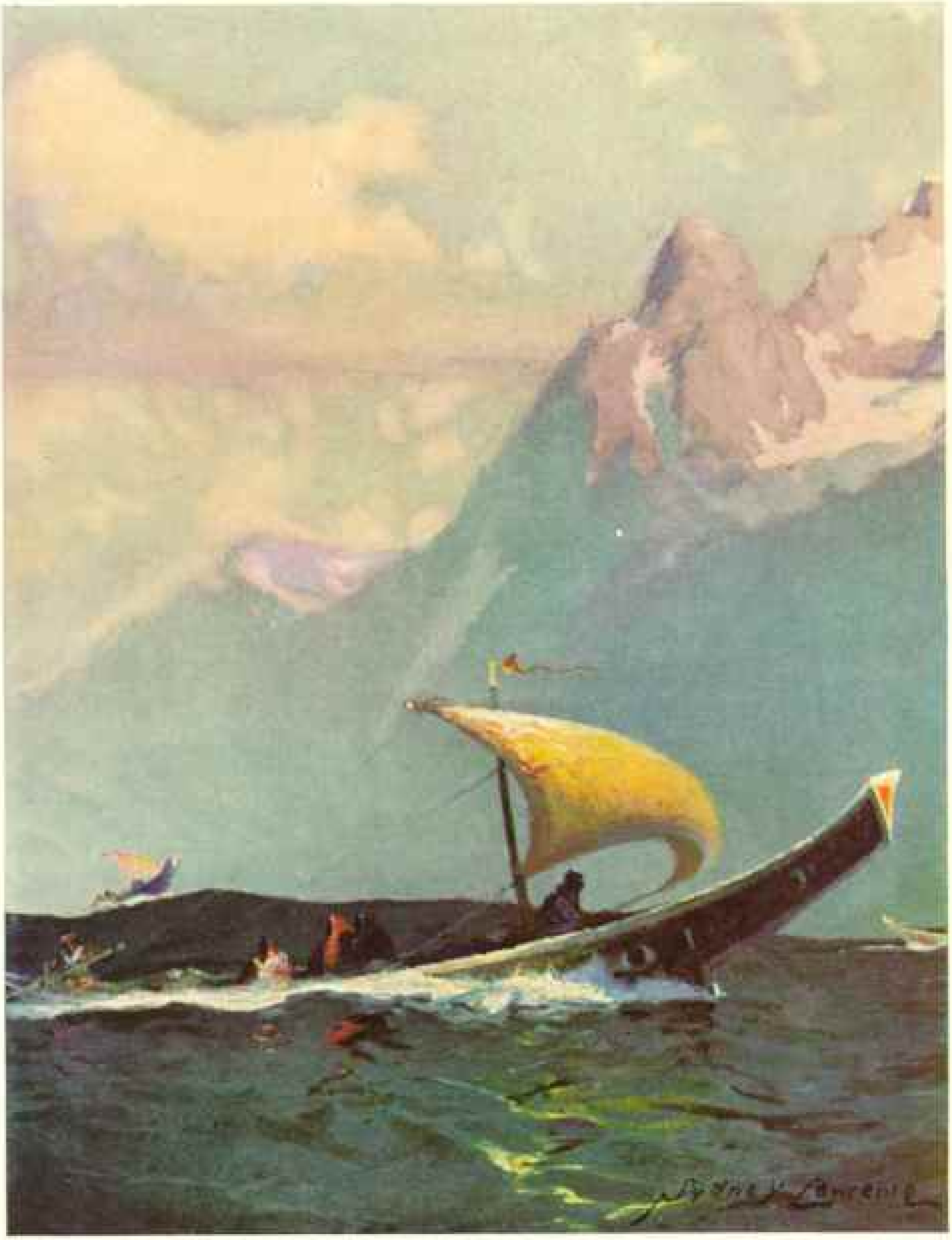

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