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# THE NATIONAL GEOGRAPHIC MAGAZINE

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Hawaii, Then and Now

With 30 Illustrations and Map

WILLIAM R. CASTLE

Leis from Aloha Land

10 Natural Color Photographs

RICHARD H. STEWART

Treasures of the Pacific

With 10 Illustrations

LEONARD P. SCHULTZ

Gleaming Fishes of Pacific Coastal Waters

31 Portraits in Color from Life

HASHIME MURAYAMA

The Farthest-North Republic

With 25 Illustrations and Map

ALMA LUISE OLSON

Finland: Land of Sky-Blue Lakes

12 Natural Color Photographs

KONSTANTIN J. KOSTICH

Augustus—Emperor and Architect

With 17 Illustrations and Map

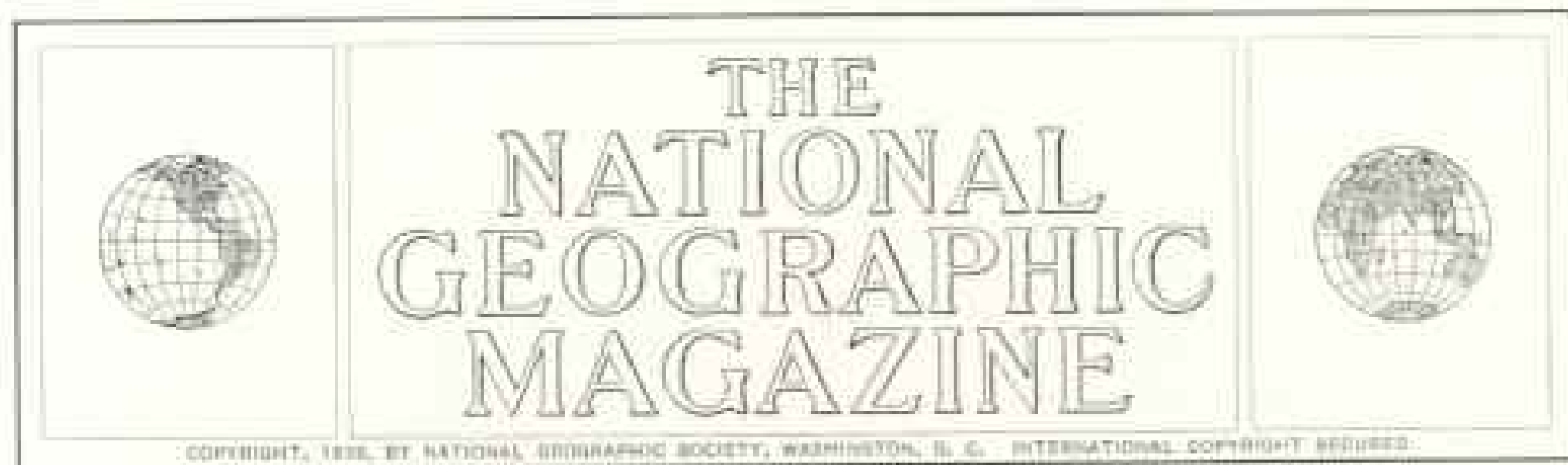
W. COLEMAN NEVILS

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## HAWAII, THEN AND NOW

Boyhood Recollections and Recent Observations by An  
American Whose Grandfather Came to the  
Islands 102 Years Ago

BY WILLIAM R. CASTLE

**A**S YOU look at a map of the Pacific, you wonder how man ever reached the Hawaiian Islands, unless he germinated there. The nearest mainland is 2,400 miles away (map, pages 424-5).\*

It is practically certain that the first settlers came from Tahiti or Samoa about 500 A.D., but why they came, exactly how they came, whether they sailed out into the blue or followed the trail of some legendary hero, no man knows. Perhaps the most plausible explanation is that they were driven from home by an invasion of savage people.

### INTO THE NOWHERE, PREPARED TO STAY

They evidently went prepared for a long voyage, since they took with them their women, their pigs, and probably seeds to plant in whatever new land they might discover. A few ruined fish ponds and temples still to be seen are believed to date from these earliest times.

There are legends of several voyages back and forth from Samoa and Tahiti about six hundred years later, and then, for some unknown reason, all communication with the rest of the world seems to have ceased until the discovery of the islands by Captain Cook in 1778.†

By that time the legends were vague, but that they were substantially true is proved by the language, which is Polynesian like that of the Tahitians, the Samoans, and the Maoris of New Zealand; and by much

of the fauna and flora, which resemble that of the South Pacific islands even though the prevailing winds and currents are from the northeast. Furthermore, the Hawaiians worshiped the same principal gods as other Polynesians.

Captain Cook, who landed first on the little island of Kauai, was treated as a god. Runners were sent throughout the group of islands to tell the wonderful news of his coming.

They even described the English language, imitating it thus: "A hikapalale, hikapalale, hioluwai, oulaki, walaualaki, waiki poha." If, to us, this does not resemble English, we must remember that the Hawaiian language contains only twelve sounds, later translated into letters—five vowels and seven consonants. The runners could hardly be expected to invent sounds like the letter "s."

A few months later, when Captain Cook returned, this time to the island of Hawaii, to explore and trade, his crew behaved outrageously. Finally a native stole one of the ship's boats, fighting ensued, and the famous navigator lost his life.

Captain Cook was honorably buried and

\* See "The Hawaiian Islands: America's Strongest Outpost of Defense—The Volcanic and Floral Wonderland of the World," by Gilbert Grosvenor, NATIONAL GEOGRAPHIC MAGAZINE, February, 1924.

† See "Columbus of the Pacific: Captain James Cook," NATIONAL GEOGRAPHIC MAGAZINE, January, 1927.



Photograph by Richard H. Stewart

THE "NAPOLEON OF THE PACIFIC" UNITED HAWAII IN 1795

To his black and gold figure before the Judiciary Building in Honolulu natives come to bow in tribute, for Kamehameha I is revered as the great king (page 421). The monument originally intended for this place went down on a wrecked ship in 1870 and a replica was made and erected. Later the lost sculpture was recovered and set up on an estate in Kohala. This statue was chosen for the recent 3-cent United States postage stamp of Hawaii in the Territorial series.

his bones were deified. Near his monument today are some of the oldest and most interesting Hawaiian remains, things which the navigator undoubtedly saw in 1778-9.

The first white missionaries to settle in the islands were the Americans who arrived in 1820. The great king, Kamehameha I, on whom these newcomers had counted for sympathy and assistance, had just died, but his successor welcomed them. The missionaries, most of them from New England, were high-minded, self-sacrificing, and devoted. They were also a bit narrow in their

outlook, but they refrained from exploiting the Hawaiians and guarded them against exploitation by others.

My grandfather, who was not a clergyman but had the missionary spirit, went to Honolulu in 1836 to take charge of the finances of the already large mission. His 116-day trip from Boston around Cape Horn was short for those times, and the vessel was big, "measuring 288 tons and carrying 600."

NATIVE UNDRESS  
MADE LADIES  
WEEP

One missionary passenger wrote of the landing in Honolulu, "It was on a Sabbath, and was an exciting day. The pilot came out to us, followed by some natives in canoes. The men in the latter were not clad. How shocked the ladies were! Some

of them went downstairs and wept."

The Hawaiians wore loin-cloths and were about as much dressed as the average bather on a beach today, but in 1836 customs were not at all what they are now. The missionaries, therefore, did their best to procure clothes for the poor heathen. The response from America was good.

The Hawaiians were not wholly co-operative, but they did like to dress for occasions such as churchgoing. My grandfather presented a Boston-made cutaway suit to one of the elders. With Christian dutifulness

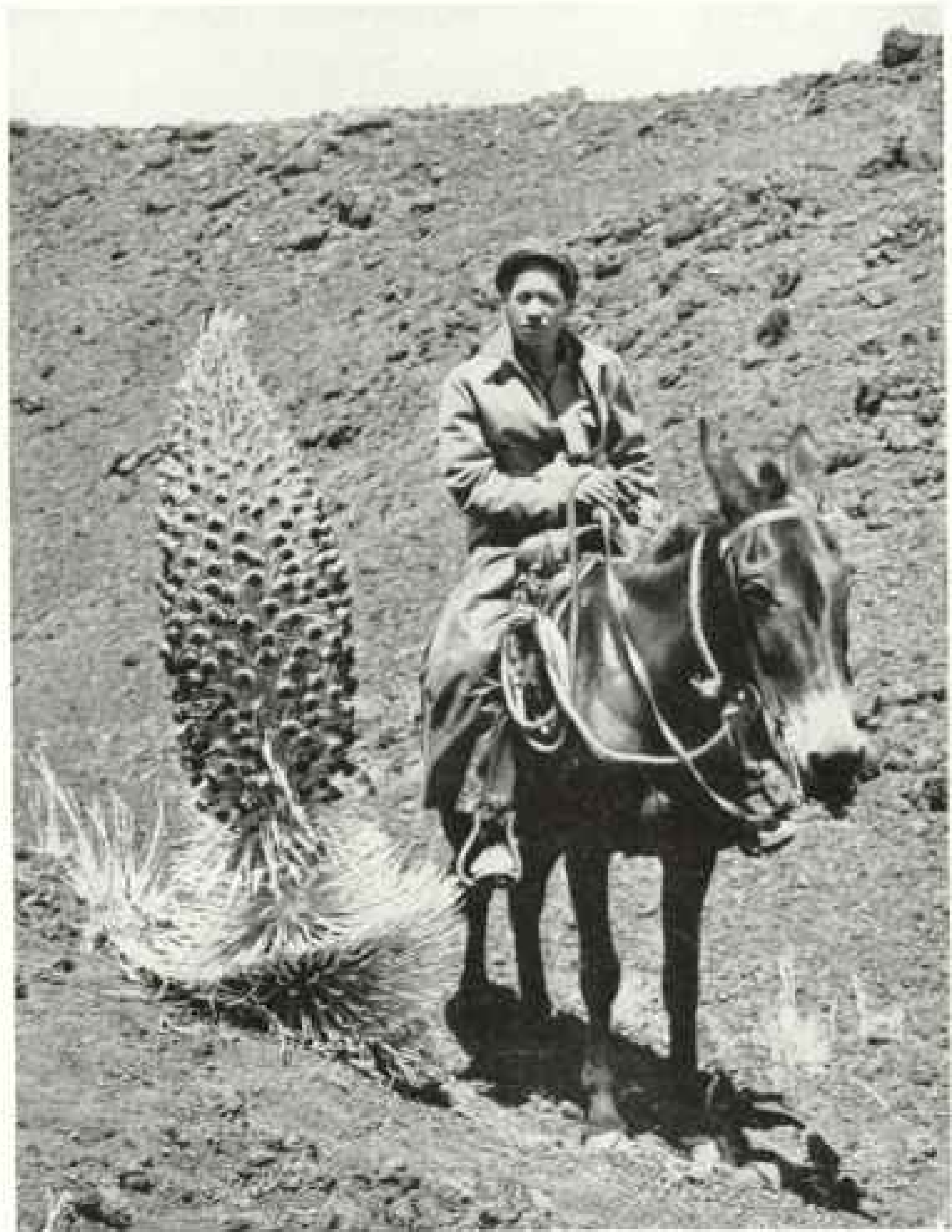
the man gave half to his brother, and at church the next Sunday one wore the coat, the other the trousers.

Clothes were largely superfluous in the Tropics. The real gifts of the missionaries were medicines and standards of decent living. These, together with rudimentary instruction in hygiene, undoubtedly saved from annihilation a race unable to cope with the diseases of civilization. The missionaries codified customs into laws, created new laws to meet new conditions, gradually built up an orderly government, taught the people how to defend their rights.

These missionaries were good Americans, but they made no attempt to bring about annexation of the islands to the United States. They did, however, give the Hawaiian Government every possible assistance in preventing seizure of the islands by any other nation.

Had they not been on hand, Hawaii would have been British, or French, before the middle of the 19th century. Their influence on the American Government induced the declaration that the United States would consider it an unfriendly act if the islands were taken over by any other power.

Even in those early days it was vaguely realized in Washington that, for defensive reasons, Hawaii was important to the United States.



Photograph by Richard H. Stewart.

#### ONLY HAWAII PRODUCES THE SILVER SWORD FLOWER

In the crater of Haleakala, on Maui, a few of these botanical marvels are still to be found; the species is unknown elsewhere. Hawaiians formerly were accustomed to dry and preserve as ornaments the velvety silver-colored leaves, but now picking them is forbidden by law. Blossoms, when they appear, are red, but intervals between blooming periods are long.

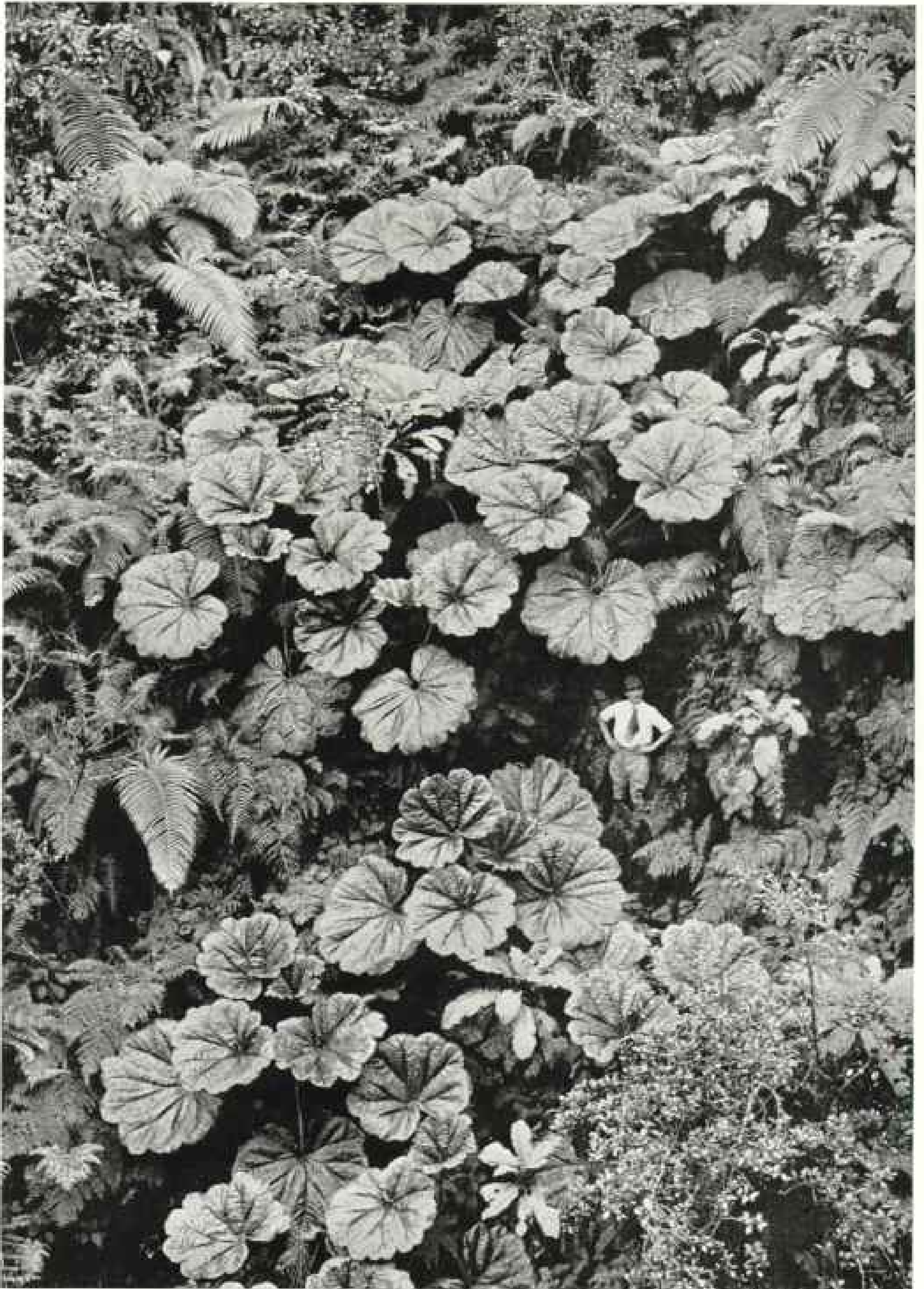
Kamehameha I has been called by the grandiloquent name of "Napoleon of the Pacific" (page 420). He certainly was a good soldier, administrator, and a man of fine character.

#### A COMIC-OPERA COURT

Kamehameha II, a weakling in body and character, died young. Kamehameha III, who reigned a long time, was an able man who, on the whole, led his people wisely. Kamehameha IV and V left no particular impression.

After this line died out, Lunalilo, a high





© Gilbert Grosvenor

THE UMBRELLA LEAVES OF THE APE-APE ARE BIG ENOUGH TO HIDE A MAN

Ages ago this plant grew on all continents; today it is found only in the hot, humid rain forest of Hawaii. The name means "the flying away of the chickens." This picture was taken from a cliff opposite in Puuhokamoa Gulch nearly a mile high on the slopes of the long-dormant volcano Haleakala, island of Maui.

chief, was elected king. He died soon after assuming the throne, and David Kalakaua was elected to succeed him.

As a small boy I knew Kalakaua. I remember well the brilliant parties at the palace, with the hula dancing and the singing and the Hawaiian food and the King's gorgeous uniform glittering with decorations. Perhaps it was an opera-bouffe court, but things were done well.

Kalakaua and my father had gone to school together and had remained friends, although they often disagreed. I used to walk with my father to his office on the days when there was no school and remember how set up I used to be when the King joined us.

My respect for His Majesty crashed, however, when one day I heard my father say to him, "Shut up, David, you fool. Don't you see the little boy?"

I suppose the King had started to tell an indelicate story, but a young reader of Carroll's *Alice in Wonderland* fully expected to hear as an answer to this dreadful rudeness, "Off with his head!"

Kalakaua took a trip around the world. Probably he tasted every wine in every country, for he is reported to have been often in a dazed condition and not always coherent. His companion on the trip told me that when the King was driving in Nikko with one of the imperial princes after a heavy luncheon he fell asleep. Rudely awakened by the cawing of crows, he said politely to the prince, "In Japan how sweet is the singing of the birds."

Yet Kalakaua was no buffoon. He was intelligent, quick-witted, loyal to his people. He died in San Francisco in 1891, and I remember the arrival of the U. S. S. *Charleston* bearing his body—the first we in Honolulu knew of his death. It was not until eleven years later that we had cable connection with the mainland.

Kalakaua's magnificent funeral, with its dirges, its wailing, the panoply of its feather cloaks and *kahilis*, really marked the end of Hawaiian royalty. His sister Liliuokalani succeeded him, but her reign was short and stormy. In her desire to abolish the constitution and make herself absolute, she was a few centuries after her time. The result was her dethronement and the establishment of a republic.

Those were exciting days. A commission was in Washington seeking annexation to the United States. In Honolulu all sorts

of stories flew about, stories of imminent revolution, as silly as the story during the Spanish War that the Spanish fleet was about to bombard Boston.

#### "SOLDIERING" IN A WAR OF RUMOR

Being about fifteen years old, I enrolled as a citizen guard, passed much time on the rifle range, never dreamed that it might have been parental influence which established my patrol station in front of our own house. It was gloriously grown-up to carry a rifle and be served hot cocoa in the middle of the night.

The whole thing was not so silly as any account today makes it seem. There was much intrigue, the Hawaiians were influenced by foreign adventurers, and if precautions had not been taken there would have been serious trouble.

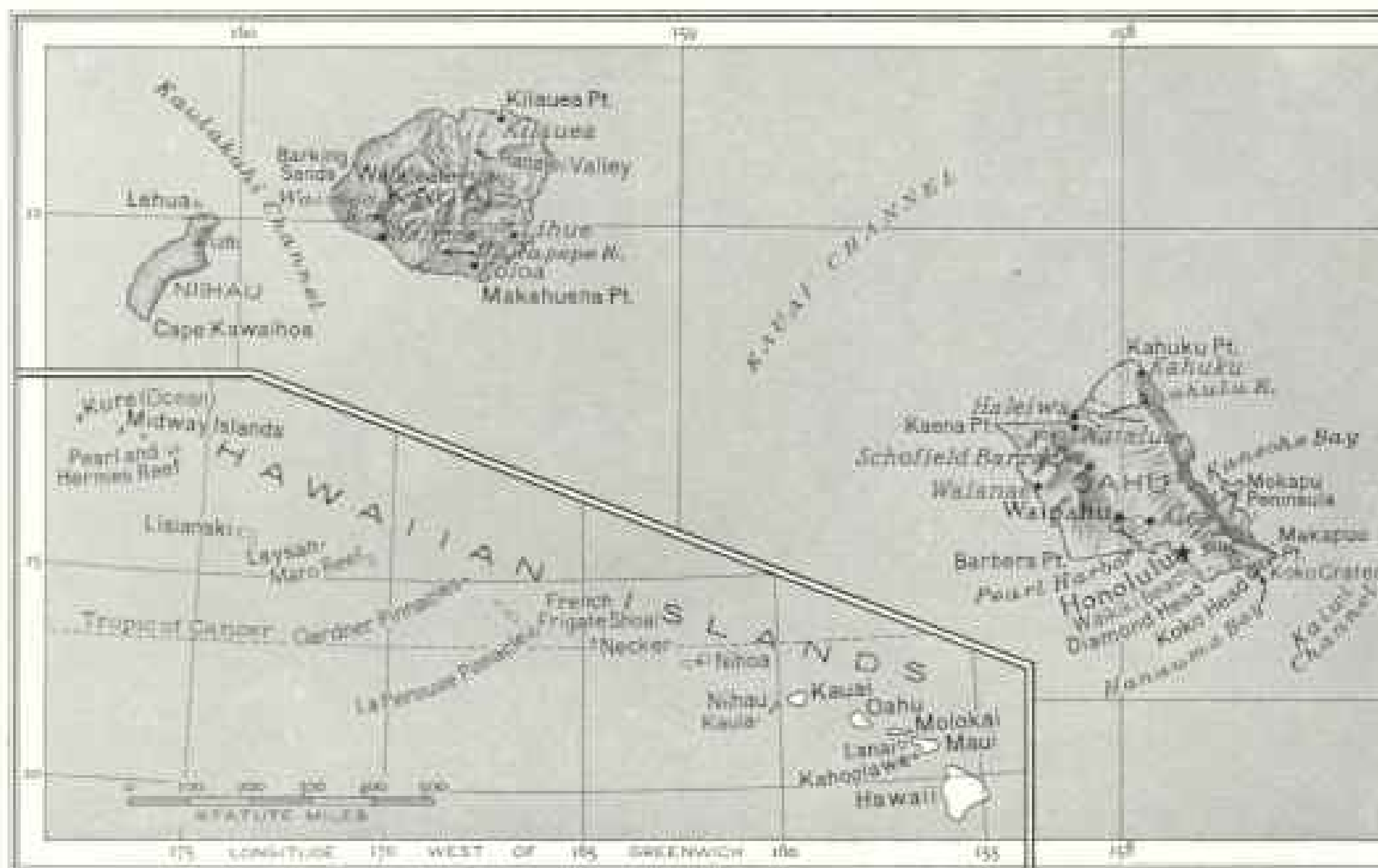
Annexation did not come until the War with Spain. When Admiral Dewey took Manila, Congress realized that Hawaii was necessary both as a stopping place for our ships on their long journey across the Pacific and as the outlying post for the protection of our Pacific coast. Annexation was made easy by the fact that it was eagerly desired by the islanders and that the civilization of the place was purely American.

When I was a boy Honolulu was a straggling village of some 30,000 people instead of a progressive city, as it is now, with a population climbing toward 150,000. Our house was on the lower slopes of Punchbowl, about a mile from the center of the town. It seemed farther because the roads were bad and we had no thoroughbred horses to cut the time.

We American children all went to the Punahou Preparatory School, riding to it across open fields which are now cut into a checkerboard of streets lined with houses and gardens. We had to saddle and unsaddle our horses and to take care of them. At school the teachers were mostly New Englanders attracted to Honolulu as a probably delightful place to teach.

#### THE FIRST GOOD AMERICAN SCHOOL WEST OF THE ROCKY MOUNTAINS

Punahou School was started by the missionaries on land given by the King. It was intended primarily for the children of the mission, but took in also any other white, Protestant children. It was really the first good American school west of the Rocky Mountains, and after the gold rush



to California in 1849 many children were sent from there to be educated in Punahou.

Probably the same lumbering sailing vessels which carried provisions from the islands for the suddenly overcrowded population of California brought the children back. The trip took anywhere from ten days to six weeks, according to the winds. The piety and the strict discipline of the school must have been a tremendous contrast to the roaring life of the mining camps in California.

When I went to Punahou, some fifty years ago, all this migrating element had disappeared. The students were island children, and the bars had been let down sufficiently to admit a few Hawaiian and part-Hawaiian children, sons and daughters in Christian families. This must have been a great concession, since the early missionaries, eager to save the souls of the benighted heathen, objected to exposing their children to the influence of the legends and customs they might learn while playing with Hawaiian children.

Actually we heard few of these legends, saw nothing of the hula dancing, except surreptitiously, when we read into it a wickedness that was not there. The Hawaiians had no written language until one was invented for them by the missionaries. All the history and mythology of the race,

therefore, had been handed down orally, generally in the form of chants passed on through generations from father to son.

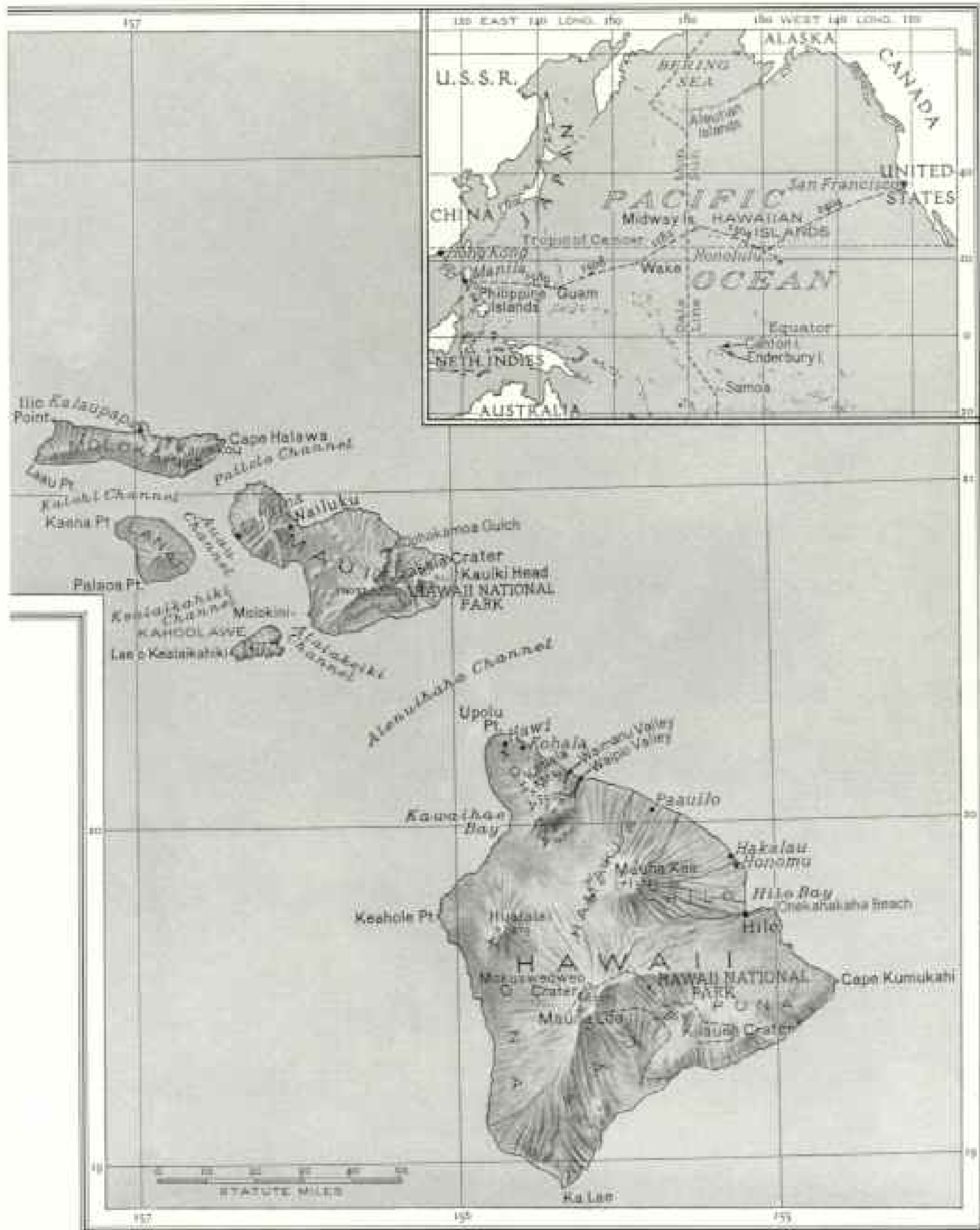
The missionaries did not study these heathen records—probably just because they were heathen—and it is fortunate that the matter has been taken in hand while there is still time to save some of the ancient traditions.

#### SUPERSTITIONS STILL PERSIST

I know many persons, Americans as well as Hawaiians, who hear at odd intervals the ancient songs of the people, utterly different from any modern music, sounding thinly from the skies or deeply underground. The wicked custom of praying one's enemy to death has by no means fallen into disuse or disrepute, and it seems still to be dangerously effective.

All these matters troubled us children not a bit. We went about having a good time as children do everywhere, except that we turned naturally to sports dictated by the climate and the place.

What a land it was to play in! You cannot help swimming when the ocean remains at the same delightful temperature all the year round, and when the mountain swimming pools are as inviting on Christmas as on the Fourth of July. Not one of us knew when he had learned to swim any

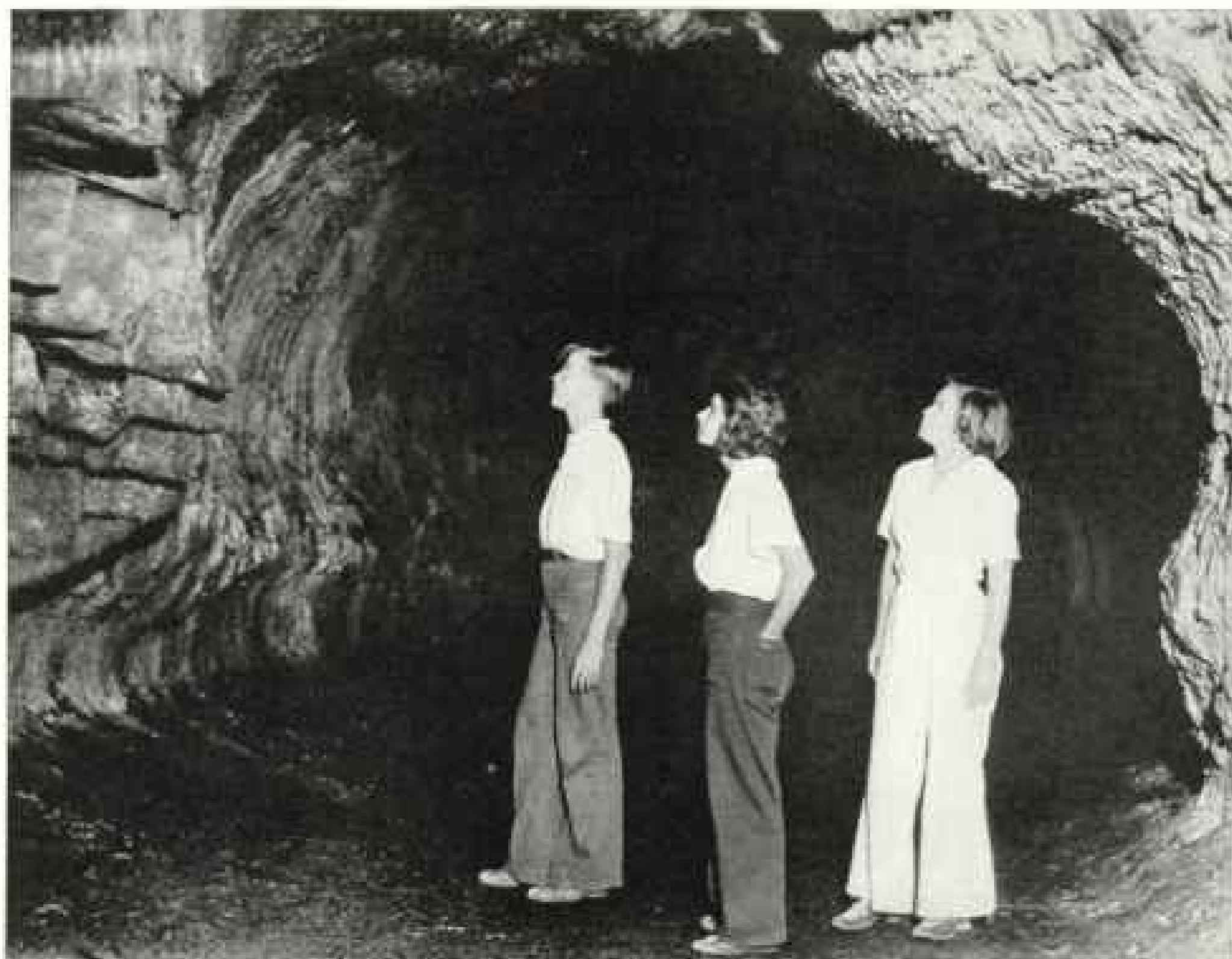


Drawn by Newman Bunstead and Ralph E. McAloer

LIKE A FLEET HEADED NORTHWEST, THE EIGHT HAWAIIAN ISLANDS WITH "SMALL-BOAT" ISLETS ARE ANCHORED 2,400 MILES OFF THE PACIFIC COAST

When the earth was ready to settle down from the molten period to something solid and dependable, they were built up volcanically from the depths of the ocean, following the line, probably, of some stupendous fissure. Geologically speaking, they are fairly recent. Kauai, to the northwest, is the oldest and Hawaii, 1,700 miles to the southeast, is the youngest, as well as the biggest and the highest, its mountains climbing more than 13,000 feet from the level of the sea. As it still has two active volcanoes, the island of Hawaii is not yet entirely finished. The Hawaii National Park is in two sections, one on the island of Hawaii, the other on the island of Maui.





Photograph from Pan Pacific Press

#### NATURE HAS "POURED" ROCK TUNNELS FROM VOLCANO "MIXERS"

From active craters molten lava creeps down mountainsides. It cools and hardens on the outside, but the center of the stream remains liquid and continues to flow. Thus tubes such as this on the island of Hawaii are formed. They are common throughout the Territory. During a recent eruption some of them were bombed by the U. S. Army to prevent their carrying the hot stone rivers into the town of Hilo.

more than he could remember when he had learned to walk.

In those days, however, few learned to ride the surfboard.\* Some Hawaiians did it, and we thought they were wonderful, but there was a foolish tradition that only Hawaiians could master the art. We tried once or twice, fell off, and believed the tradition (Plate IV).

Today most Hawaiian-born American children—boys almost always, and some girls—learn to ride the waves on boards, standing either on their feet or on their hands. Among the most expert are the *haoles*. (This word, meaning foreigners, those who do not belong in the islands, has become almost Anglicized, so common is its use.)

In my childhood we used to be content with surfing in outrigger canoes. Though the sport seems simple compared to surf-boarding, it is wonderfully exhilarating.

It has the thrill and almost the speed of tobogganing and an upset means only a swim in crystal-clear, refreshing water. A spill is certain if the canoe turns so that the outrigger is toward the oncoming wave and parallel to it (pages 430 and 462).

#### COASTING ON GRASS SLIDES

Another kind of warm-climate tobogganing, almost forgotten in these days, used to be a strenuous sport. In the mountains there are long, even slopes covered with a coarse and very slippery grass. Some of these slides were lengthened and improved by the early Hawaiians. Copying the ancient custom, we used to bind *ti* leaves together, making a kind of sled as slippery as the grass. On this we coasted down the slopes at terrific speed (page 456).

\* See "Waves and Thrills at Walkiki," by Thomas Edward Blake, NATIONAL GEOGRAPHIC MAGAZINE, May, 1935.



Photograph by Richard H. Stewart

OUT OF THE BLUE TO BISHOP STREET COME SHIPS FROM THE MAINLAND

Honolulu owes much to farsighted men such as Matson and Dollar who, by establishing luxurious steamer service, extended its smiling thoroughfares to California (page 452).

The only drawback to this sport was climbing back to the top of the slide. There were no footholds, as in snow, and it was more like climbing on sheer ice. Beside the slides reserved for the chiefs in the olden days there were always placed stones which formed comfortable stairways.

It was unique sport to ride the bundles of cane sent by flume to the mill. This was possible only on the windward side of the island of Hawaii where the cane fields climb up and up on the flank of the mountain and the mills are virtually at sea level. The deep gulches, necessitating long detours or expensive bridgework, as well as the steepness of the cane fields themselves, make it impossible to build the usual plantation railways, and the cane is therefore flumed, sometimes for two or three miles (page 450).

To ride a bundle of cane in the flume, along the edge of precipices, across the gulches where we often looked down a couple of hundred feet or more—it seemed thousands—appeared a dangerous experience. Actually there was no danger at all

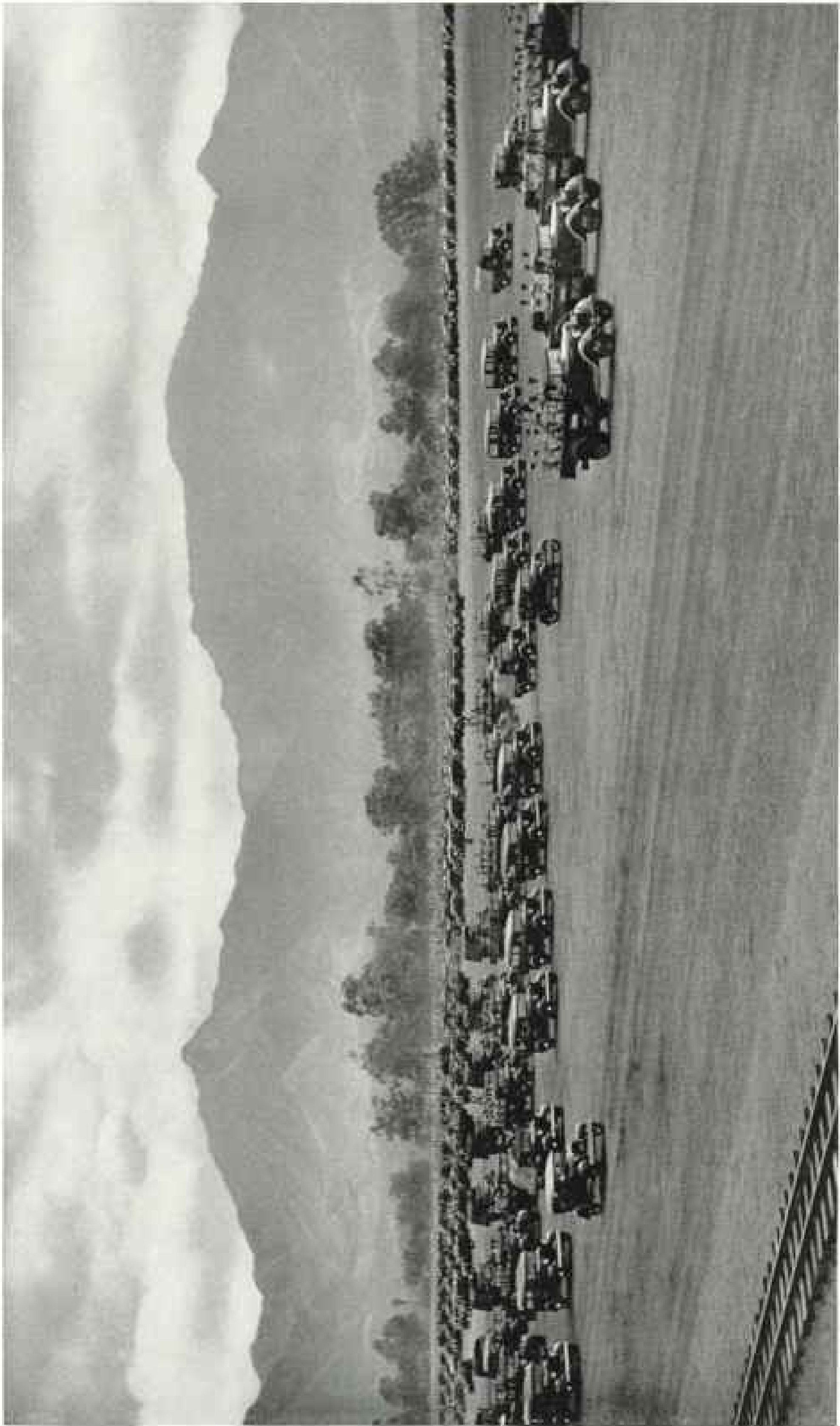
unless a rider should suddenly change his mind and try to climb out of the flume at the wrong moment.

Less exciting, certainly, but of far more lasting interest, was the collecting of land shells, the lovely *achatinella*. Nearly everybody has hunted shells on the seashore; not many have hunted them in the treetops. But that is exactly what we used to do in Hawaii.

These land shells are spirals—pointed, half to three quarters of an inch long, generally rather fat, but occasionally long and thin—of the most delicate and sometimes the most definite shades of red or green or pink. Sometimes they are striped, sometimes flushed with yellow.

When I was a boy, comparatively little was known about them and only a few varieties and species had been classified, so there was always the excitement of seeking a new variety which might be named after the discoverer.

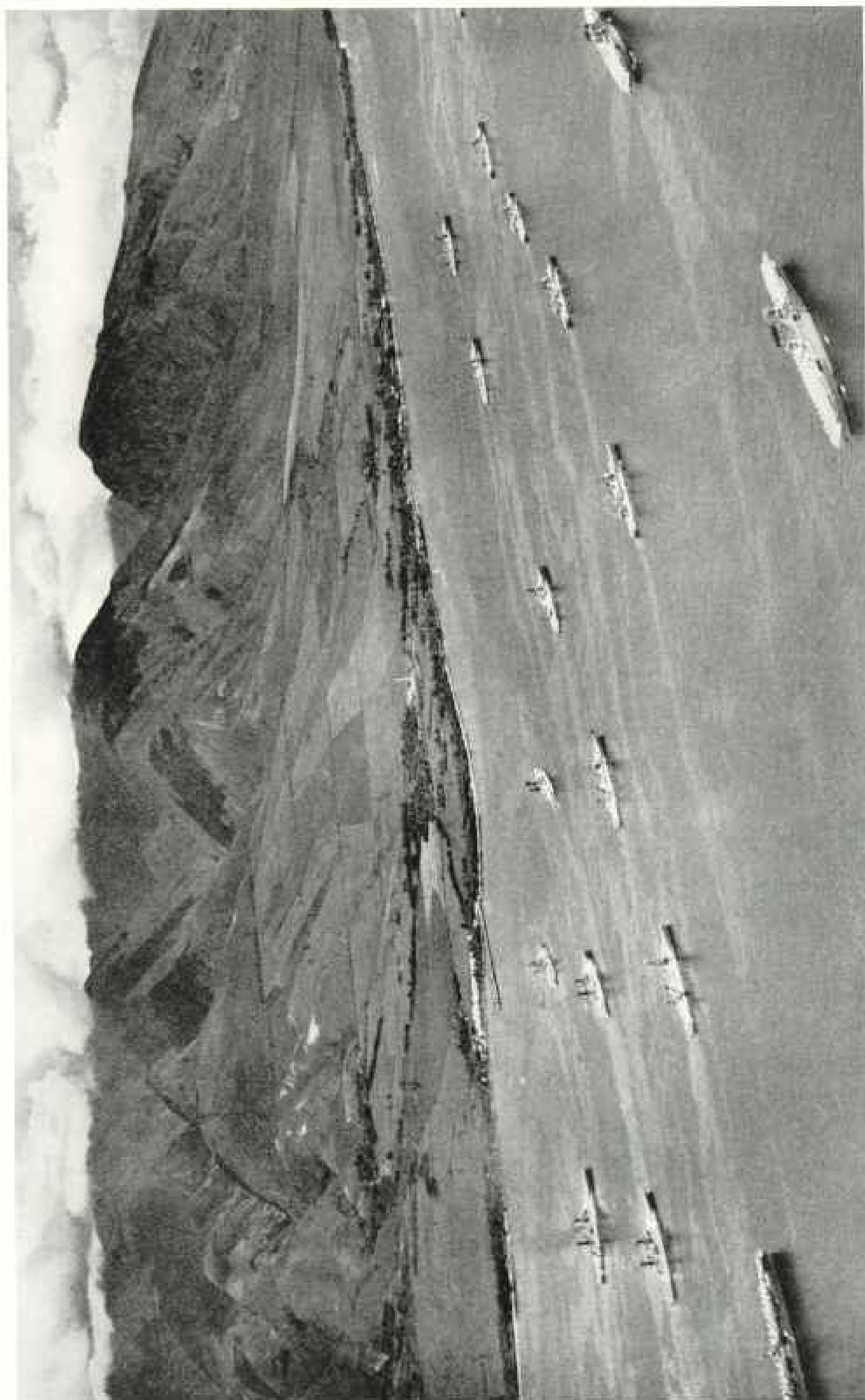
C. Montague Cooke, one of the boys most zealous in the search for shells, now a



Photograph from Pan Pacific Press

WITH ROAR OF MOTORS INSTEAD OF THUNDER OF HOOPS, THE U. S. CAVALRY ADVANCES

Complete motorization of the American Army in Hawaii was made evident in this review at Schofield Barracks when thousands of trucks, supply cars, ambulances, mechanized batteries, and searchlight units paraded.



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FRESH FROM WAR GAMES, A UNITED STATES SQUADRON RESTS IN LAHAINA BAYS, WHERE OLD PACIFIC WHALING FLEETS WINTERED

In the foreground are three airplane carriers that took part in sham battles in Hawaiian waters. From ships like these some flyers took off in the search for Amelia Earhart. Along the shore of these sheltered waters off the west coast of Maui lies Lahaina, ancient royal capital of Hawaii. Behind it broad fields of sugar cane cover slopes leading up to the west Maui peaks. Opposite the pier is a large sugar cane mill. Back of the settlement stands Lahainaluna School, established in 1831 by the American Mission Board.

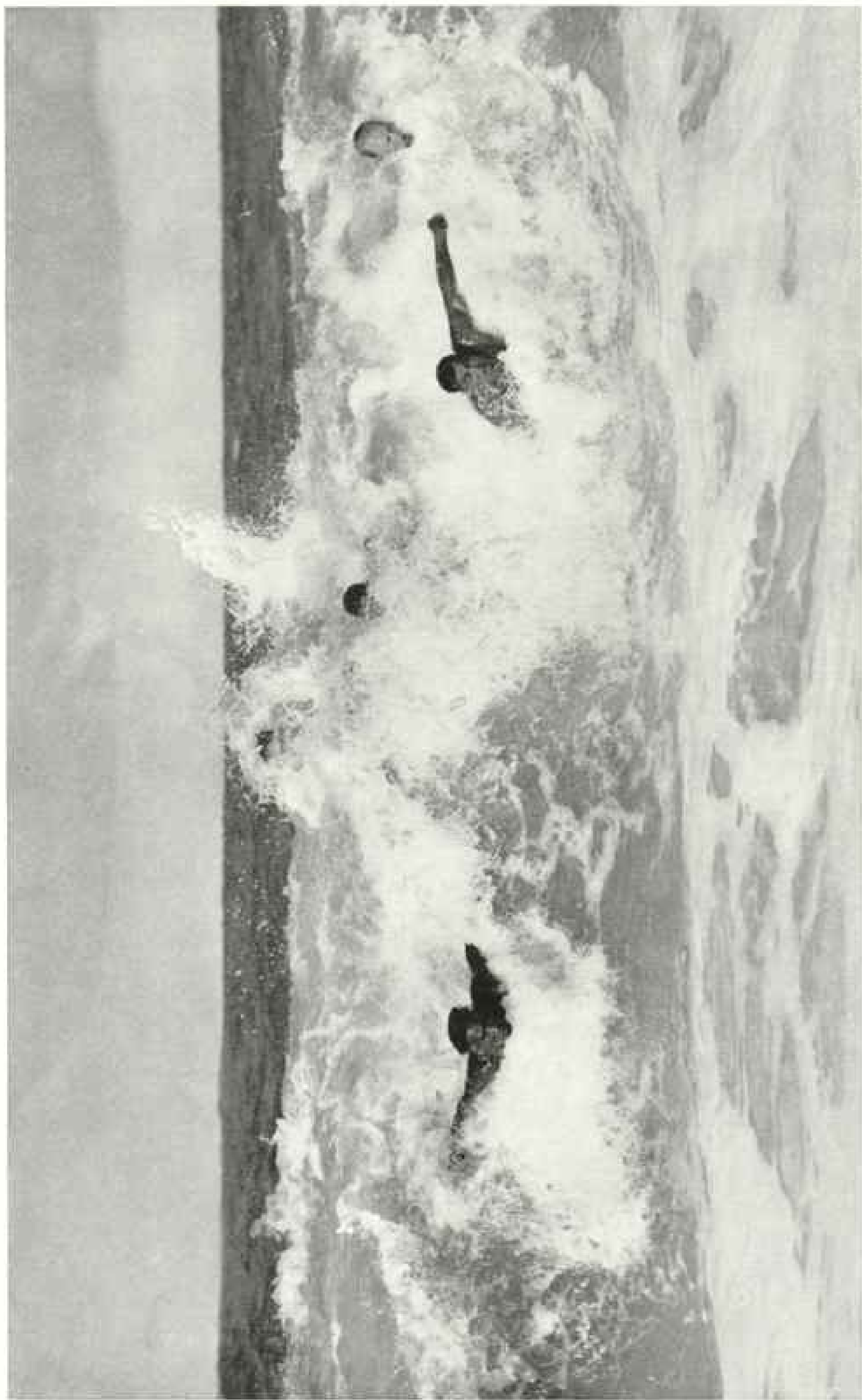




Photograph from Pan-Pacific Press

BEACHWARD AT EXPRESS SPEED THE OUTRIGGER RIDES THE WAVES.

This is a sport that even the beginner can enjoy. When the author was in school in Honolulu, he and his friends had fun surfing in canoes, but there was a superstition that only Hawaiians could master the surfboard. Of course, this belief has long since been disproved (pages 426 and 462).



Photograph from Pan Pacific Press

**DUKE KAHANAMOKU STILL DEMONSTRATES MASTERY OVER THE HEAVY MAKAPUU SURF NEAR HONOLULU**

Now well along in years, the famous Hawaiian swimming champion (extreme left) teaches young athletes the strokes with which he made world records a generation ago. He now is sheriff of the city and county of Honolulu. His figure retains the symmetry and grace that distinguished him when he was a boy. The author knew him well more than 40 years ago.



Photograph by W. Robert Moore

AMONG TREE FERNS 20 FEET HIGH WINDS A MOTOR ROAD TO KILAUEA

Hawaii National Park, island of Hawaii, contains many wonders besides the volcano with its pit of fire. Here is rain forest lush and humid as the world in the early ages of creation (page 427).

distinguished scientist, has given his life to the study of the *achatina* and related forms, and has assembled in the Bishop Museum in Honolulu an incomparable collection. There are still shells to be found in the mountains. Undoubtedly there are new species to be discovered and classified.

COLLECTING SHELLS IN TREETOPS

Requisites for success are sharp eyes, a sound body—because one must walk for miles and sometimes do stiff climbing—and a complete absence of squeamishness about putting the live shells in one's mouth. This last is really essential because, while holding a branch to keep from falling, one cannot well get out a box or a bag which can be tightly closed. When put in the pocket the shells have a habit of crawling away. Perhaps it is as a result of this custom that we Hawaiians never object to eating snails.

In Hawaii the parents of boy shell collectors have no cause for worry. There are no wild animals, not a snake of any kind, and not even a poisonous insect which does any real harm. The only mammal indigenous to the islands is a species of small bat.

There is a little hunting. Wild goats, descendants of domestic animals brought in by Captain Cook, are found on Molokai and elsewhere, and goat hunting is an interesting sport because it is really difficult. The goats can climb where man cannot follow and it is often necessary to shoot them at long range, across a wild gulch or narrow valley, or far above, where one gets a glimpse of the silhouette of the animal against the sky.

On Molokai, also, there are deer in the mountains, introduced in 1867; but they are not particularly wild and to shoot them is a little like shooting cattle.



Photograph by Richard H. Stewart.

#### THE HAWAIIAN NET THROWER HAS THE SKILL OF A MAGICIAN

Gathering the fabric into a bundle, he swings it for a moment and releases it so that the weights around the edges fly outward from the center, spreading it to its full area as it strikes the water. These nets extended are 25 feet or more in diameter. To master the trick of casting them requires long practice.

There are, or were, a few wild boars on Hawaii, the great grandsons, presumably, of domestic pigs which ran wild. Still, they are clever brutes and make good hunting.

#### EVERYBODY PLAYS IN HAWAII

Probably the most amusing sport of this kind is the night hunting of wild turkeys. No guns are used, only songs, fire, and a pole with a noose on the end. The idea is that the turkeys, roosting in a tree, are blinded by the light of the torches and charmed by the singing and that thus they remain in a trance when the fatal noose is slipped over their necks. I have caught birds in this way, but always felt that "stunned" instead of "charmed" would be a better word to apply to the effect of the so-called music.

In Hawaii both children and grownups enjoy all the normal American sports. The schools play football in the autumn and baseball in the spring. Tennis is played all the time, by all sorts of people, very often dressed in much-abbreviated swimming clothes. One of the most popular sports is polo, and crowds go to see the weekly games in Kapiolani Park, at Waikiki. In these games there is often an Army against a civilian team, and frequently the civilian team wins, for there are some star players among the islanders.

Fathers and sons are often team mates or are on opposing teams. One of the fathers said, "You don't get old in Hawaii until you really want to."

There is excellent deep-sea fishing, and very exciting sport it is when the big fellows



take the hook. A few people even do this sort of fishing while swimming in the water, watching the huge fish far below and diving to attack them with spears.

For most of us children the center of all that was wonderful was the volcano of Kilauea (page 448). Perhaps our parents were unduly confident as to our discretion and in their belief that the volcano would continue to behave respectably. At any rate, I know that I was permitted to do pretty much as I pleased and to go pretty well anywhere I wished during our frequent trips to Kilauea.

Of course we were instructed not to run through a fern-filled hollow, since the ferns might mask the yawning mouth of a steam crack where a man or a boy could easily disappear and be gradually parboiled. We learned to distinguish the different kinds of lava rock so that, in climbing, we should not trust to footholds which might give way.

Taken through the crater for the first few times by guides, we were taught when we were on the edge of the lake of fire not to trust ourselves on overhanging rocks which might not be firmly anchored. The guides explained that we must always be thinking of the winds, so that we might not be caught in any drifting sulphur fumes. When we had learned these elementary facts, we had the crater to explore just as other children explore gravel pits.

#### LIVE VOLCANO CRATER A PLAYGROUND

It was a large playground. The sides of Kilauea, vertical except where they have broken in, are some 500 feet high and are nearly eight miles in circumference.

The floor of the playground covers 2,650 acres, but some of them are out of bounds, so to speak, since there is always either a fire lake or, as now, a huge crater within the main crater which smokes and sometimes burns. Thousands of people go into this crater annually and only one of them has been injured.

There were few parts of this huge scar in the surface of the earth that we did not explore. We crawled into the caves, which were really lava tubes, carrying string and candles because that was what people always did in books; but the ordinary cave hunters had the advantage of us because they were not driven out by the heat, and never saw far ahead of them the glow of red-hot lava (page 426).

We studied every possible way to climb

down into the crater, avoiding only the low and uninteresting southern wall because there the sulphurous fumes from the pit were always drifting in the trade wind. We found olivine crystals and tried unsuccessfully to find emeralds, not realizing that the islands do not offer the proper geological conditions to have any precious stones.

When the molten lake of lava was on a level with the floor of the crater or had begun to build itself a cone, we went as near as the heat permitted and, with long sticks, brought out gobs of molten lava from the miniature flows which kept starting out from the restless lake. We allowed this lava to burn out the stick. When it cooled, we had left a crude black stone vase.

At night, of course, it was dangerous to wander off the trail, and we were never tempted to do so. It was fascinating enough to watch the lake of fire, sometimes spouting in a dozen places, sometimes churning, great waves beating on the shores, always unexpected and absorbing.

The last time I went to Kilauea there was none of this. The fire had sunk back into the earth, leaving an enormous, smoking, funnel-shaped pit many hundreds of feet deep (page 454). At present, also, the volcanologists have little enthusiasm about letting anyone wander at will.

The Volcano Observatory, conducted by Dr. T. A. Jaggar, is full of interest and information. The Director has discovered much about the behavior of volcanoes and predicts eruptions far more accurately than do the natives, who depend not on science but on the visits of the Goddess Pele.\*

#### KILAUEA CAN BE CRUEL

In 1954 Kilauea so far forgot itself as to have a spectacular eruption, when frothy lava burst through a 700-foot crack and cascaded downhill in veritable rivers of fire.

In 1790 occurred its first eruption in historic times. It annihilated the army of a chief who was marching to fight the great Kamehameha, just then beginning his remarkable career. Is it any wonder that the Hawaiians believed the goddess of volcanoes to be fighting on Kamehameha's side?

\* See, in the NATIONAL GEOGRAPHIC MAGAZINE, the following articles by Dr. Thomas Augustus Jaggar: "Eruption of Mount Vesuvius, April 7-8, 1906," in the June, 1906, number; "Sakurajima, Japan's Greatest Volcanic Eruption," April, 1924, number; "Mapping the Home of the Great Brown Bear," January, 1929; and "Living on a Volcano," July, 1935.

## LEIS FROM ALOHA LAND



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Dufaycolor Photograph by Richard H. Stewart

### A GRACEFUL ORIENTAL FIGUREHEAD ADORNS A SAMPAN'S PROW

Smiling from the bow of this Hawaiian fishing boat, a half-Japanese, half-Chinese girl typifies the racial mixtures so common in the mid-Pacific United States Territory, about 2,400 miles from California (Plate V). The brightly painted 30-foot craft lies at her moorings in the Anahulu River on Oahu, most populous of the islands and seat of the Territorial capital, Honolulu.

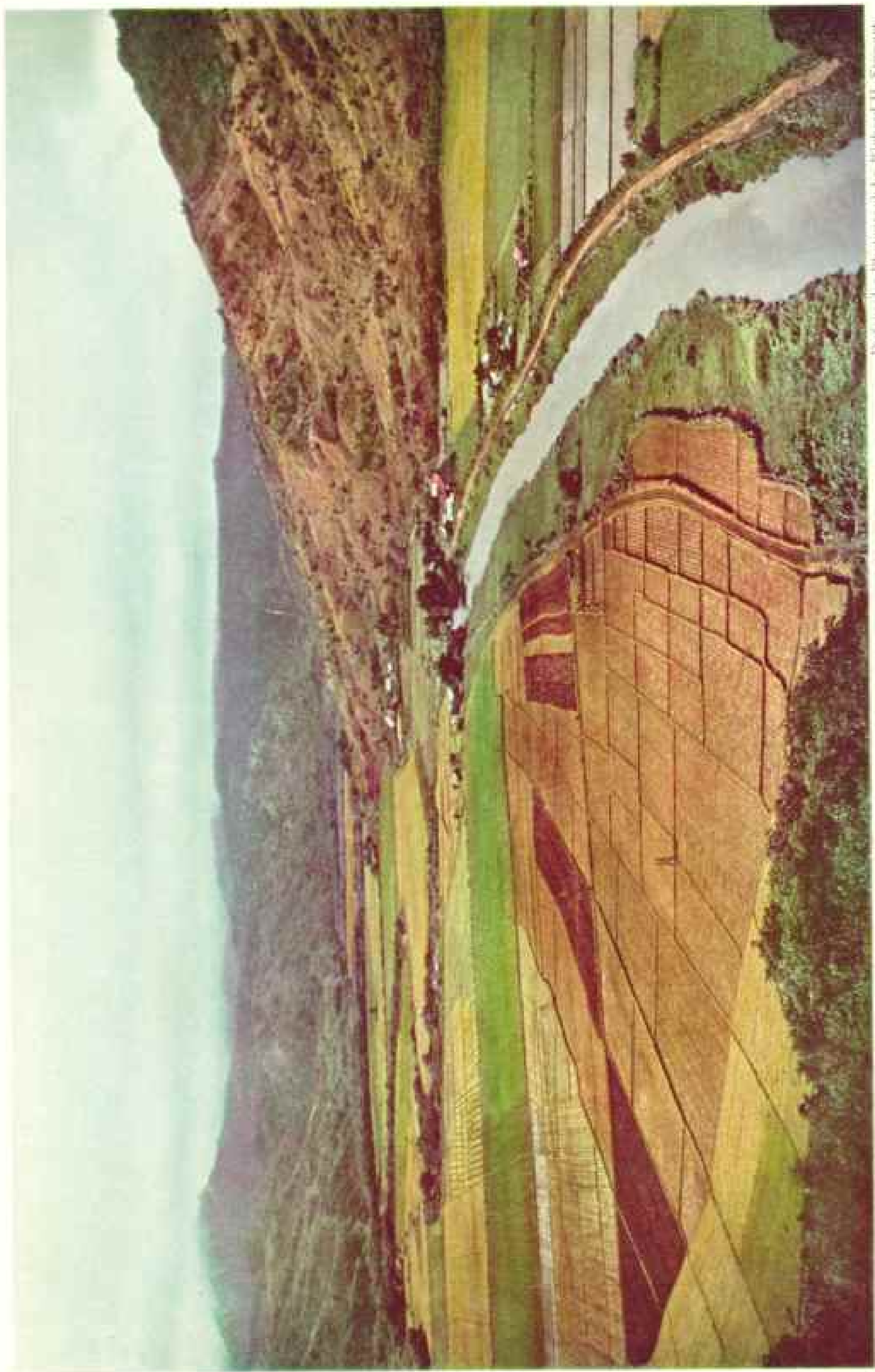


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**RAINBOW-TINTED WAAMEN GORGE IS A SMALLER-SCALE "DOUBLE" FOR ARIZONA'S FAMED GRAND CANYON**

A highway parallels the rim of the valley, a mile wide in places. The English navigator, Captain James Cook, explorer of the Hawaiian Islands, first landed in 1778 on Kaimi, near the distant shore just visible. Visiting the neighbor island of Hawaii the following year, Cook was killed by natives who at first worshiped him as a god. Stone fishponds, paved trails, and valley ditches, attributed by natives to a race of dwarfs, were built by early Polynesians.



© National Geographic Society

Date: October Photograph by Richard H. Stewart

**RICE PADDIES ARE LIKE STRAW MATS FLUNG DOWN ON HAWAII VALLEYS' FLAT FLOOR**

Rich volcanic soil and copious rainfall combine to give Kauai the nickname of "Garden Island." To defend maturing rice from raiding ricebirds, cords draped with rags are stretched between flimsy watchtowers, like the two in the left foreground. Tin cans, shotgun, floppy scarecrows, and shouting laborers create a defensive bedlam. Rice is grown only in a few such marshy valleys. Clouds usually veil Waialeale (background), on whose summit 40 feet of rain falls every year, making it one of the wettest spots on earth. Yet within a few miles sugar-cane growers must build irrigation works!





"ALL A-BOARD" AT WAIKIKI FOR A SURF RIDE!

Sun-baked mermaids at Honolulu's celebrated beach line up their surfboards just before a swift dash on the crest of a curling wave. Robert Louis Stevenson loved Hawaii and twice lived at Waikiki.



© National Geographic Society

Dufayesbur Photographs by Richard H. Stewart

"THREE LITTLE HULA MAIDS ARE WE!"

Grass skirts swish, brown arms and bare feet weave the pattern of a hula, the classic Hawaiian dance. It is performed, sitting or standing, to the accompaniment of musical instruments, chants, songs, or even to the rhythmic swish of split lengths of bamboo, or knocking of hardwood staves.

LEIS FROM ALOHA LAND



FIVE FACES, FIVE RACES—ALL FRIENDS BENEATH OLD GLOBY!

Hawaiian-born girls of different blood, each in the garb of her race, grace the deck of a steamer at Honolulu. From left to right: Japanese, Chinese, Hawaiian, Filipina, Korean.



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Dulayrōne Photographs by Richard H. Stewart

MAKING FLOWER LEIS IS A FAMILY AFFAIR

Quick brown fingers weave carnations and ginger flowers into the wreaths that say "welcome" and "farewell." Expressing friendship and affection, the lei is a symbol of Hawaii. The finest chains are put in split bamboo (foreground) or rolled in sheaths of green ti palm leaves to keep them fresh.

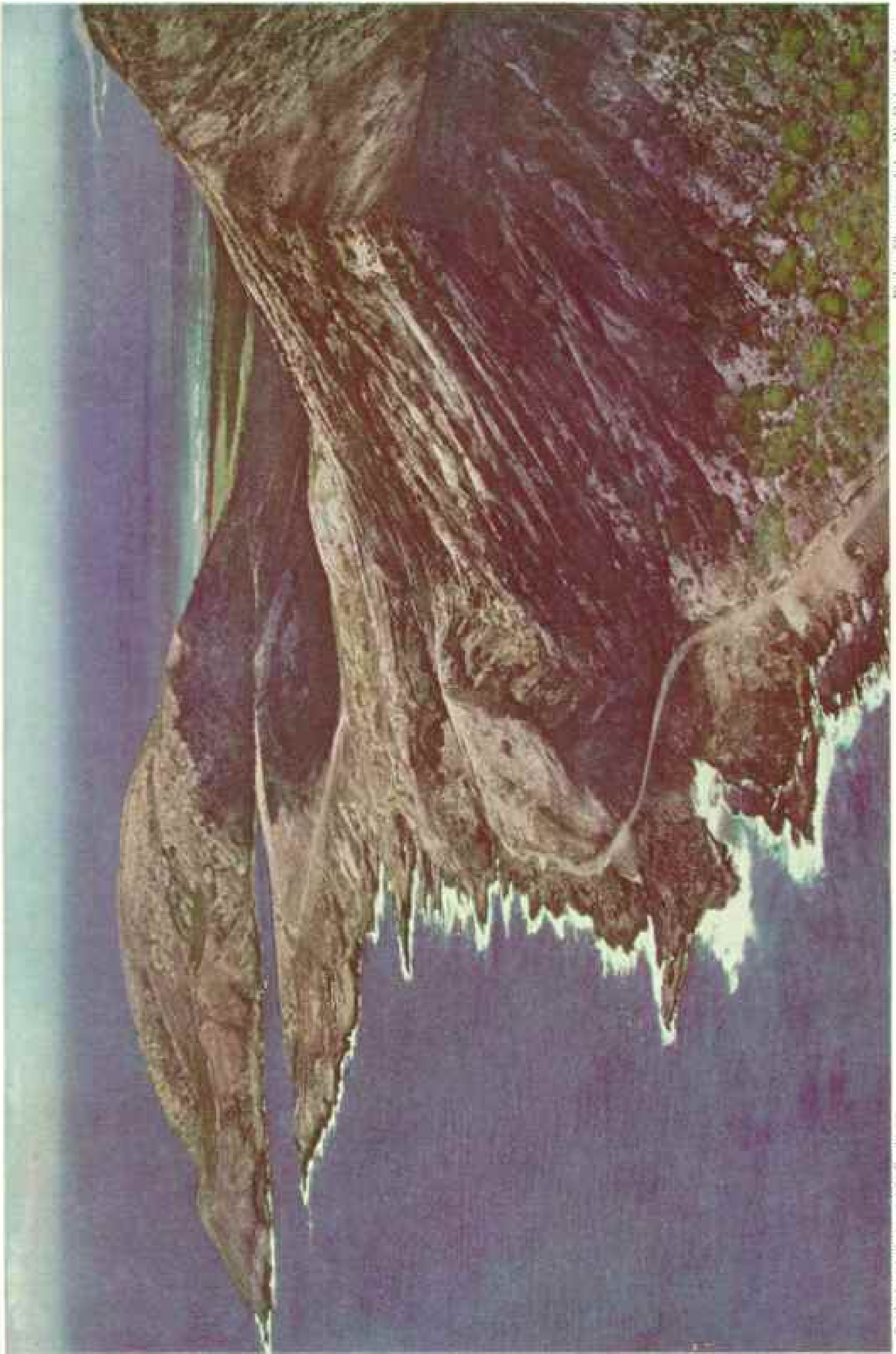


Duclaycolor Photograph by Richard H. Stewart

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THE SUBJECT FOR A SCULPTOR, A HAWAIIAN FISHERMAN POISES HIS SPEAR ABOVE THE CRASHING SURF.

At Ouekabalaha Beach, on the island of Hawaii, a boy fishes in the manner of his ancestors. Breakers sometimes sweep him off his feet as he wields his wooden, iron-pointed spear. If the waves do not wash ashore the impaled fish, the youth must plunge into the sea to retrieve it.



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Finlay Photograph by W. Robert Moore

TAWNY HEADLANDS OF LAVA AND ASH LIFT ABOVE THE FOAM-FRINGED "FISHPONDS OF THE KINGS"

Koko Head, at the southeast corner of Oahu, thrusts into waters that once were reserved for Hawaiian kings. Furrowed slopes rise to the lip of Koko Crater's cup-shaped summit (right). Hanalei Bay, an extinct, drowned crater, like a blue spear of sea, pierces brown flanks of the promontory (left background). A scenic highway now skirts the shore.





© National Geographic Society

Dufaycolor Photograph by Roberts and Roberts

HAWAII HAS MADE THE WORLD PINEAPPLE-CONSCIOUS

Laborers gathering the Territory's second most important crop usually wear goggles to shield their eyes from the sun and gloves to protect their hands from the spiky leaves and horny husks of the "pines." A pineapple plant usually thrives for about four years, producing successive fruits on erect stems. Sugar, Hawaii's chief product, and pineapple make an ideal agricultural team, for the fruit thrives on dry upland slopes where cane does not grow without irrigation.



For more than 130 years afterward no rocks or ash were ejected, but in 1924 renewed activity began with a violent disturbance which continued for three weeks.

On horseback we used to explore the country within a radius of fifteen or twenty miles. We peered down into the depths of some of the amazing dead craters which are deeper and far more spectacular than Kilauea, even though they do not cover so much ground.

Often we collected specimens of lava, from the porous bits like pumice stone, light as a feather, to the highly polished obsidian, or volcanic glass, tough and heavy. The one is often just a mass of the hairlike filaments which blow from the surface of a lava fountain; the other is lava which has cooled very rapidly from an absolutely fluid state at great heat.

There were also beautiful sulphur crystals, lovely in color and texture but really too fragile to transport. There was a forest of dead trees with lava hanging from the branches, thrown there long ago when some new lava flow began.

When we were tired exploring, we just lay back in the shadow of giant tree ferns to eat our picnic lunches, adding always a pile of ohelo berries (native huckleberries), red and pale yellow, tasting like delicate blueberries. The Hawaiian raspberries, as big as walnuts, were tempting to look at but insipid in taste.

Sometimes there were wild bananas, the meat richer than that of the cultivated fruit, light salmon in color; or masses of brilliant red, highly polished ohias, hiding close to the branches of the trees under their deep-green, shining leaves. Those were great days in the tropical forest and on the upland plains, where there was always a breeze and where it was really cold at night.

Strangely enough, I never went to the top of either of the great mountains of Hawaii, Mauna Kea and Mauna Loa, both over 13,000 feet high, the one pointed at the top, the other a flat dome. Here, at the very summit of the latter, in the center of the plain, is another of the world's most active volcanoes.

#### A "RINGSIDE" VIEW OF AN ERUPTION

Mokuaweoweo—Hawaiian words are always easier to pronounce than they look when one remembers that every vowel is pronounced—is active only about once in four years. Since one never knows when

the exact time will come, not many people have seen this volcano in eruption.

An uncle of mine had that good luck. He was camping one night at the edge of the crater, which is from 500 to 600 feet deep. All was dark and peaceful, and he went to sleep. In the night he was awakened by a slight earthquake and instantly became conscious of a great light and a roar of sound.

From the center of the crater rose a column of molten lava, a hundred feet or more in diameter and so high that its top could be seen by ships at sea.

My uncle said the wind and the roar were terrific. He would never admit that he was frightened, said his staying and watching was proof that he was not. Actually, all these volcanic manifestations are so unbelievably beautiful that a man might stay to look even if he thought the next minute would be his last.

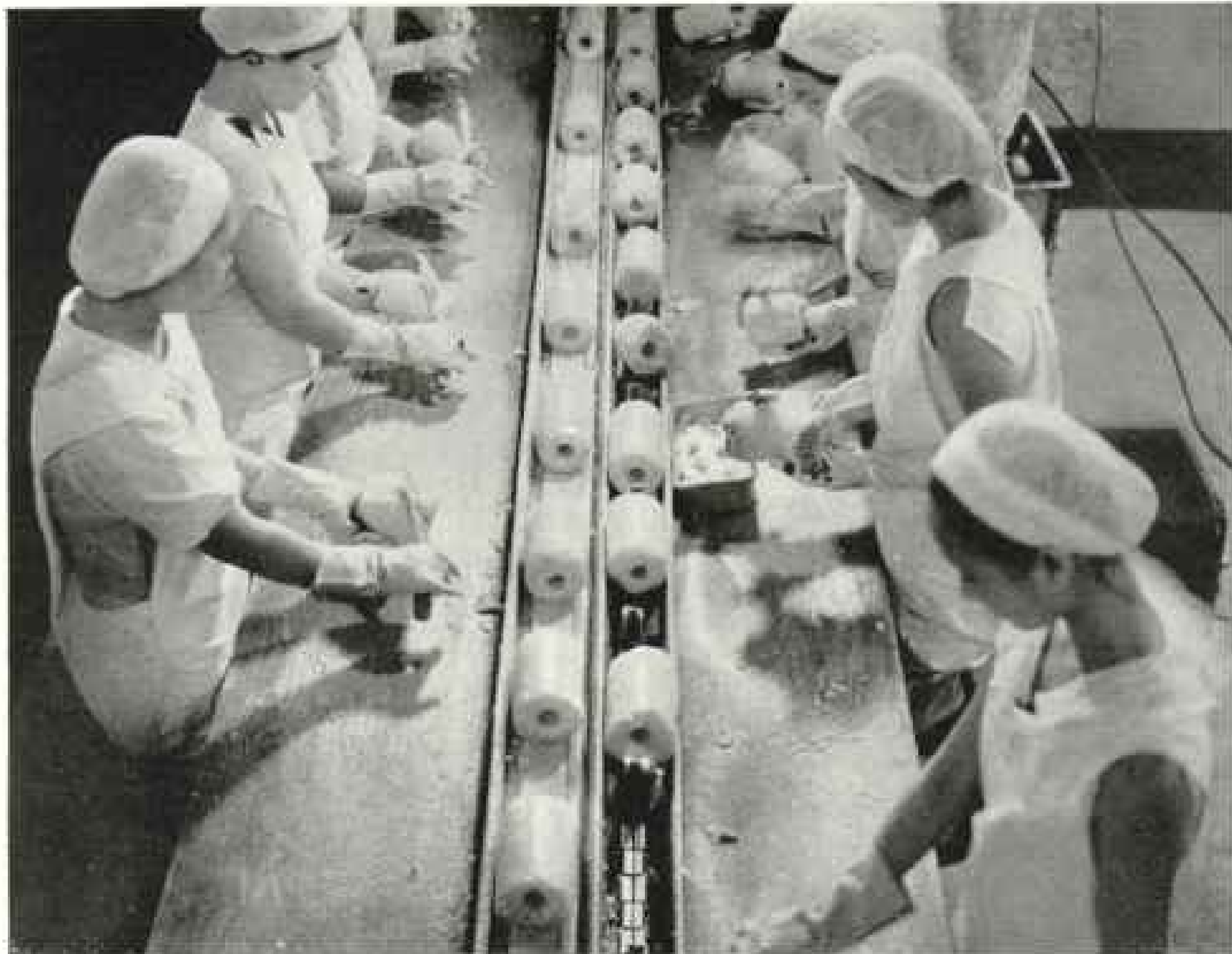
The important activities of this volcano do not occur in the crater, because the molten lava, pushed up irresistibly from subterranean depths, seldom gets so high without finding a weakness in the side of the mountain where it can break out. Thus begin the occasional lava flows, which sometimes last for days and now and then reach the ocean itself.

They are not particularly dangerous to human life because they break out and flow rapidly only in the high, barren region, which is uninhabited. Long before they reach the settled areas, they slow down to a speed of a mile or half a mile a day. It is really amazing, as one looks back over the flows of the last hundred years, how little property damage has been done.

The hardest lava, the *pahoehoe*, as the Hawaiians call it, is generally in the higher, more barren regions. The soft lava, or *aa* (a word known to all cross-word puzzle fans), disintegrates very rapidly and is the basis for the magnificent soil on which cane is grown.

The Hawaiians, who are still the principal inhabitants of this part of Hawaii, are always prepared for flows because they have been warned in advance by the Goddess Pele. If a lava flow shows signs of continuing for a long time, I have no doubt that the Hawaiians, and perhaps some Americans, try to propitiate the goddess through sacrifices.

In Kilauea itself Pele can be propitiated by gifts of ohelo berries or, on important occasions, of suckling pigs. Perhaps the



Photograph from Hawaiian Pineapple Co.

WHITE-CLAD GIRLS PARE PINEAPPLES FOR THE SLICING MACHINE

An ingenious machine peels the fruit to fit the cans, trims ends to even lengths, and cuts out the core. As the cylinders move along on a belt, girls wearing sterilized rubber gloves trim any remaining pieces of outside shell. Then the cylinders go to the slicer (Plate VIII and pages 445, 447, 456).

reason that I am alive to write this article is that, as a boy, I never went into the crater without throwing a few branches of obelo berries into the fire!

Almost as thrilling and far more magnificent than the volcanoes on the island of Hawaii, except, of course, when they are in violent action, is the superb, long-dormant crater of Haleakala, 10,032 feet above the sea on the island of Maui (page 455). This has a circumference of 21 miles, and is more than 1,000 feet deep. Dead lava cones several hundred feet high on the floor of the crater look, from the rim above, like anthills.

Standing on the summit of the mountain, you feel as if you were in the center of some weirdly beautiful universe. At your feet is the immense chasm of the crater, torn and tortured. On all sides rises the blue black of the Pacific, up and up, making a horizon level with your eyes, islanded with white cloud masses far below. Across the channel the three domes of Hawaii's mountains shoulder their way through the clouds, the

two highest, snow-covered in winter, looking like white islands of the sky.

I had a startling experience one morning on Haleakala. At breakfast time a professor uncle of mine from Chicago was missing. We called, but there was no answer. At last we saw him, several hundred feet below us, trying to climb down into the crater at a spot where it was impossible to succeed.

"That is like these professors," my father said. "They think they know everything. But since we do not want to have to report him missing to your aunt, you will have to climb down after him and show him how to get back."

DIRE PERIL ON A LANDSLIDE

The man was in real danger because he did not know the nature of the rocks over which he was climbing or even the lay of the land. I made quick time, but my voice did not carry downward. I could not stop him until I was almost upon him.

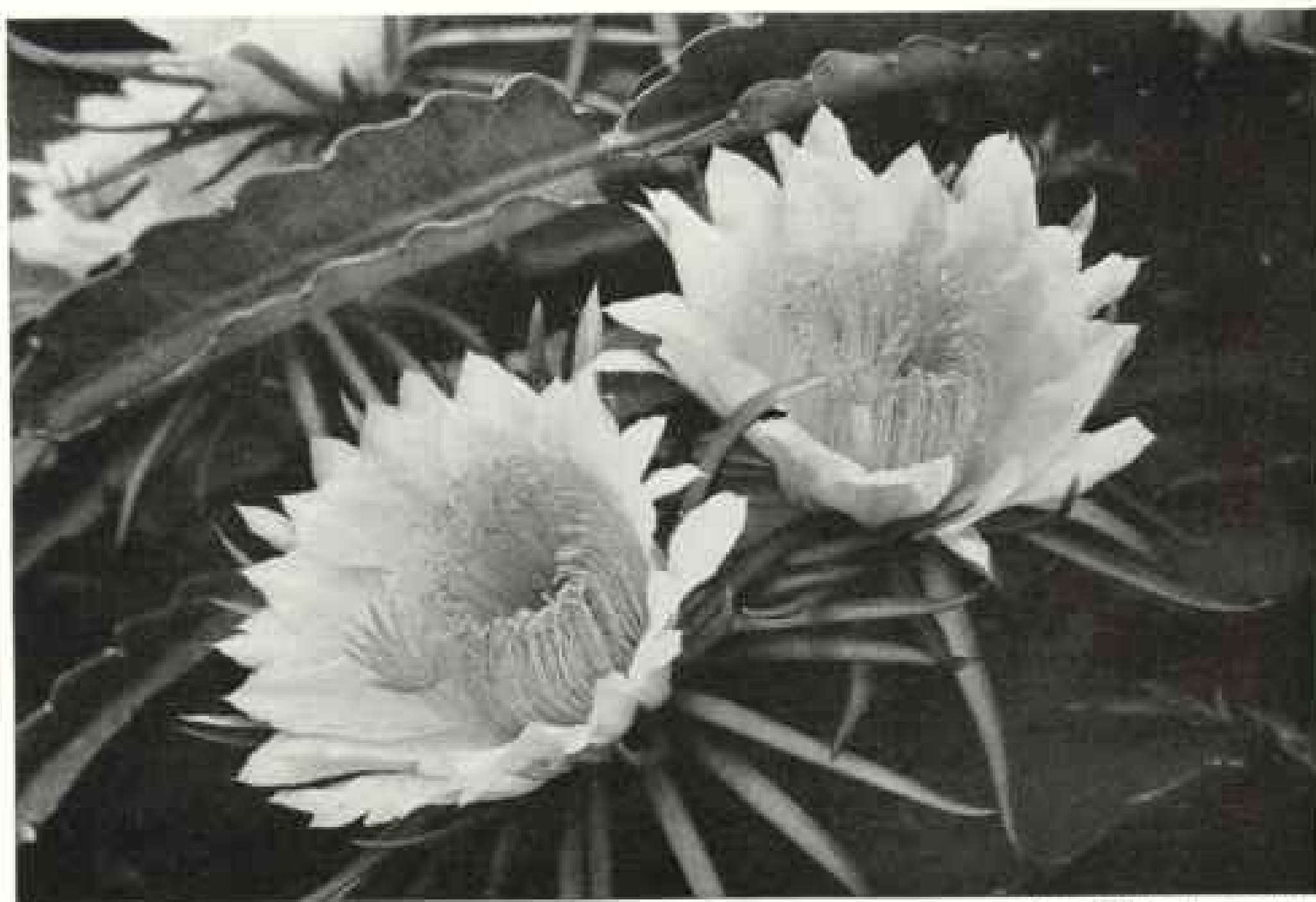
I found the foolish man sitting in the



Photograph from Hawaii Tourist Bureau

VAPOR OF VULCAN'S BREATH FOGS THE HIGHWAY IN HAWAII NATIONAL PARK,  
ISLAND OF HAWAII

Steam cracks are everywhere, and in wet weather, especially, the whole area reeks with sulphurous fumes.



Photograph by W. J. Senda

NIGHT-BLOOMING CEREUS LENDS ENCHANTMENT TO THE DARKNESS

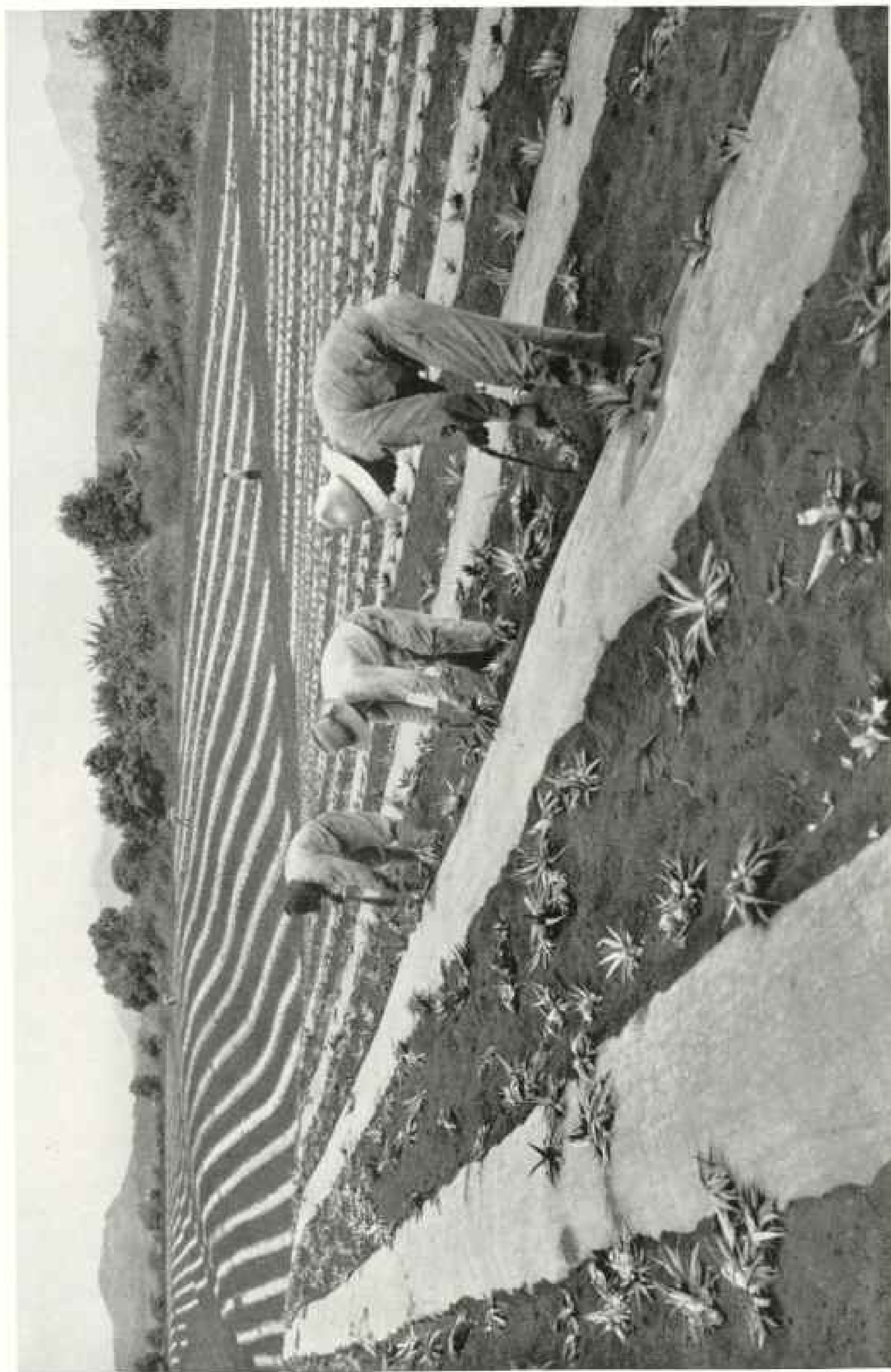
At Punahou School, Honolulu, a half-mile-long stone fence is covered with this exotic cactus, which has become popular in the islands. When the author was a boy, he rode horseback to classes across a wind-swept grass plain which now is an elaborate park with flower gardens and a lotus pond (page 423).



Official Photograph U. S. Army Air Corps

MILES OF PINEAPPLES COVER ARID HILLS ON MOLOKAI

Roads leading to the residence of the manager make geometric patterns in the trim fields. Originally this field was covered with cactos and weeds. It had to be laid out for drainage, then plowed and fertilized before it was ready for planting (Plate VIII, and pages 444, 447, and 456).



Photograph from Hawaiian Pineapple Co.

PINEAPPLES ARE PLANTED THROUGH MULCH PAPER.

On Molokai so little rain falls that it is necessary to conserve every drop of moisture. These coverings, absorbent as blotters, attract and hold water. At the same time they protect the roots of the tender plants from the tropic sun and prevent the growth of weeds.





Official Photograph U. S. Army Air Corps

AUTOMOBILE PARKING SPACE IS PROVIDED ON THE RIM OF AN INFERNO

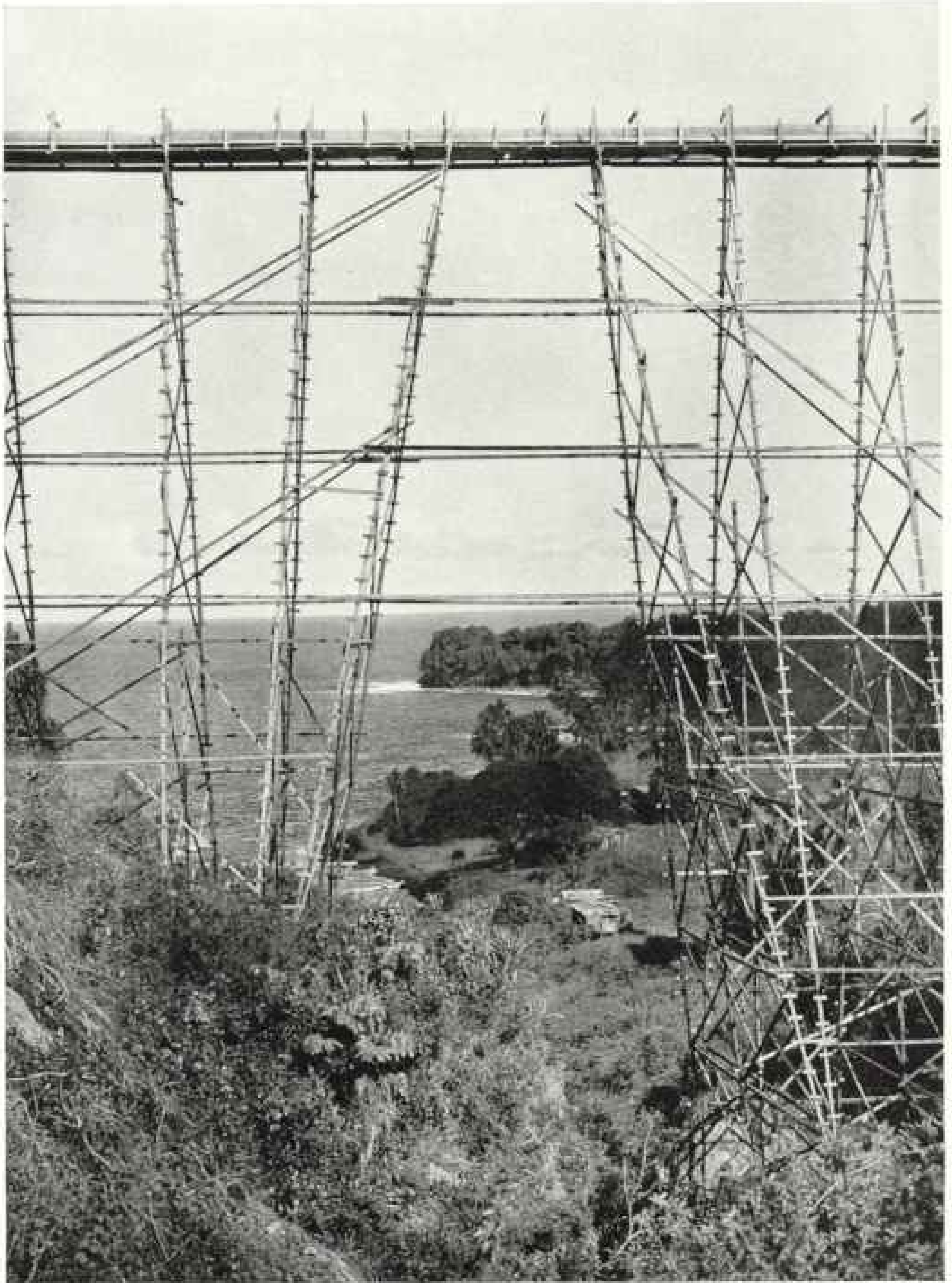
From the edge of the fire pit of Kilauea Crater thousands of visitors look down in safety upon the flames of the nether world. Excellent motor roads lead to a paved surface where cars may be left while their owners contemplate the awesome spectacle (pages 434 and 454).



Photograph by J. J. Todd

**SUGAR FIELD WORKERS LIVE IN COMFORTABLE HOMES FURNISHED BY THEIR EMPLOYERS**

On this Oahu plantation the houses are placed near the irrigation reservoir. One of Captain Cook's sailors reported seeing cane in Hawaii; how it got there is a mystery. Commercial growing began nearly a century ago and now gives employment to thousands of workers (pages 450 and 455).



Photograph by W. Robert Moore.

HIGH FLUMES BRING CANE FROM MOUNTAIN PLANTATIONS TO THE SEA

When the author was a boy, he sometimes rode a bundle of stalks down these towering slides, peering down over the sides often 200 to 300 feet (page 427). They were well-nigh indispensable to the sugar growers, for the country is so rough that the expense of road building was prohibitive. This structure spans one of the numerous indentations on the east coast of Hawaii. Such means of transporting crops are used only on islands where water is plentiful.

middle of what had been a landslide and was about to be another. If he moved, the gravel began sliding. It was obvious that if he moved far he would be carried to the bottom of the crater in an avalanche of gravel and rocks.

Just as I arrived, his camera went. It was not a pretty sight to see the thing leaping along, breaking to pieces, the film streaming out.

He began to give me messages to my aunt, but I told him not to be an ass. It was no time to be respectful.

I ordered him to remove his trousers and throw them to me. This he did with great difficulty, slipping sickeningly as he did it.

I had taken off my own trousers and quickly I fastened the two pairs together with my belt. Then I lay flat on a solid rock and threw him one end of the crude life line.

Following instructions, he stood up as well as he could and made a leap for the solid edge of the slide. If he had missed it, he would have gone down with the thundering mass of rock that he started when he jumped.

When, an hour or two later, we got back to the rim of the crater, my father had much to say to his brother-in-law. I realized that I had never before known the extent of my parent's excellent vocabulary.

With our tough little ponies we rode to the Kohala Mountains at the north end of Hawaii where we could look down into these magnificent valleys, Waipio and Waimanu. The cliffs are so stupendous that there is no possible approach to the broad, level valley bottoms except from the sea. On the north side of Molokai are similar though smaller valleys.

In such places one can still see Hawaiians in almost their primitive state, so utterly cut off have they been from the rest of the world.

To one of these Molokai valleys some settler took a pair of water buffaloes to work in the rice fields. He left the valley, or died. The water buffaloes multiplied and now no man dares visit the valley, since these dull, patient-looking creatures, harmless when tamed, are among the most dangerous of all wild beasts. They cannot spread into other parts of the island because they cannot swim the sea around the headlands nor climb the cliffs which hem them in.

Kauai probably gives more scenic variety than any other island. It has broad,

peaceful valleys that somehow remind one of England; it has canyons with all the color and the impressiveness of the Grand Canyon of the Colorado, if on a smaller scale (Color Plate II); it has, on the marshy uplands of the central mountain, one of the rainiest regions in the world; and along the northwest coast of the island are superb barren cliffs, cut with narrow valleys which can be approached only from the sea.

It used to be a miserable trip to Kauai from Honolulu. The channel dividing the islands is only about 74 miles wide, but it is almost always rough, and the steamers which in those days made the trip were absurdly small and amazingly unsteady. The trip took most of the night and, unless one was an extraordinary sailor, a day of recuperation was necessary. Today one can take an airplane after breakfast in Honolulu, fly to Kauai, circle the island, and be in Honolulu again for luncheon!

#### HAWAII, PERCH OF MAN-MADE BIRDS

We can now fly with safety from the Pacific coast to the islands. Honolulu has become a world aviation center. It is the first lap on the westbound trips of the Pan American Clippers on the route to Hong Kong and Shanghai and on the contemplated route to Australia. Honolulu sends out planes daily to Maui and Hilo, and every day except Sundays to other islands of the group.\*

From Pearl Harbor, the naval base, sped planes on the futile search in the South Pacific for Amelia Earhart. One can seldom look upward without seeing military planes, often in large numbers, practicing or maneuvering. There have been entirely successful mass flights of naval planes from southern California.

As for commercial flying, Clippers from San Francisco and the Orient are as regular as ferryboats. They leave San Francisco Bay in the afternoon and arrive in Honolulu the next morning for breakfast. By the lay of land and water the islands must always be the great commercial and military air base of the Pacific, the point from which radio beacons operate, the concentration and dispersal point for all the planes that fly the widest ocean of the world.†

\* See "Flying the Pacific," by William Burke Miller, NATIONAL GEOGRAPHIC MAGAZINE, December, 1936.

† See the National Geographic Society's Map of the Pacific Ocean, issued as a supplement to the NATIONAL GEOGRAPHIC MAGAZINE, December, 1936.



Photograph from Pan Pacific Press

#### LIFTING THE NAHA STONE WAS THE MEASURE OF A KING

According to legend, any warrior who could raise an end of this ponderous block of lava was destined for royalty. Kamehameha, the story goes, performed the feat and won the other chieftains to his support. The relic rests in the city of Hilo, Hawaii.

The trip by sea is now a pleasure where it used to be misery. Four and a half days on admirable ships are very different from eight days on tubs. I remember once sitting in my chair on deck, the chair being tied, of course, because the old *Zealandia* rolled even in harbor!

We were holding fast to keep from being thrown out when a woman sitting next to us asked my father why the ship rolled so much.

He said: "It is to prevent the steamer from going too fast. When we roll we take in a little water at the top of the funnel, and that dampens the fire!"

Unfortunately the good woman accepted the statement as truth, and my father was much embarrassed.

#### HAWAII HAS "GONE MODERN"

It was Captain William Matson who was responsible for the improvement in Pacific ships. He realized that the Pacific must keep step with the Atlantic in ship construction; that bathrooms are as important at sea as on land; that fast ships are demanded as well as fast trains.

When recently, on one of the splendid new steamers, I rounded the lionlike promontory of Diamond Head and saw once more the whole panorama of Honolulu, I realized sharply that, aside from the landscape, Hawaii had changed as vitally as had the type of ship on which one arrives (page 461).

The huge hotels stand out boldly among the coconut trees that line the beach; and big hotels inevitably mean hordes of visitors who, in themselves, change the character of the town, make it more sophisticated.

Large public schools and the white cluster of buildings which is the University of Hawaii show the progress in population since I rode horseback to school at Punahou and prove that the old missionary enthusiasm for education has not diminished. Fine parks and a density and variety of vegetation which did not exist a few years ago show the growth in public spirit.

As the *kamaaina* of yore (the man who is a native of the place) lands and walks or drives through the city, the changes become even more striking. If Honolulu has no modernistic architecture, it has first-class





Photograph by Richard H. Stewart

#### WALKERS HAVE "MUSIC" WHEREVER THEY GO ON THE BARKING SANDS

In dry weather this desolate beach near Waimea, island of Kauai, voices protest like a dog at every footstep. A favorite sport of visitors is to slide down the slopes and produce sustained howls.

modern buildings. The Academy of Arts, with its treasures of Hawaiian and oriental art, seems, in its architectural simplicity and the harmony of its lines, fully to express the serenity of the Hawaiian spirit.

In front of it Thomas Square, which used to be a hideous, dust-blown park, with tight, inartistic clumps of crotons and red hibiscus, is now a place of delight. There are a fountain flanked by banyan trees, and smooth green lawns, and graceful groups, not clumps, of salmon-pink hibiscus. This flower is everywhere, in thousands of shapes, sizes, and colors, for it has its thousands of devotees.

#### HONOLULU STRIKINGLY AMERICAN

When people build homes for themselves in Honolulu, they are no longer content to copy the austere houses of New England, or the gingerbread atrocities of the post-General Grant era, or even the bungalows of southern California. Now people try to build houses which could properly be in Hawaii and nowhere else, and they succeed surprisingly often. They surround these houses with gardens which, in a climate where growth does not stop during the win-

ter, look fully established and even old in a few years.

The city is different also because of the change in the character of its population. Few pure Hawaiians are to be seen. The oriental population, a large part of it American citizens because born in Hawaii, has enormously increased, and the Japanese are much in evidence because their shops have reached out into the suburbs.

Nevertheless, the city is far more definitely American than it used to be. One sees everywhere typical American faces; one realizes that the machinery of government and of business is wholly American. Every day Hawaii, through the development of its essential character, becomes more and more in spirit what it is by law and in fact, an integral part of the Nation.

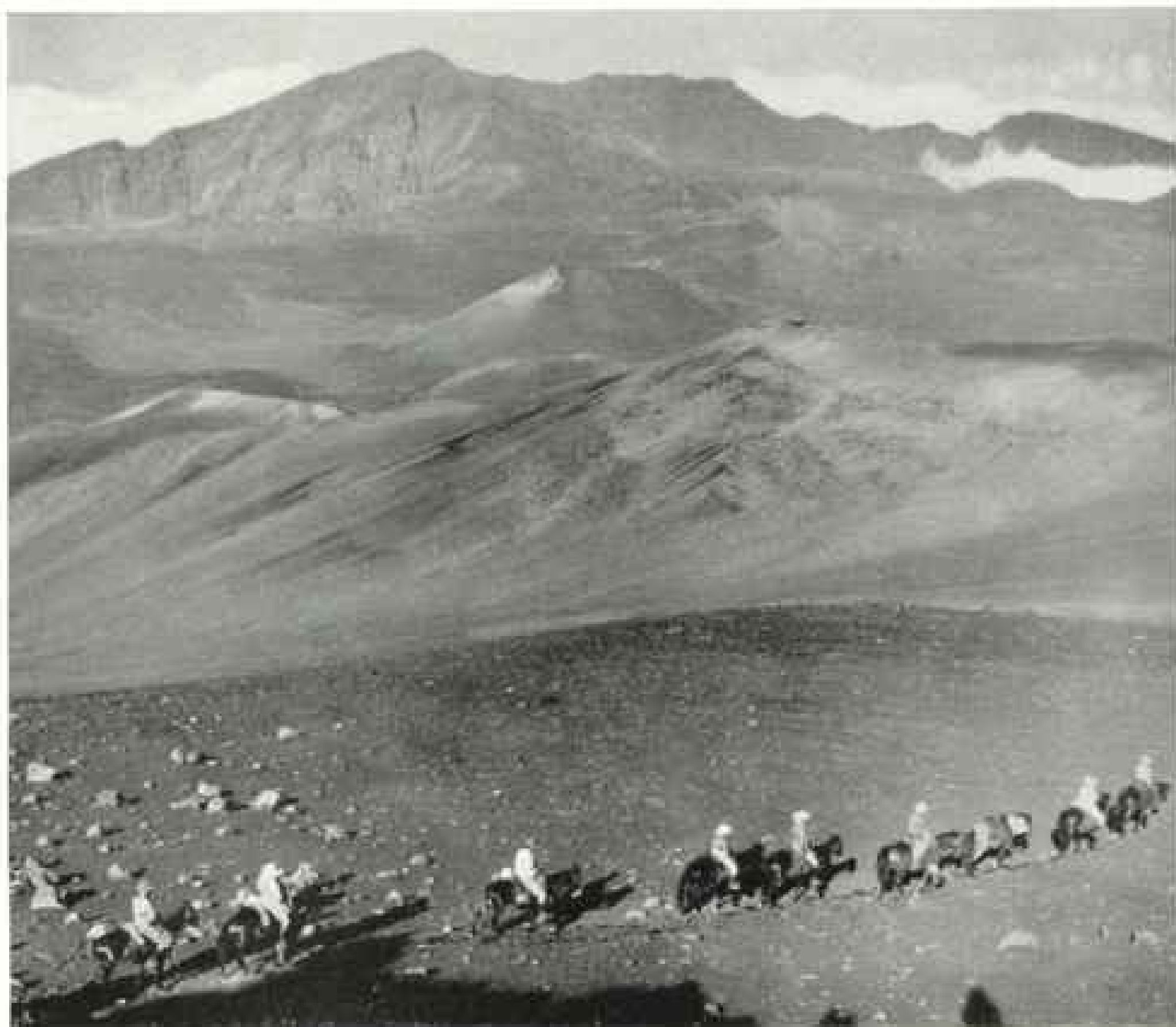
Boys and girls of all nationalities attend the public schools, work together, play together, have their fights and their jokes, learn to have the same likes and dislikes. From schooldays the little American citizens whose fathers and mothers are aliens are determined to be in every way American. There is not an American custom, good or bad, which they do not try to adopt.



Photograph by W. Robert Moore.

## AWED VISITORS LOOK DOWN INTO THE FIRE PIT OF KILAUEA

Every few years a subterranean disturbance sends molten lava welling up to fill the mighty pit and overflow its top. Such eruptions, however, give advance warning and when they occur there is never any serious damage. The liquefied rock does not spout up violently, and as it cools its flow becomes slower and slower (page 434). This picture shows the huge maw of Kilauea Crater, known as Halemaumau, in that section of Hawaii National Park which is on the island of Hawaii (page 448).



Photograph by News of Hawaii

THE "HOME OF THE SUN" CRATER TAKES VISITORS BACK TO THE WORLD THAT WAS

The bowl of the dormant volcano Haleakala on Maui Island is more than 1,000 feet deep, and its floor covers 19 square miles. In the rain forests on the slopes grow the ape-ape plants, survivals of forgotten ages (page 422); and here and there may be seen the striking silver sword flower (page 421). There now is a good automobile highway to the top which formerly could only be reached by horseback or climbing.

Sugar is the basis of Hawaiian prosperity. The soil, the climate, all the physical conditions, make this inevitable. Hawaiian planters have determined to produce sugar in a manner as nearly technically perfect as human ingenuity can devise (449, 450).

They supervise minute studies of soils, of fertilizers, of systems of irrigation; they test varieties of cane from all over the world, cross one variety with another in order finally to procure the ideal, the variety most resistant to disease and blights, that which is most vigorous and has the highest sugar content.

This application of scientific method has raised the amount of sugar produced in a crop season of 18-22 months on an acre of ground from two or three to twenty tons. The average for the Territory is a little

more than eight tons. In all, Hawaii usually produces about a million tons annually.

Heavy production is necessary if the plantations are to pay. The majority of them require both irrigation and fertilization, which are expensive. Furthermore, on all of them there is a determination to maintain the highest standards of living among the laborers, and that means high pay.

#### SCIENCE APPLIED TO SUGAR

When you get the most advanced scientific study as the basis of the work, from the planting of the cane to loading the bags of sugar for export; when you have labor that is well paid and contented; when you also have managers and owners who consider their enterprise as a co-operative



Lenses—Pan Pacific Press

TI LEAVES MAKE GOOD TOBOGGANS FOR MOUNTAIN COASTING

Long before Americans came to the islands, Hawaiians enjoyed the sport of sliding down steep grass slopes on these improvised sleds (page 426).

scheme for the benefit of the largest possible numbers, stockholders, laborers, officers—then it does seem as if all elements were trying to do their best.

Sugar has been produced in Hawaii for a hundred years. The next most important industry, the raising of pineapples for canning, is recent.

Pineapples have grown in the islands for many years. I remember once, as a boy, leaning over the side of the little steamer which was anchored off one of the Maui ports to take on freight, and calling down to the Hawaiians in their canoes that I would take a dollar's worth of pineapples. They were good to eat raw and I thought my mother would be glad to have some for

pickles and preserves.

I should first have asked the price, because I found myself the somewhat bewildered possessor of one hundred pineapples!

JAMES D. DOLE,  
PINEAPPLE  
PIONEER

It remained for Jim Dole, only a class ahead of me in Harvard, to decide that pineapples could and should be raised in large quantities for canning, that it ought to be possible to sell the canned fruit cheaply enough to make it a part of the national diet, and that Hawaii was the place to try the experiment. He went from Boston to Honolulu and, after months of arduous persuasion—he had no capital of his own—he managed to secure

enough financial assistance to start in a modest way.

Twenty-five years later thousands of acres of upland, a little too cool for the best cane, were gray with regiments of pineapple plants, and Hawaiian canned pineapples formed part of the stock of every village grocery store in the United States. It is not given to many men to see such complete fulfillment of their dreams.

Pineapples, like sugar cane, are cultivated scientifically, and vast tracts of land, too arid for cane and not economically within reach of irrigation, are now covered with pineapples (Plate VIII, and pages 444, 446).

It has been found that, if the plants are sheltered with paper from the drying sun,



Photograph by Harley Melhus

#### HAWAIIAN COWBOYS RIDE A HERD IN THE SEA

Cattle to be transported from the Kona coast are led into the water, lashed by their horns to lighters, and forced to swim to the ships. Cranes hoist them dangling to the docks. For this marine herding the men change from leather to wooden saddles. The horses' tails are bobbed.

enough moisture can be retained in the soil to make watering unnecessary. The small, dry island of Lanai, off the southwest coast of Maui, looks like a madman's dream with its hundreds of acres sheathed in white paper (page 447).

#### ENORMOUS CATTLE RANCHES

Sugar plantations and mills, pineapple plantations and canneries, are owned by stock companies. The cattle ranches are more feudal.

One cannot think of cattle without thinking of the Parker family, and a visit to the 600,000-acre Parker Ranch on the uplands of Hawaii is, so far as the welcome is concerned, like a Southern welcome before the

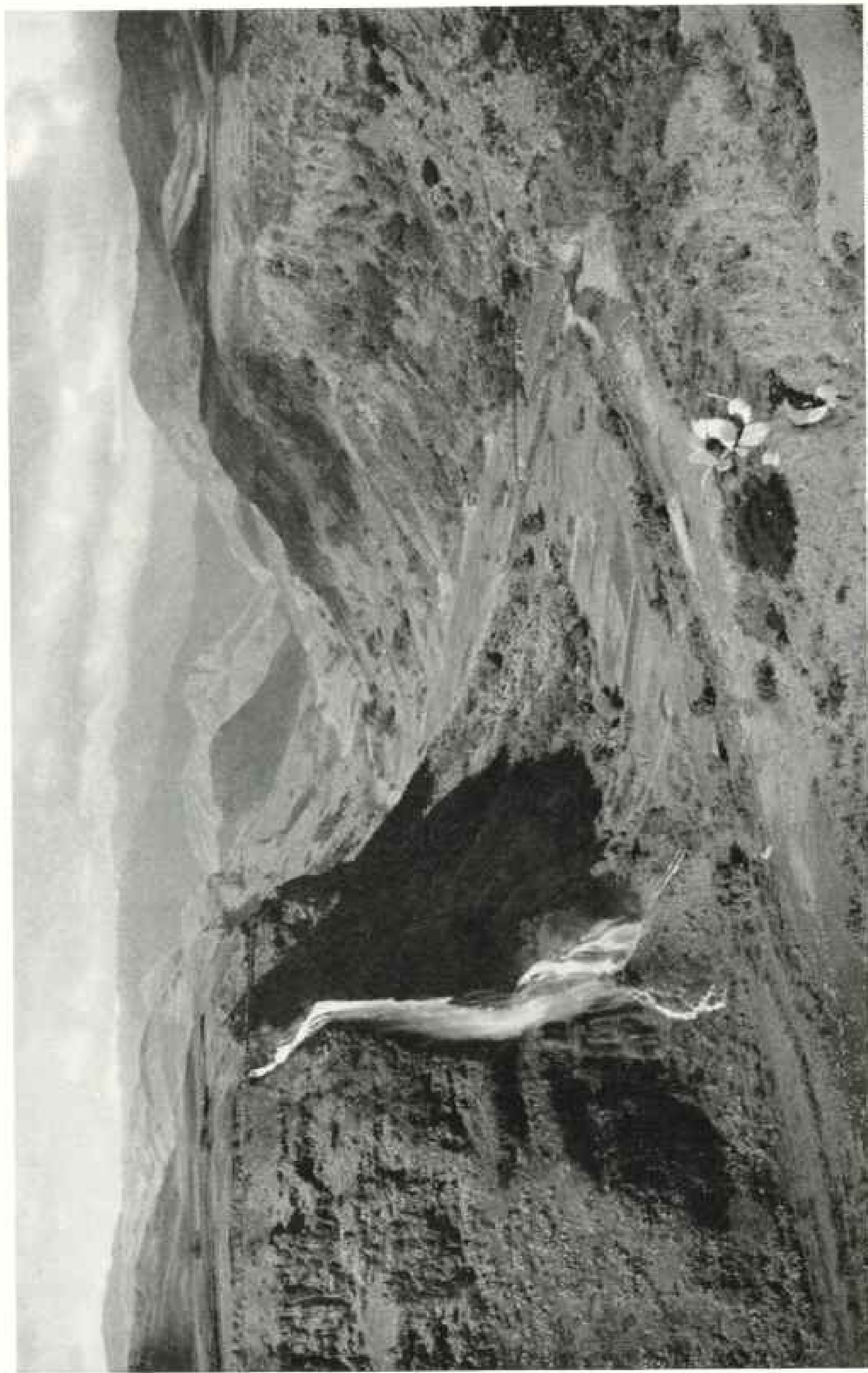
War; so far as customs go, like a trip into medieval history. The family lives its own separate life; the only people within miles are retainers of one kind or another; news of the outside world seems no longer to have any special importance. This ranch owns one of the largest herds anywhere of pure-bred Hereford cattle.

#### COFFEE AND RICE ALSO GROWN

The production of meat, all consumed locally, ranks third among Hawaiian industries. Some 1,300,000 acres, about a third of the Territory's area, are devoted to it. There are about forty large ranches.

The Kona District of the island of Hawaii produces excellent coffee, but not in





Photograph by W. J. Scudle

**WATER FROM ONE OF THE WETTEST SPOTS ON EARTH KEEPS HANAPEPE VALLEY ETERNALLY GREEN**

On the floor of this gash in the mountains of southern Kauai rice fields never suffer drought, for the cloud-dimmed area in the background has one of the world's highest average precipitation records. The graceful cataract at the left is one of many that leap into the canyon (Plate III).



Photograph by Richard H. Stewart

CHILDREN OF MANY NATIONS CELEBRATE LEI DAY ON MAY DAY

To honor a queen selected for the occasion, this chorus of youthful Hawaiian dancers performs a ballet in front of the Capitol of Hawaii. They are presenting an elaborate hula. Other racial groups do dances peculiar to their own lands. A similar festival, in commemoration of King Kamehameha's uniting of the Islands, is held June 11 (Plates IV and V).



Photograph by Richard H. Stewart

#### TWO LITTLE FILIPINAS PICK KONA COFFEE

Coffee has been tried on most of the islands, but now commercial growing is confined to the Kona coast of the island of Hawaii (page 457). The bean is not cultivated on large plantations, as are sugar and pineapples, but mostly on some 1,200 farms of 12 to 15 acres. Kona coffee is especially valued for blending, both in the islands and on the mainland United States.

sufficient quantities to supply even the home market. Most of the crop is shipped to the United States mainland for blending purposes.

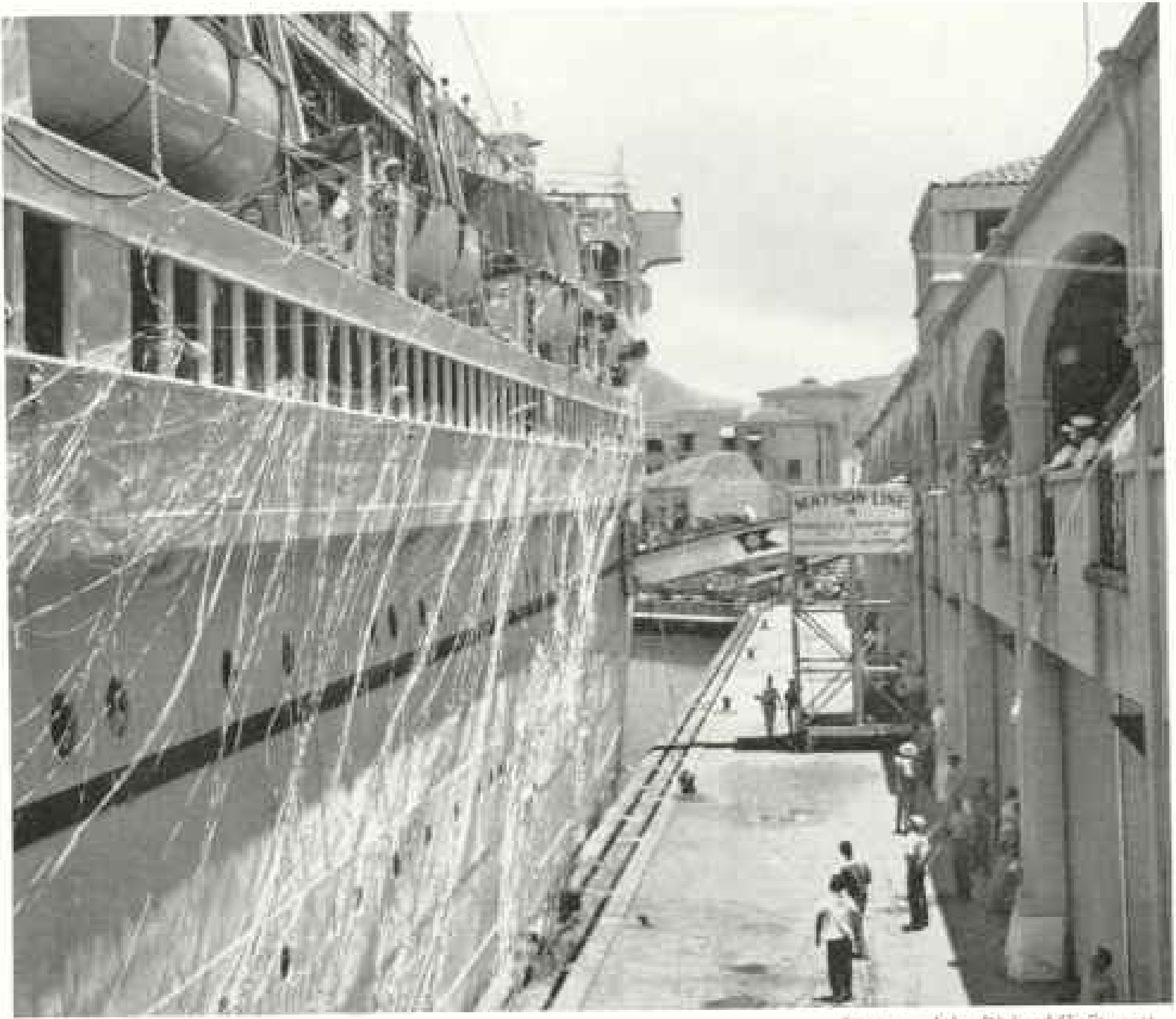
Some rice is grown in the islands, and that gives visitors a chance to watch the water buffaloes plowing through the mud (Plate III). Mediterranean fruit flies have pretty well destroyed the fruit industry, except for bananas, which they seem not to like, and pineapples, which are too tough for them to enter. For such fruit as avocadó pears and guavas, which grow wild all through the hills, there is an embargo on the Pacific coast.

When I used to listen, in Washington, to the almost daily complaints of the Spanish Ambassador because of the embargo on Málaga grapes, Spain being infested with the fly, it was easy to be sympathetic be-

cause Hawaii suffered, and also to be firm because I knew what disaster the fruit fly brought.

All kinds of tropical fruits and crops have been tried in Hawaii, but experience has proved that the only crops absolutely suited to the place, and therefore the only crops commercially profitable, are sugar and pineapples.

Hawaii has few manufactures. There are no minerals to speak of in the islands, and the heavy industries, therefore, could be built up only at a great disadvantage. One foundry produces a certain amount of sugar-mill machinery, but in general it is cheaper to import from the mainland. The manufacture of fiberboard from bagasse, the refuse fiber of sugarcane, shows some promise.



Photograph by Richard H. Stewart

WITH BANDS PLAYING AND STREAMERS FLUTTERING, THE "MATSONIA" LEAVES HONOLULU

Departing guests wear about their necks the leis presented by friends bidding them *aloha*, and as the ship moves away from the pier and rounds Diamond Head they fling back these wreaths of flowers as a gesture of promise to return.

A good local beer is made in Honolulu, and I understand that a license has been issued for the manufacture of the Hawaiian liquor called *okolehao*, or, more familiarly, just "oke." Much of the molasses, which is a by-product of the sugar mills, runs to waste if it is not used as fertilizer.

MILITARY AND NAVAL FORCES

One further innovation has completely changed the character of Hawaii from what it was when we were all the more or less loyal subjects of Her Majesty Liliuokalani, and that is the presence—in Honolulu one might almost say the omnipresence—of American military and naval forces. It is one of the largest posts in the service and one of the most popular because the climate is excellent and living conditions are rea-

sonably simple. After life in the Philippines the officers' wives seem primarily to appreciate having fresh milk for their babies!

FURNACES NOT NEEDED

Both military and naval stations are comfortable, and are generally built in cool and open situations.

The Navy centers its operations at Pearl Harbor, that fine landlocked harbor, with a narrow entrance leading from the open ocean to some twelve square miles of deep and utterly calm water. Thoroughly well fortified, it could hold the entire American Fleet and probably one or two foreign fleets as well if we should ever invite them to an international tea party. The huge dry dock and the extensive machine shops are fitted



Photograph from Pan Pacific Press

OH, WHAT FUN IT IS TO RIDE IN A ONE-MAN OUTRIGGER CANOE!

Less difficult to master than surfing, this sport provides plenty of thrills. An upset means only an invigorating plunge into the sparkling surf (page 430).

to put through repair work of all kinds.

The Army has several posts, the largest, Schofield Barracks, being on a breezy upland plain some twenty miles northwest of Honolulu (page 428). The Army has charge of the fortifications in Diamond Head. Between them the Army and the Navy, with the assistance of modern science, have made the island of Oahu as nearly impregnable as is humanly possible.

This is vital, since Hawaii is of such inestimable importance as a defensive outpost that the United States can never afford to let it go.

The mainland Pacific coast will always be

protected with an American fleet based on Pearl Harbor.

Hawaii is not an offensive station—is not, as some people like to say, 'a spearhead pointed at the Orient.' It is, roughly, only a third of the distance from California to Japan, and could not, in my opinion, be used as a base to attack that nation because it is too far away.

Hawaii is living proof that Americans and other races can live together in mutual understanding. The future value of the Territory to the world, therefore, as well as to the United States, will be cultural as well as economic.

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*Notice of change of address of your NATIONAL GEOGRAPHIC MAGAZINE should be received in the offices of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your December number, The Society should be notified of your new address not later than November first.*



# TREASURES OF THE PACIFIC

## Marine Fishes and Fisheries Yield Vast Wealth from Alaska to Baja California\*

BY LEONARD P. SCHULTZ

*Curator of Fishes, United States National Museum*

**M**ARINE fishes and fisheries form the basis of one of the most important industries of the west coast of the United States. In our Pacific ports a larger poundage of fish is landed than in our Atlantic and Gulf coast ports combined.

Monterey, California, in poundage, is the third largest port of entry for fish in the world, exceeded only by Hull, England, and Stavanger, Norway; and Los Angeles-Long Beach is fourth. These and many other interesting facts about the marine fishes and fisheries of the West came to my attention in the years I was teaching fisheries courses at the University of Washington, and collecting fishes from Washington to California.

### THE SEA SERPENT MYTH

Sea serpents are known the world over, mostly from newspaper accounts of these mythical monsters. From British Columbia comes the story of a long-haired "sea serpent" found on the beach. Alas for romance! The hairs were the long gill rakers of a mammoth basking shark, which had become stranded and then partly decomposed.

Sea serpents are figments of imagination, created from glimpses of huge fish, or compact schools of small fish swimming near the surface of the ocean. In the Pacific the "king of the herring," a long, harmless, ribbon-shaped fish with a high dorsal fin in front, the reddish tips of which often extend out of the water when it is swimming near the surface, is good material for such a yarn.

Other myths of my childhood were shattered when I took up the serious study of fish. For instance, when I used to angle for sunfish in a small lake in Michigan, my elders cautioned me not to talk loudly lest I frighten the fish away.

I have learned since that sound in air is not transmitted to water except slightly, but that the stomping of feet in the bottom of the boat causes vibrations that can be heard in the water. Well do I remember

as a boy swimming beneath the surface how two stones struck together in the water caused a frightful noise in my ears.

Experiments in firing guns over lakes have shown that the terrific sound in the air is barely heard by a diver under the surface. Although fishermen of the high seas have placed emphasis on the disappearance of fish as a result of gunfire from battleships, no signs of frightened fish have been discovered in the surrounding waters during repeated firing of large and small naval guns over stretches of many miles.

The firing of big guns does not kill fish, but dynamite explosions in the water do. Once while I was at Yaquina Bay, Oregon, with Dr. Carl L. Hubbs of the University of Michigan, the Government was blasting the channel deeper. We were anxious to collect the fish killed by the detonation of a ton of dynamite that shot a column of water several hundred feet in the air.

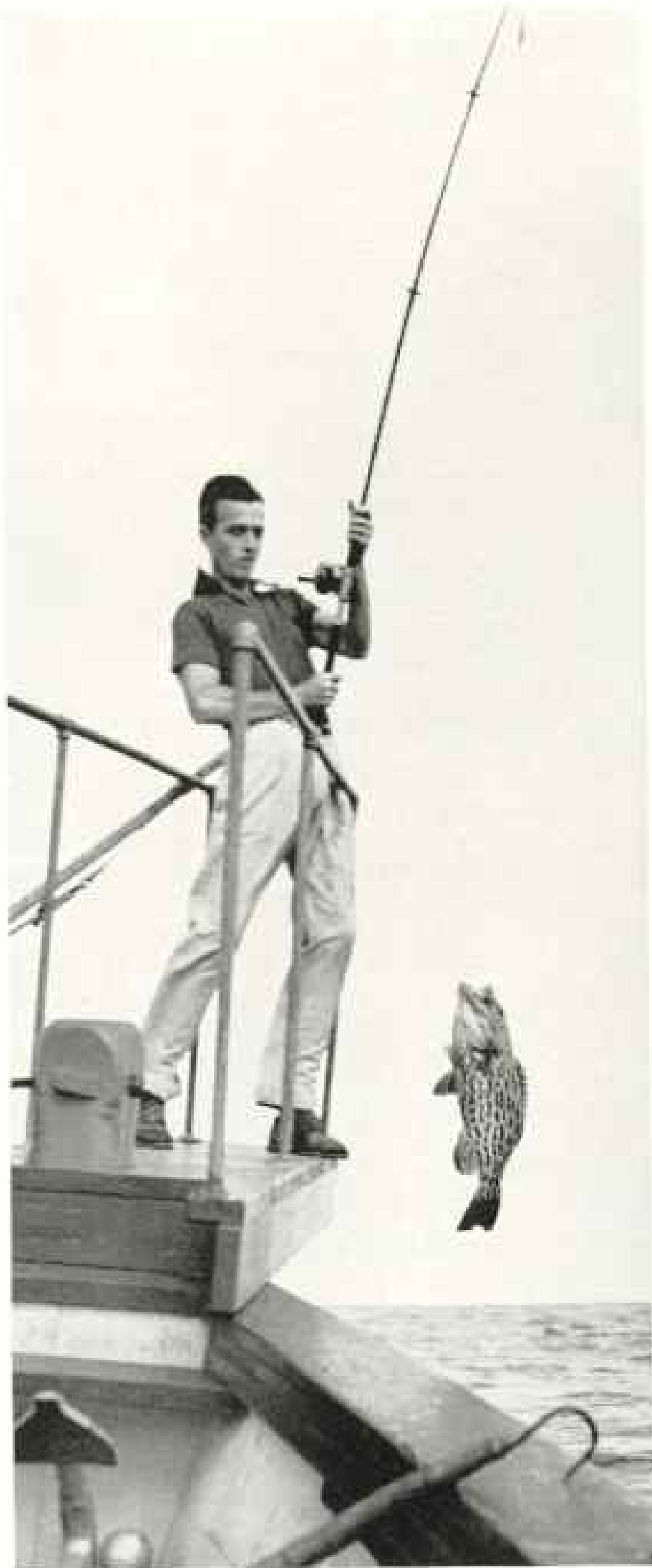
Although we were a quarter of a mile away, the force of the explosion stung the bottoms of our feet in a rowboat. The terrific noise from the first explosion was the signal for thousands of sea gulls and other aquatic birds to come and eat the dead and stunned fish that floated to the surface. Before we could pick up a fish, the birds had consumed them all.

### BIRDS WATER-BOUND FROM OVEREATING

Soon we discovered they had eaten so many fish that some could not fly from the water. We caught several birds and made them disgorge the fish in the bottom of the boat. In an hour we had a fine collection; the fish were not damaged by their short stay in the stomachs of the birds.

From additional experiences and explorations by students of fish, some of which date as far back as 1731, many of the mysteries associated with the life story of fishes have been discovered. By the use of dredges and trawls the deep-sea fish

\* See NATIONAL GEOGRAPHIC MAGAZINE, "Fishes and Fisheries of Our North Atlantic Seaboard," December, 1923, and "Devil-Fishing in the Gulf Stream," June, 1919, both by John Oliver La Gorce.



Photograph by Kurt Severin from *Black Star*

#### EASY TO LAND IS THE SPOTTED CABRILLA

This largest of the western cabrillas, sometimes weighing 20 pounds, is one of the finest food fishes on the Pacific coast; yet it is not highly regarded by sportsmen. The angler, on his raised platform built out over the gunwales, doubtless hoped for a gamier catch.

fauna of the Pacific has been explored, and strange and almost incredible forms have been revealed.

At moderate depths the fishes are bright red, with large eyes. The soft-bodied fish, living still deeper, have large eyes also, to catch the faint glimmerings of light which penetrate to that depth, or they are entirely blind. Those from depths of half a mile or so are usually black.

#### WONDERS OF THE DEEP

Many of these deep-sea fish, as well as those near the surface, such as the lantern fishes and the singing fish, have luminiferous organs along their sides and on their heads that give off light like a firefly at night. These many luminiferous organs on the singing fish, or midshipman, look like the pearl buttons of a uniform when the fish is taken from the water. Hence the name "midshipman." The name "singing fish" is appropriate, too, for the creatures produce a peculiar humming sound during the breeding season.

Certain deep-sea angler fishes have one of the fin rays near the top of the head developed into baitlike tentacles with a luminiferous gland, or "electric light" at its very tip. There has been much speculation on the use of this most delicate and unusual organ, some students thinking that it serves as "bait" to attract live food, and others that it is a courting spark to beckon a mate in the total darkness of the depths of the ocean.\*

Other remarkable structures are found on fish. For example, the rock snails and clingfishes are provided with sucking disks, just back of the lower parts of their heads on the underside. This hydraulic sucking organ enables them to cling to objects securely while the waves and tidal current rush past. At intervals of quiet between

\* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Round Trip To Davy Jones's Locker," June, 1931; "Depths of the Sea," January, 1932; "Wonderer Under Sea," December, 1932, and "Half Mile Down," December, 1934, all by William Beebe.



Photograph by John Degeiman

**THREE MEN TO A HOOK, FISHERMEN BATTLE FURIOUSLY IN A SCHOOL OF TUNA**

After coaxing the big fighters alongside the fishing vessel *Santa Margarita* by throwing sardines and other live bait overboard, the men work fast to haul in all they can before the school moves away. Three poles are attached to a single line, and barbless hooks are used so no time is lost in freeing the fish. Here a 150-pounder will be dumped onto the crowded deck. Sometimes an hour's catch amounts to several tons. At the close of the brief battle the men are exhausted (page 488).

the passing of the waves they swim about, obtain food, and then fasten themselves again to a rock to avoid being swept away by the next wave.

These structures are no more wonderful than the breeding habits of the grunion, the surf smelt, and many other fishes. On moonlit nights during the high tides of March to June, the grunion comes in on the long sandy beaches of southern California with the sweep of the water up the beach as the waves break, lies for a moment,

then flips back into the wash of the next wave, having deposited its eggs, fertilized the instant they are laid, in the sand of the beach. Succeeding tides bury the eggs deeper, protecting them until the next series of high tides washes them out two weeks later.

**GRUNION SPAWN BY MOON TIME**

Shortly after the tide begins to recede, the spawning grunion appear in this tidal series on the second, third, and fourth

nights after the full moon. Two weeks later the eggs laid are ready to hatch, and at this time another series of high tides accompanying the new moon washes them out of the sand, causing them to hatch.

Experiments have shown that grunion eggs can be kept in moist sand, and after two weeks made to hatch at any time by the simple expedient of adding sea water and releasing them from the sand by stirring. The grunion depends wholly on the constancy of the tidal cycles; first to help bury the eggs, and then to release them from the sand. The tides accompanying the new moon, when the eggs are ready to hatch, are higher than the usual tides, as are those accompanying the full moon.

The surf smelt, or silver smelt, deposits its eggs along the shore only in fine gravel as the ocean wave breaks and flows up the beach. The eggs are laid and fertilized the second or so that the fish are in the upper part of the wave and they stick firmly to the gravel. Thus, even though subsequent waves roll them around violently, they do not become dislodged.

The selection of fine gravel instead of sand by the silver smelt is a remarkable adaptation. In sand the eggs would be buried and might smother, but in fine gravel the easy seepage of sea water assures the eggs of an ample supply of oxygen for their development.

Sportsmen and tourists capture these surf smelt on the spawning grounds in a few inches of water by dipping them up with hand nets of a special type. Just off the Olympic Highway, in the State of Washington, I have seen men run forward with dip nets into the breaking wave, scooping up many smelt just as they started up the beach to lay their eggs.

In Puget Sound "rakes" of a special type are used to draw the fish from the shallow water. Commercial fishermen detect the schools of surf smelt by their breaking the surface, or "flipping" just offshore. Nets are laid out quickly around the schools and hauled ashore.

#### FISHES THAT BUILD NESTS

Other fishes build nests. For example, the crested blenny, a common eel-like fish, lays a neat little ball of eggs under and between stones alongshore during late winter and early spring. The male usually stays curled around the eggs to help protect them from molestation until they are hatched. Yellow-

ish eggs of the clingfish are laid also on the undersides of stones.

Although most fish eggs, or roe, are edible, the eggs of sculpins are often poisonous if eaten. Such eggs are found among rocks and on pilings (Color Plate VIII), as well as between clusters of the blackish mussel that grows abundantly on pilings and on reefs exposed at low tide.

#### HALIBUT EGGS FLOAT IN THE OPEN SEA

The halibut spawns its eggs in the open sea, where they float pelagically. Vast numbers are produced to offset the dangers which overtake the eggs and young fish during their four or five months of helpless drifting. Myriads of them must be swept farther out to sea and lost, because they never reach the banks or sea bottom upon which they can continue their development.

As they grow, the eye on one side migrates, so that both eyes are on the same, or colored, side of the head. Shortly after this, they rise into the upper layers of the water in the ocean and are deposited inshore, along the coast, where their further growth is possible. Maturity is reached in their twelfth year, when they are taken by fishermen on submerged offshore banks.

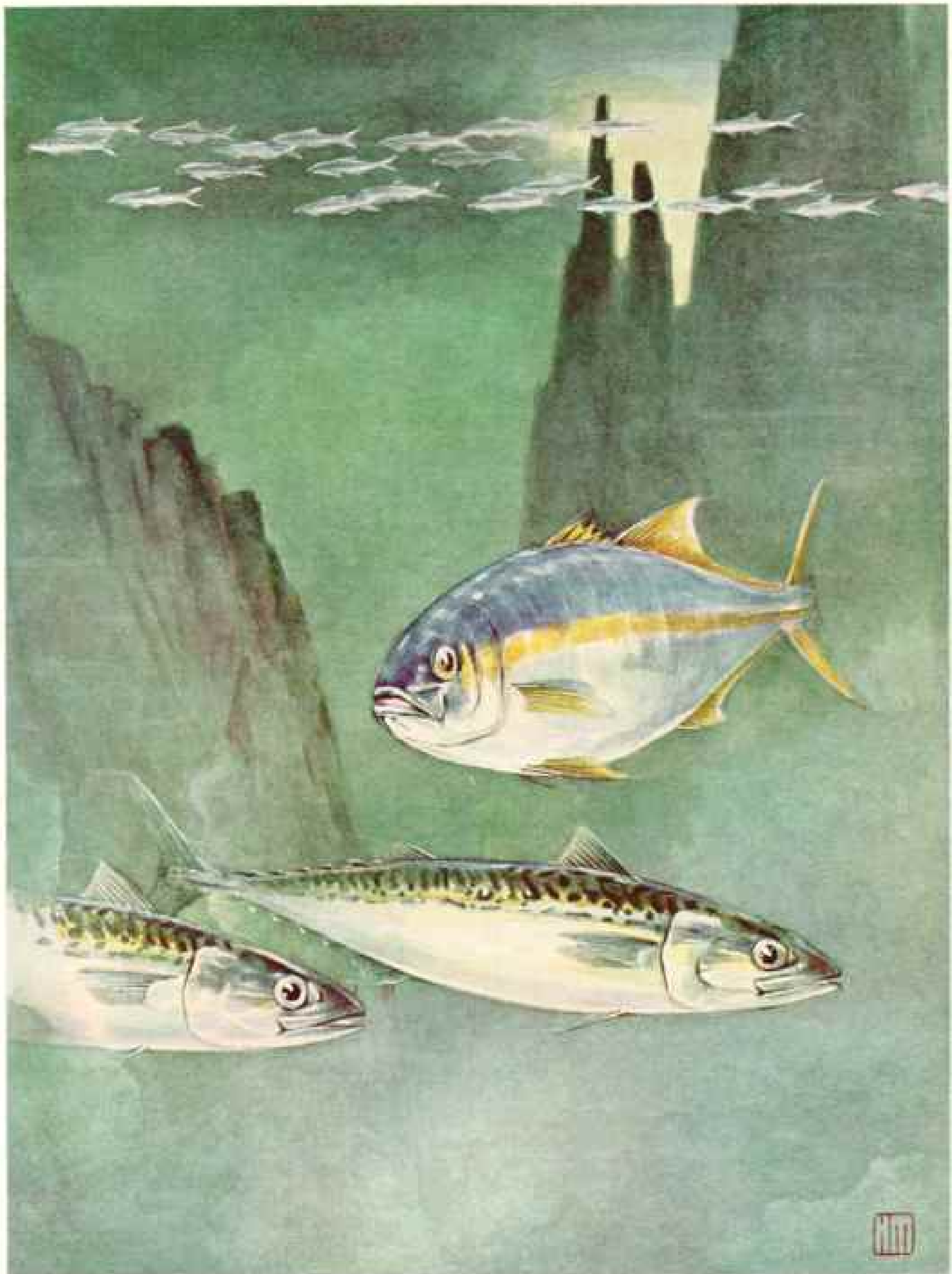
It has been said of old that oceanic fisheries are inexhaustible; that the stock of fish will be replaced by the "fairy god-mother" who looks after such things. But experience has shown that the resources of the sea can be used up just as certainly as an oil well can be pumped out.

Fortunately, just before the Pacific halibut became so depleted that it no longer was profitable to fish for them, the United States and Canada ratified the Northern Pacific Halibut Treaty, October 21, 1924, and there was started an outstanding attempt to conserve and rebuild a marine fishery. This treaty was placed in the hands of an international commission to obtain facts, and in 1931 the commission was given powers of regulation.

The method of fishing for halibut is to lower on the sea floor a long ground line to which are tied, every nine or thirteen feet, lines five feet long with hooks attached. The distance between the lines is determined by convenience of handling on the deck of the fishing vessel (page 493).

The ground line is 1,800 to 2,100 feet long and is known as a "skate." From four to twenty skates may be spliced together and set. Every halibut gear is anchored at

GLEAMING FISHES OF PACIFIC COASTAL WATERS



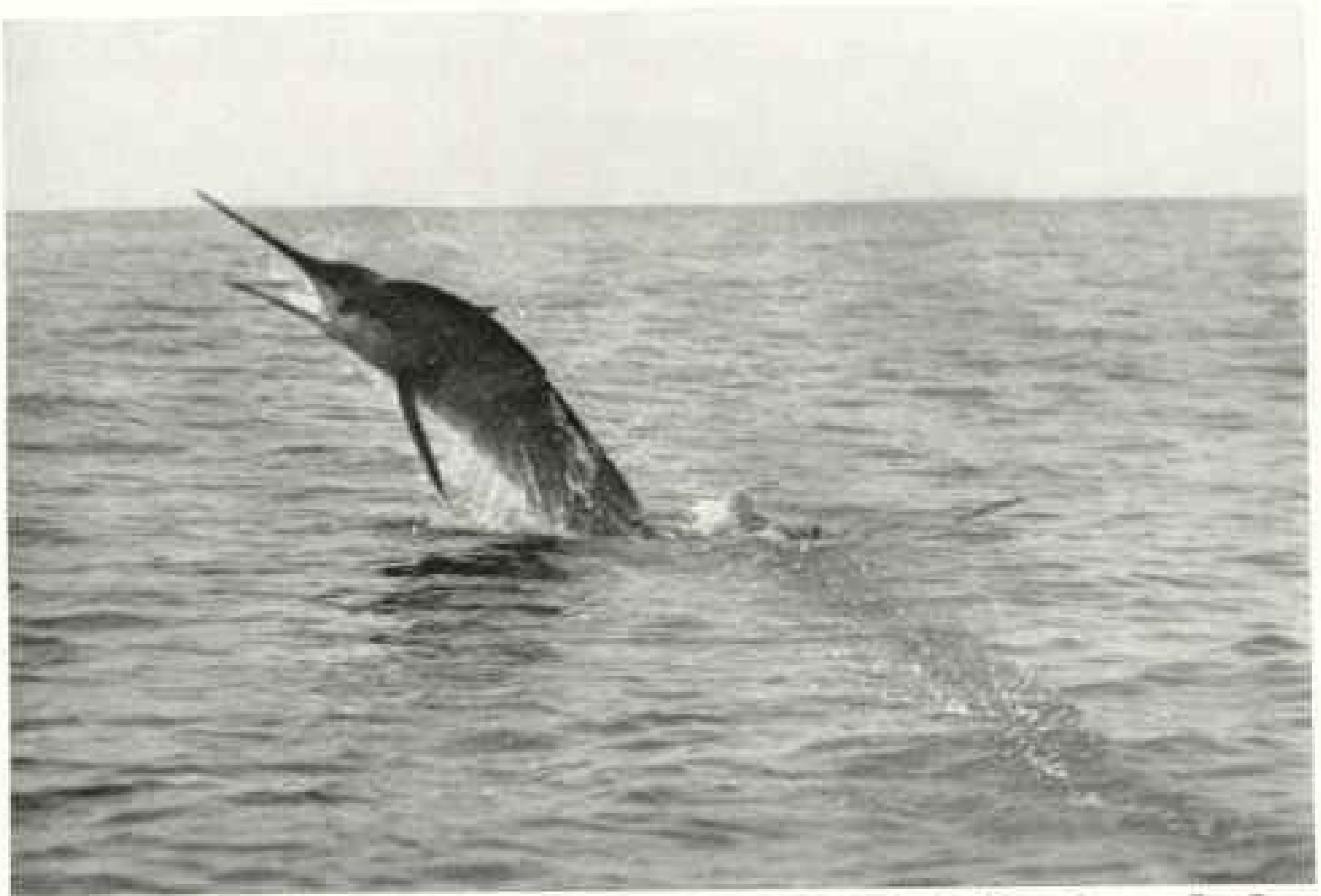
© National Geographic Society

Painting by Hashime Murayama

ONE OF THE GAMIEST DENIZENS OF THE SEA IS THE CALIFORNIA YELLOWTAIL (CENTER)

A feather, a spoon, live bait, or even a piece of pork rind may lure the highly temperamental YELLOWTAIL (*Seriola lalandi*). Valued as food are the PACIFIC MACKEREL (*Pseudocaranx dentex*; lower) related to the Atlantic's club mackerel. NORTHERN ANCHOVIES (*Engraulis mordax*; above) small, with large, underslung mouths, are food for larger fishes, but they should not be confused with the European species of hors d'oeuvre fame. Two months of intensive study in California preceded the studio work of the staff artist Hashime Murayama who painted, especially for the NATIONAL GEOGRAPHIC MAGAZINE, this series of fishes native to the coastal waters of western North America.





Photograph by Mohardt and Bagnard, courtesy Zane Grey

**PROLICSOME LEAPS OF THE MARLIN TURN TO SAVAGE PLUNGES WHEN IT IS HOOKED**

This spectacular fighter, the "acrobat of the sea," puts to test the angler's skill from the moment it takes the bait until it is gulled. Once hooked, the fish may tear off a thousand feet of line. It jumps, walks on its tail, leaps out of the water, and sounds, always fighting to the last, sometimes for more than an hour. Improperly called a "swordfish," the marlin gets its name from the resemblance of its snout to a marlinspike.

each end with buoy kegs and flag markers to indicate its position.

The Indians used similar methods and developed a hook more efficient than our present fishhooks. It was not suitable, however, for use in such large numbers as is necessary in the present type of commercial fisheries.

In 1907 the stock of halibut south of Cape Spencer, Alaska, must have been much greater than now, for that year the halibut fishermen were catching an average of 280 pounds to every 6-line skate fished. By the end of the war in 1919, only 82 pounds were landed with the same gear and in the same fishing time. The catch fell to a low of 35 pounds in 1930, a year before the halibut commission put into effect its regulatory measures.

Today the stock of halibut has recuperated and increased until in 1937 the fishermen were catching 61 pounds to the skate. Thus was first demonstrated how a marine fishery could be controlled for the benefit of the fishermen. They catch almost twice as many fish with the same effort; or they can

fill their boats in practically half the time and with less expense.

**FLOATS FROM ACROSS THE OCEAN**

Halibut and salmon fishermen, travelers, and others who have been along our west coast, mostly north of Washington State to southeastern Alaska, have noticed, and picked up, on the beach each year, thousands of glass balls. These are net floats used by Japanese fishermen instead of the cork or cedar floats used in America. Some are ball-shaped, others spindle-shaped. A few are as large as 18 inches in diameter, but most of them are only three to six inches.

"What is the source of these floats?" many ask. Some believe they come from the nets used by Japanese fishermen operating in the Gulf of Alaska and in Bering Sea. However, the United States Coast and Geodetic Survey and the International Fisheries Commission have shown that such floats would be carried by the ocean currents to the Aleutian Islands if released in the Gulf of Alaska. Furthermore, no fish-

ery off the west coast of North America, not even the highly contested Japanese fishery in Bering Sea, uses so many floats as are cast on the shores of British Columbia and southeastern Alaska.

The glass floats have been traced from northern Japan to the Kamchatka Peninsula, where there are extensive fisheries using just such floats. They probably drift across the Pacific Ocean in a little more than a year, carried here by the easterly open-ocean current known to us as the Japan Current and to the Japanese as "Kuroshio."

### Northern Anchovy

(*Engraulis mordax*)

The northern anchovy, family Engraulidae, is found only from British Columbia to Baja California (Plate I). Its nearest relatives are the herrings, but it differs from them in the size and shape of its mouth, which because of an exceedingly long lower jaw opens to the very rear of the head. With such a mouth and weak teeth, it cannot feed on other fish, and is obliged to subsist on tiny animals and plants (plankton) that float in the sea.

These delicate fish, although the largest of the anchovies, are only four to seven inches in length, and are much more important as food for game and food fishes than as prey for commercial fishermen. They occur in large schools, and about 300,000 pounds of them are netted annually.\*

The developing eggs of the northern anchovy are found floating freely in the waters of Monterey Bay, California, throughout the year, but most of the spawning occurs from December to June. In Grays Harbor, Washington, recently hatched anchovies have been found during the summer.

The eggs are not like the typical spherical fish egg but are about twice as long as they are wide. Colorless, and almost completely transparent in the sea water, they float at the mercy of the wind and tidal currents.

### Yellowtail

(*Seriola dorsalis*)

The yellowtail, also known as amberjack and white salmon, belongs to the group of mackerel-like fishes called pompano (pompano), or cavalla, family Carangidae, with numerous cousins in practically all the warm and temperate seas (Plate I).

It is a graceful swimmer, occurring in schools along the shores of the mainland and around the adjoining islands from Monterey Bay, California, southward to the Gulf of California,

\* Size, weight, and annual commercial poundage throughout this article refer to catches in west coast waters. Records of game fishes made by sportsmen are subject to frequent changes.

beyond which it is not common. During the spring and early summer it is abundant off southern California and, later in the season, off Mexico.

It is classed as both a food and a game fish. In recent years from two to four million pounds have been taken annually by commercial fishermen. Many also are caught by anglers, since it is one of the finest of the Pacific game fishes, striking viciously and running fast.

The average weight is ten or twelve pounds, and the largest recorded weight is 60½ pounds by the Tuna Club. The yellowtail feeds on the smaller fishes such as sardines, anchovies, silversides, and shrimps.

### Pacific Mackerel

(*Pneumatophorus diogo*)

The Pacific mackerel belongs to the family Scombridae and is a close relative of the tuna and albacore of the family Thunnidae (Plate I). It differs from the latter in having only two small keels on each side of the tail instead of three.

It is similar to the chub mackerel of the Atlantic, but unlike the common mackerel in several ways. On the Pacific coast, where it is called greenback mackerel, striped or zebra mackerel, and night mackerel, it occurs from Prince William Sound, Alaska, southward to California. Other chub mackerels are found off South America and Japan.

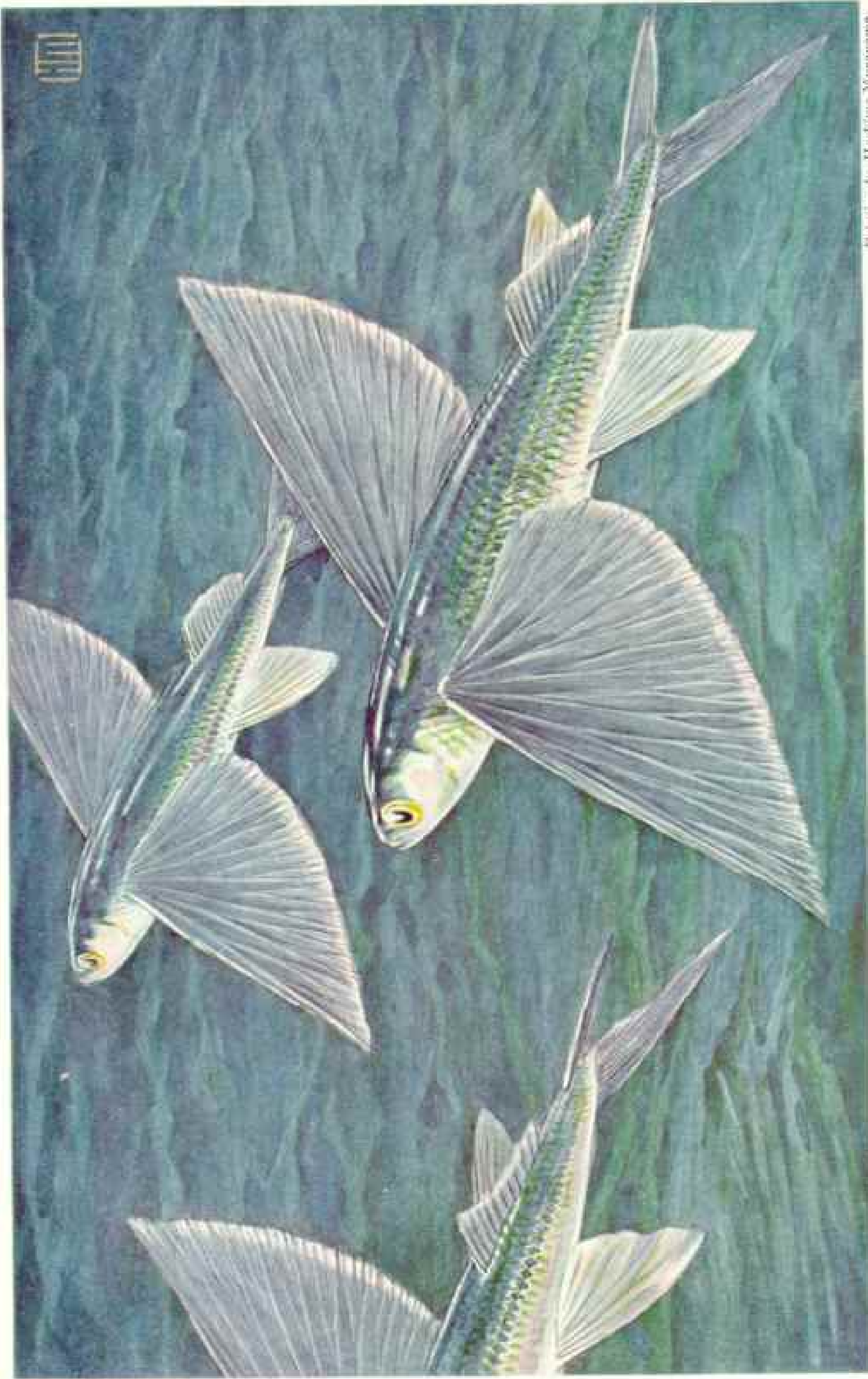
The Pacific mackerel spawns from near San Pedro to Cape San Lucas, from April to August. The eggs, floating freely in the ocean offshore, hatch in about three days.

Although the fish averages only about two pounds, one measuring 22¼ inches in length and weighing 3½ pounds has been recorded. The catch off California from 1928 to 1931 ranged from 15 million to 60 million pounds annually. The California State Fisheries Laboratory has carried on extensive studies of the species.

The fish are taken largely by hook and line, some boats using live bait or feather lures on short poles. More important is the set line, usually some 1,250 feet long, with short snells attached every two and one-half to three feet, each bearing a hook. Four or five such lines are carried on each boat, and several weighted buoys with red flags attached are used to float them at the proper depths, the flags marking the location.

Fishing is done just beyond the kelp beds in open water in the early morning, because the mackerel are closer to the surface at sunrise than at any other time. They occur deeper in cold than in warm weather, the depth varying from 30 to 75 feet.

They have voracious and indiscriminating appetites, eating anything they can swallow and taking live bait, clams, pileworms, cut bait, and artificial lures.



Painting by Masahiro Murayama.

© National Geographic Society

WITH TAIL FOR LAUNCHING POWER AND FINS FOR WINGS, GLIDERS OF NATURE SKIM OVER THE SEA

Thrashing the water, the tail catapults the California Flying Fish (*Cyboristes californicus*) into the air. Instantly tail action ceases, and large pectoral fins spread out wide. When the fish touches the water again, tail action is resumed and the flyer "taxies" along like a seaplane or skipping stone. Successive take-offs seldom number over four. Most single flights last only one or two seconds, although some of 12 and 13 have been recorded.



© National Geographic Society

Painting by Harbison Murray

QUEER FISH WHICH GIVE BIRTH TO THEIR YOUNG DWELL BOTH IN THE SURF AND ON ROCKY BOTTOMS

Close to the shoreline, the Spangled or Black Perch (*Tautoga onitis*, upper left) raises families of from 21 to 90. Each baby fish, about two inches in length, is a perfect miniature of its parents, which usually are about seven inches long. Vastly more prolific are the 14-inch Black Rockfish (*Scaenodes opacatus*, upper right, and lower) which may bring forth 30,000 offspring at one time, each about one-third of an inch long.



## California Flying Fish

(*Cypselurus californicus*)

The California flying fish, one of the largest of its kind, belongs to the family Exocoetidae, inhabitants of warm seas only (Plate II).

Its closest relatives are the halibreaks and needlefishes, all of which can leap from the water for short intervals. From the family's ability to jump, the power of flight has developed in the flyers, the fins having evolved into sails and the tail into a motor. Similar flying is found in the gurnards and other distantly related fishes.

Had the pioneers in aeronautics studied the fundamental designs of flying fishes instead of birds, the principles of flight might have been mastered much earlier. Indeed, the shape of the hull of the Bellanca plane is like that of the California flying fish, and the Lockheed, a more speedy plane, is similar to another form of flying fish (*Halocypselus*).

Contrary to reports by untrained observers, the fins of flying fish do not flap like birds' wings. There are no muscles in the fins to produce such flapping.

As the flying fish swims under the water near the surface at high speed, both pairs of wings (fins) are folded back against the body. But as it breaks through the surface, the large fore wings spread wide and then serve as supporting planes. The tail remains in the water, and the body and head are supported in the air at a slight angle.

The tail now vibrates violently from side to side, furnishing the propulsive power to lift the fish from the water and causing also the slight undulating movement of the wings which casual observers have mistaken for flapping. As the "taxi" along the surface progresses, only the lower side of the tail is in the water.

It is estimated that, in taking off, the California flying fish attains a speed of 55 miles an hour. The taxi covers from 15 feet to 45 or more, and the flight from a few feet to a hundred yards. With a long, fast taxi the fish may remain in the air for a half to two-thirds of a minute, but most flights last for only two or three seconds.

The fish control their flights well both horizontally and vertically, often making excellent use of the wind. Sometimes they will taxi again upon coming down to the water. Dr. Carl L. Hubbs, of the University of Michigan, found that once in 16 times there were five take-offs before the flight actually ended.

When boats are passing near by, flying fish will take off in great numbers, like grasshoppers suddenly disturbed in a meadow. Perhaps they are frightened by the vibrations of the propeller. The presence of mackerel, tuna, or other voracious fish which feed on them causes large schools to take to the air in an attempt to escape.

The California flying fish, or great flying fish, reaches a length of more than a foot. It is found regularly in the open ocean from off southern California to Baja California, and sometimes appears in the summertime off northern California. The flying fishes of other adjacent tropical seas and probably this one, too, lay their eggs in floating seaweed. Off our west coast they are not caught commercially, although off Australia and elsewhere flying fish are taken commercially for food.

## Striped, or Blue Perch

(*Taeniotoca lateralis*)

The blue perch, among the most gorgeously colored fishes in the family Embiotocidae, is called also surf fish or viviparous perch (Plate III). The first name was derived from its habit of living in the ocean surf, where it is taken by sportsmen with hook and line. Viviparous refers to the method of reproduction or giving birth to its young.

Other species are found in the bays near wharves where boy anglers catch them by the hundreds. The blue perch may be distinguished by the small alternating narrow rows of brilliant orange and dazzling purplish-blue stripes extending along the sides from head to tail.

There are 22 species of viviparous perch in the family, one of which has taken up its habitat in fresh water, and occurs only in the Sacramento-San Joaquin River Valleys. Along the North American shores occur 18 marine species, and in Japan three, but they are found in no other place in the world.

The blue perch is known from the vicinity of Vancouver Island and Puget Sound southward to the San Benito Islands, Baja California. Throughout this region it is abundant in the bays and along the open shores, feeding on small shrimps, worms, and other tiny animals. It loves to lurk around wharves where it can pick its food off the piles.

Because of its very small mouth, it is difficult to catch except by means of a tiny hook baited with parts of clams and worms. The commercial catch for all surf fishes is very small, not exceeding 300,000 pounds annually. The blue perch occasionally reaches a length of a little more than a foot in Puget Sound and weighs nearly two pounds, but the average size is only seven or eight inches.

Male and female blue perch differ in the structure of the anal fin just behind the vent on the lower side of the body. In the female this fin is unmodified, but in the male it has a glandlike structure or swelling near its front.

Breeding occurs during the summer, but the eggs do not start developing until September or October. The female has an ovary-uterus in which the eggs are fertilized and develop into embryos between the delicate folds of tissue of this organ.



In Puget Sound, by late November or early December, the embryos are about one-twentieth of an inch long, in February one-half inch, in March three-fourths inch, and in June or July, just before birth, about two inches.

The number of young produced by one mother blue perch varies from 20 to 90 according to her size. During the six or seven months of gestation the embryos are nourished in a most remarkable manner. The young are bathed in a fluid which is formed from the cell contents of the delicate linings and folds of the ovary-uterus. This fluid is taken into the intestine of each baby blue perch first through the gill slits, and later through the mouth when it has formed.

The much-needed oxygen is absorbed from the folds and the lining of the ovary-uterus, largely through the fins and skin after they reach a length of three-fourths of an inch.

After that length is attained, and until birth, the fins are greatly enlarged, many times the normal adult size. At birth blue perch appear to have all the characteristics of the adults and are ready to seek food for themselves.

### Black Rockfish

(*Sebastes mystinus*)

Black rockfish are members of the family Scorpaenidae, which has numerous relatives, such as the sculpins (Cottidae) and scorpion fishes, in Arctic, temperate, and tropical seas (Plate III). With 13 spines in the front part of the fin on the back and 5 or 6 spines on the



Photograph by Alma Overholt

#### A FLYING FISH BECOMES LURE FOR A MARLIN

This "glider of nature" (Plate II) is being affixed by the angler to marlin tackle and will be trolled in search for the spectacular fighter (page 468). Usually flying fish sought for bait are netted. Occasionally they trap themselves by skimming onto a boat's deck from the open sea.

lower portion of the cheek, they are readily distinguishable from other species.

Between six million and nine million pounds of rockfish are landed annually in Pacific American ports. Besides this commercial catch, thousands of pounds are caught by fishermen seeking other species and thrown back because of the limited market.

The black rockfish takes live bait such as herring and small viviparous perch, as well as parts of clams, worms, and artificial lures. It is found from Alaska to San Diego, being rather common along the coast and in certain bays, though it is more abundant near the Juan de Fuca Strait than in Puget Sound.



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Painting by Hashime Murayama

STRIKING "OCEAN GOLDFISH" ARE CONSPICUOUS RESIDENTS OF CATALINA ISLAND'S MARINE GARDENS.

Orange bodies of pugnacious *Gambusia* (*Hypoclinemus rubicundus*) are familiar to sightseers who ride in the island's glass-bottom boats. They belong to the demerselle or rock-pilot family, bright little fishes of tropical seas, and depend upon speed and agility for protection. On the bottom creep *Parasurus* (*Parasurus platyceros*), from two to three inches long, members of the vast shrimp family. They have cannibalistic tendencies and live in deep water.

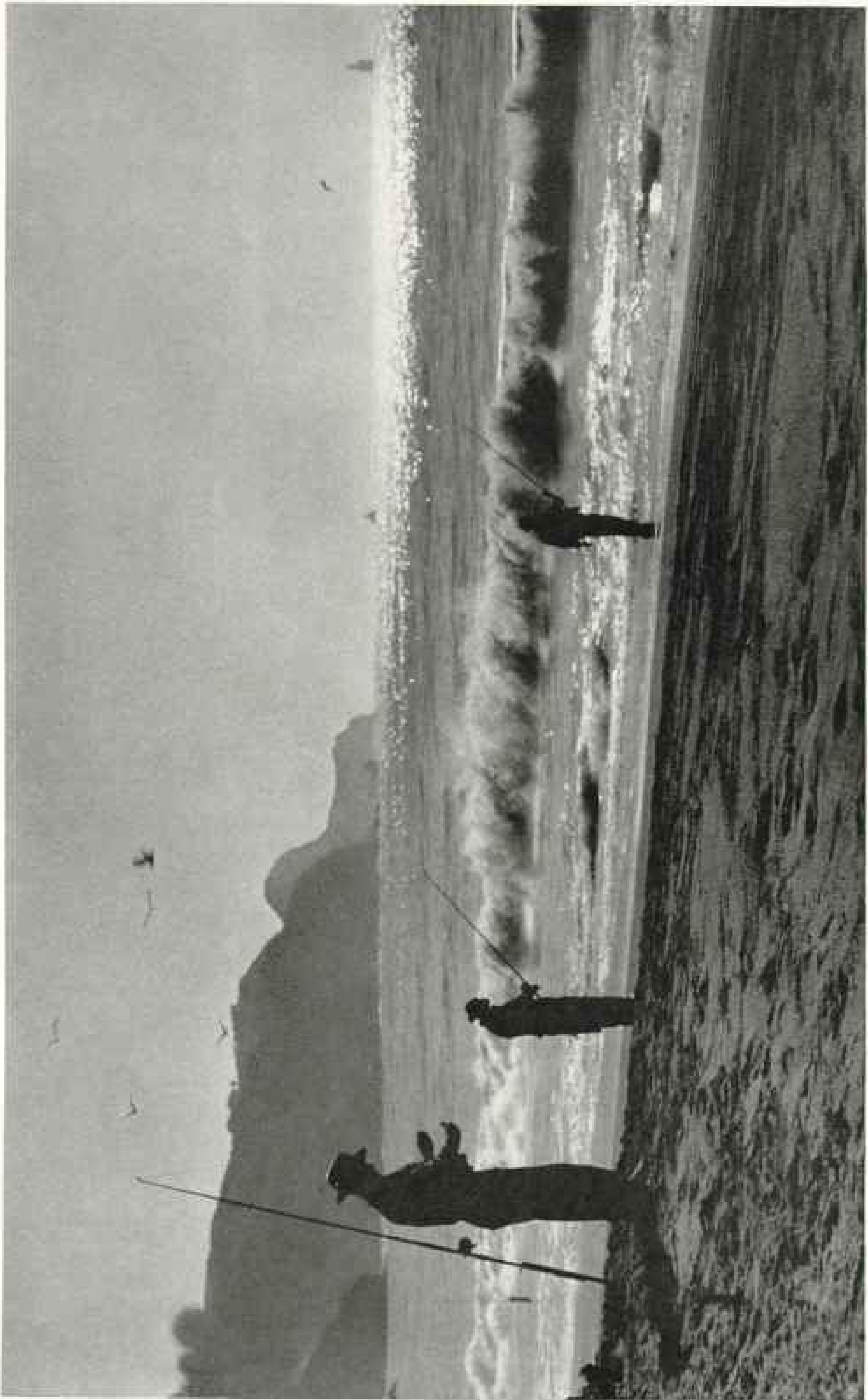


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LARGER MOUTHS OF RED ROCKFISH COULD HOLD A MAN'S FIST; PATCHES OF SHARP TEETH MIGHT CAUSE IT

Like their black relatives (Plate III) Red Rockfish (*Sebastes rosenii*) give birth to thousands of young. Known as Corsairs, these bright orange sea dwellers thrive in deep water from Cedros Island, Mexico, to San Francisco. In wait below for unwary marine animals, which may stray within reach of their pincers, the Rock Corsair (*Cancer antennarius*) with hair-fringed feet. Although edible, they seldom reach the markets in commercial quantity, for fishermen have difficulty in luring them from their rocky hide-outs near the shore.

Painting by Hachime Muroyama

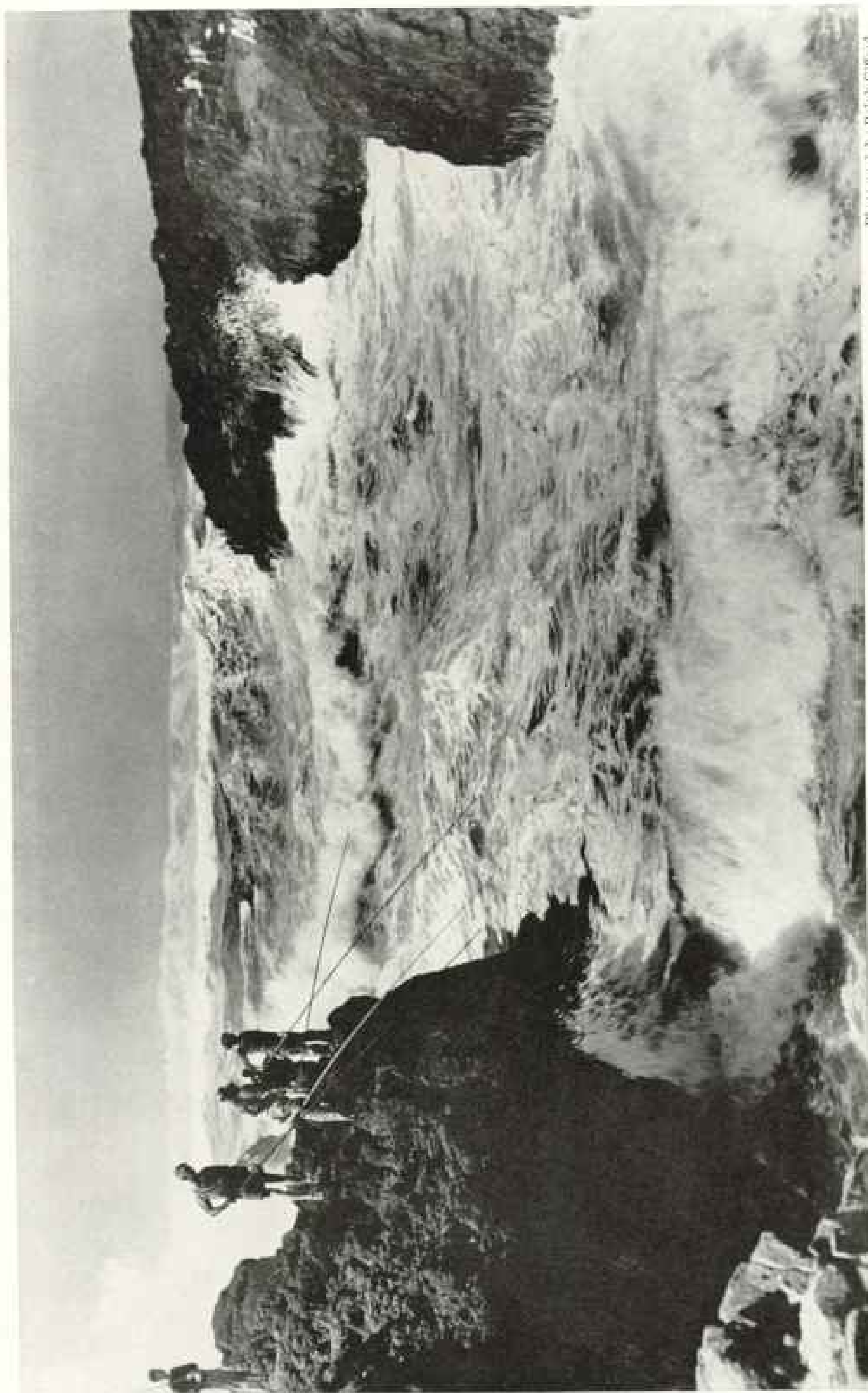


Photograph from Californians, Inc.

**SAN FRANCISCO SHORE FISHERMEN HAUNT BAKER'S BEACH WHEN THE STRIPED BASS RUN**

Pieces of sardines, clams, and small live fish, cast into the surf, are tempting lures for the game fighters, sought by anglers near Golden Gate Park. These popular fish also attract groups of sportsmen in scores of pleasure boats and in recent years they likewise have become important commercially. The baits respond most readily to artificial minnows, plugs, or spoons, trolled at from one to three miles an hour.





Photograph by Ralph Gifford

INTO THE FOAM OF "DEVIL'S CHURN," YEAR-ROUND OREGON FISHERMEN CAST THEIR LINES

High on the rocks south of Yaachuts, anglers perch to lure ling cod, greenlings, surf fish, rockfish, and other denizens of rocky bottoms from their hide-outs. Lightness of the poles testifies that gamier fish stay farther out at sea, but even those close in provide excellent sport. All along the State's rugged 4000-mile shore line surf fishing is popular. No license is required.



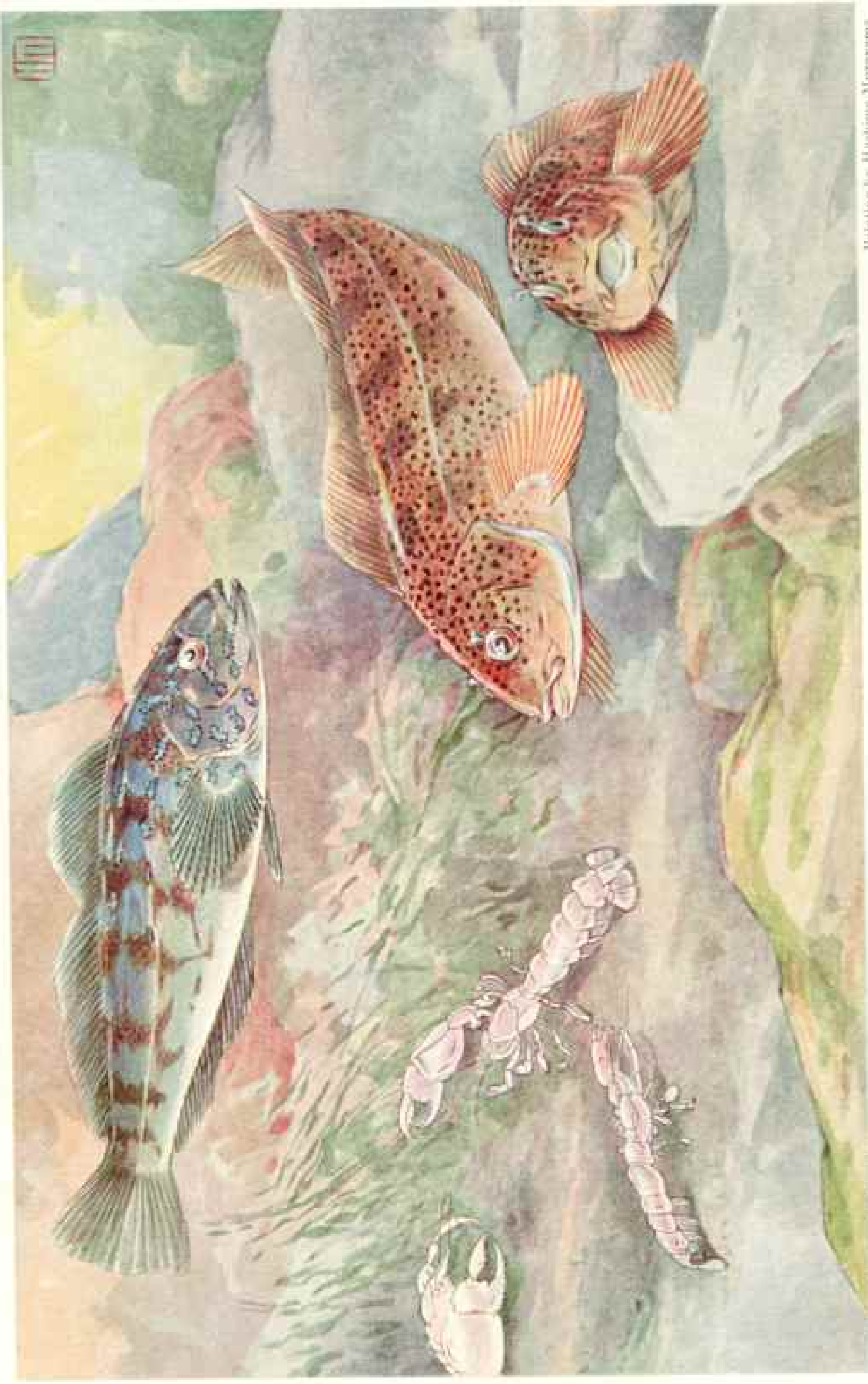


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Painting by Hashim Miyayama

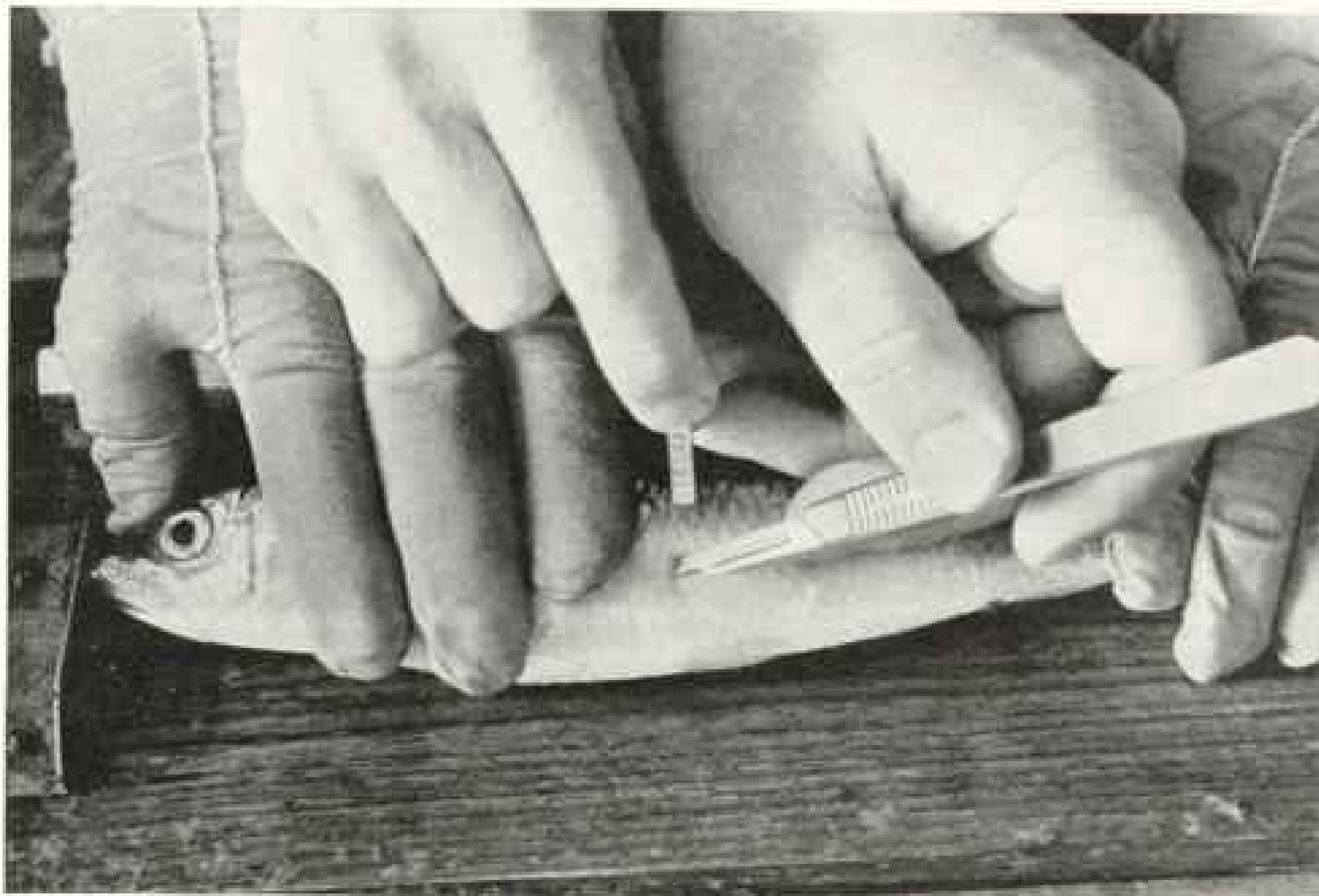
“CHAMELEON OF THE SEA” THE LING COD MIGHT BE CALLED BECAUSE IT CHANGES ITS COLOR TO FIT ITS SURROUNDINGS

Sometimes the upper parts of the Pacific Cutles (*Ophiodon elongatus*) are dark brown, at other times greenish or reddish, depending on the hues of the rocks or kelp in the vicinity. Mottling helps to “camouflage” them. The author has seen violent changes occur in the coloring of the fish when it has been struck light blows. “Cutlus” is a Chinook word meaning “worthless,” but in this case it is a misnomer, for the fish is valuable as food. Although Ling Cod bear a superficial resemblance to the true cod of the Atlantic, they are not related.



Painting by Hastings Murryama

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 SPLASHES OF IRIDESCENT BLUE EMBLazon MALE GREENLING; QUIETTER TONES OF RED AND BROWN SPECKLE THEIR MATE'S  
 Often incorrectly called Rock Trout, Greenlings (*Chryxus decagrammus*, male above, two females at right) are valued as filets on the Pacific coast; Anglers seek them around rocky headlands and sometimes in the surf near reefs. Ghost Surtraps (*Callionyx californicus*) are erroneously called "crawfish" by dealers who sell them for bait. Long, thin-bodied, and translucent, they contrast with the black mud in which they live. Sometimes they burrow a foot below the surface, where they turn around simply by rolling themselves up.



Photograph by Cy La Tour

#### INTO THE STOMACH OF A SARDINE GOES A METAL TAG

For the same purpose that birds are banded, to trace migration, tags are inserted in the abdominal cavities of live California sardines, which are then released. Electromagnetic devices, set up in fish-meal factories on the Pacific coast, detect these tags later, when the sardines are brought into the plants, and thus it has been established that these fish often travel a thousand miles along the coast. The insertion does not harm the fish (pages 485, 488).

Like most of the other four dozen or so species of rockfish along the Pacific coast, it frequents rocky shores where it feeds on shrimp and small fishes. Its large mouth adapts it to voracious habits of feeding, and the patches of sharp teeth on the jaws render its victims helpless at once.

Like the surf fishes, all of the rockfishes give birth to their young. During the winter or early spring 30,000 eggs or more in each large female are fertilized and begin their development. By March, April, or as late as June the tiny young, about a quarter of an inch long, escape into the sea.

Unlike their parents, they do not seek rocky shores for protection but float suspended in the water. They are nearly transparent at first, but by the time they have reached three-fourths of an inch their skin becomes pigmented and then they seek the protection of rocks and seaweeds. They grow to a length of about a foot and a half.

#### Garibaldi

(*Hyprypops rubicundus*)

These ocean goldfish, as they are known along the coast of southern California, belong to the family Pomacentridae, or demoiselles

(Plate IV). They occur in most warm seas, with many species in the Philippines, Africa, and elsewhere, and are known for their striking colors.

The demoiselles are usually small, active, brilliantly colored fishes that may be seen among the rocks and reefs, in tide pools, feeding on minute organisms but depending on their constant activity and quick movements to escape their enemies. Although several species of this family occur in the warm seas of America, no others except the blacksmith (*Chromis punctipinnis*) are found off California.

The garibaldi, which attains a length of 14 inches, is one of the largest of the demoiselles. Known from Point Conception southward to Todos Santos Bay, Baja California, it lives in the large rock pools and among the rocks of the reefs. The adult is a brilliant scarlet, but the young are dusky scarlet with numerous markings of intensely bright blue. The dorsal fin has 12 sharp spines and about 16 soft rays.

The fish are of slight commercial importance, and are not often taken by anglers. They are the most brilliant species to be seen from the glass-bottomed boats which carry visitors over the submarine gardens off Santa Catalina Island.

### Prawn

(*Pandalus platyceros*)

The crustacean family Pandalidae, or prawns, two to three inches long, consists of shrimp-like creatures frequently taken with shrimp along the Pacific coast from Unalaska to San Diego, California (Plate IV). Northward of the Juan de Fuca Strait they are found in shallow water, but southward they occur at depths of from 200 to 1,600 feet.

In California they are captured in a modified type of octopus trap made out of  $\frac{3}{4}$ -inch rattan instead of wire. The trap is 4 or 5 feet long with a diameter of 3 feet, tapering to 9 inches at the other end. The mouth is in the form of a funnel at the large end with an opening of 6 inches.

### Red Rockfish

(*Sebastes rosaceus*)

The red rockfish, one of the most attractively colored species among the 54 or 55 in the family Scorpaenidae along the Pacific coast, is distinguished from the others by four or five bright rose-pink spots along the back on each side of the fins (Plate V). The darker border around these spots is deep purple or blood red, never greenish. The rest of the body is orange red, and the fins are rosy, mottled with orange.

This species is found from Puget Sound southward to Cedros Island, Baja California, occurring in considerable abundance off southern California but less commonly off the coasts of Washington and Oregon.

Its large mouth makes it a formidable-looking creature and enables it to feed on herring, perch, crabs, and shrimps, which it swallows whole in one gulp, after crushing them with its "throat teeth," or pharyngeals.

Red rockfish make up a large portion of the commercial catch of six million to nine million pounds taken annually in trawls and by hook and line along our coast and sold almost wholly in the fresh fish markets. They live among rocky reefs as well as in bays at considerable depths, usually near the bottom.

When they are brought up from such depths, their eyes usually bulge and their stomachs protrude from their mouths. This is the result of the sudden reduction of pressure as they come to the surface, and the too-rapid expansion of gases in the pockets behind the eyes and in the large air bladders of the abdominal cavities.

Halibut and other fishes that have no air bladders or very tiny ones can be brought up without apparent harm to them, but those with large air bladders usually are dead by the time they reach the surface. A similar effect is experienced by human divers who come to the surface too quickly, the nitrogen in their blood forming bubbles and causing the serious condition called "bends."

### Rock Crab

(*Cancer antennarius*)

The rock crab, family Cancridae, has along the Pacific coast eight close relatives, one of them the common market crab (Plate V). Although edible, it is seldom seen in the fish stalls, probably because it is difficult to catch sufficient numbers from the rocky shores that it inhabits. It can be taken from under and among rocks at low tide from Tomales Bay, California, to Baja California. It measures only about 6 or 7 inches across the back shell, or carapace. Like other crabs it is somewhat of a scavenger.

### The Ling, or Cultus Cod

(*Ophiodon elongatus*)

The ling, or cultus cod, only member of the family Ophiodontidae, is confined in its wanderings to the northeastern Pacific Ocean, and bays from the Gulf of Alaska to San Diego, California (Plate VI). In British Columbia and Washington State it is most abundant.

Its closest relatives are the greenlings and sculpins, which are of similar habits and habitat, but the true cods are far removed from the ling in structure, classification, and habits. Probably the name "ling cod" was bestowed by European fishermen, who knew the ling of the North Sea. It would have been no more inaccurate to add to the name the word "trout," as has been done with many of the greenlings, the ling cod's closest cousins.

This species is extremely variable in color, the coloration appearing to be associated with the habitat rather than the sex. When a fish three and a half feet long was brought up alive by a trawler in Puget Sound, it appeared a marbled dark brown with orange spots. The captain struck it on the head with a gaff hook, and like a flash it completely changed its hue, the dark areas becoming light creamy yellow and the light areas brownish.

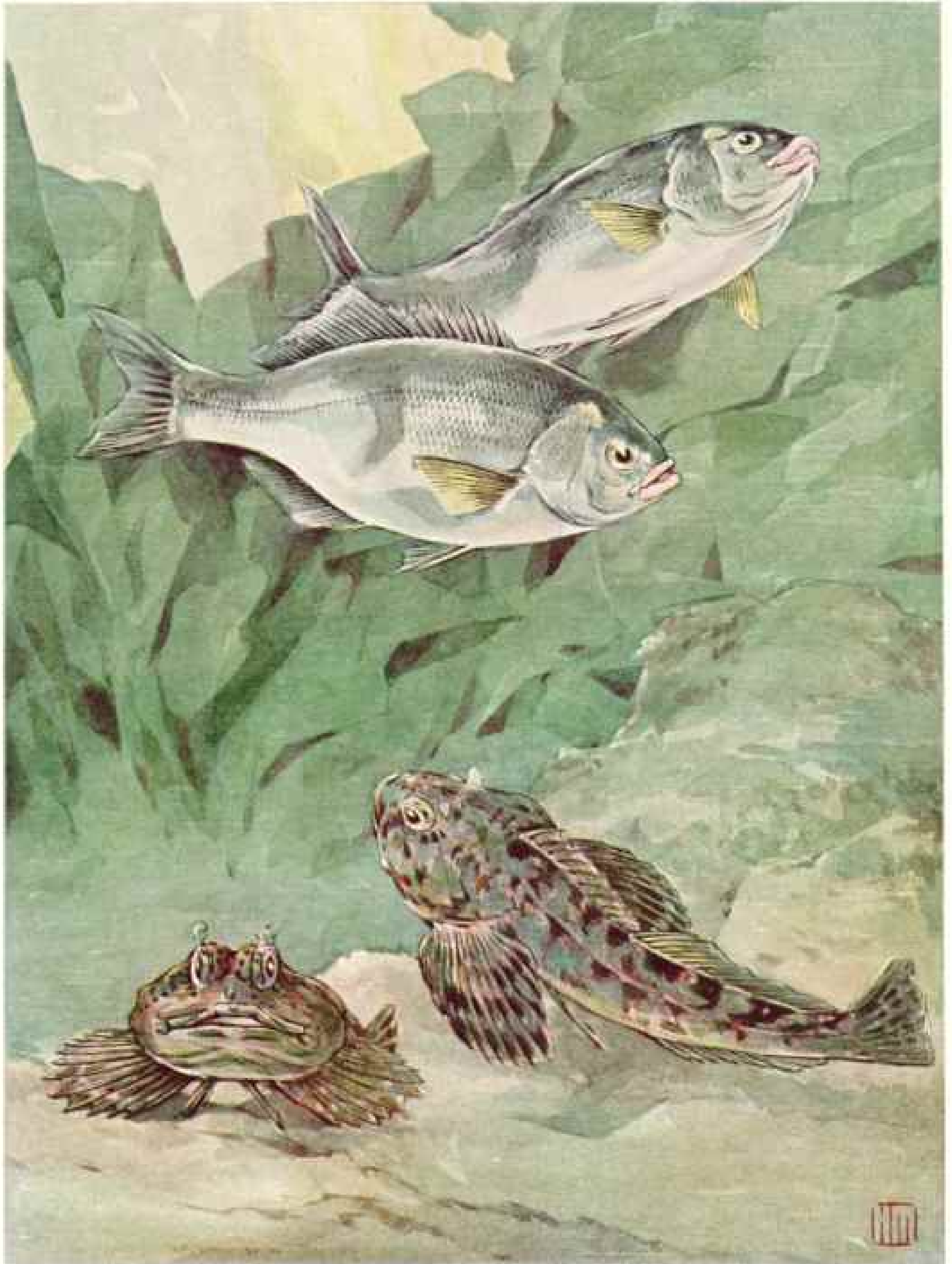
Female ling cod grow much larger than the males. The largest male on record, caught off British Columbia, was  $36\frac{3}{4}$  inches long and weighed 22 pounds. Females weighing 70 pounds and measuring five feet in length have been taken.

Caught by trolling, these large fish are profitable prey for commercial fishermen, the annual catch landed in American ports ranging from 1,500,000 to 3,000,000 pounds. Practically all are marketed fresh, but if the demand slackens they are subjected to quick freezing, glazed with ice, and stored, with little loss of flavor.

The livers of ling cod, as well as those of other west coast fishes like the halibut, are used in making fish liver oils of high vitamin content.

The ling cod occurs from shallow water to a depth of at least 1,200 feet, large fish having been taken on halibut gear set at the latter





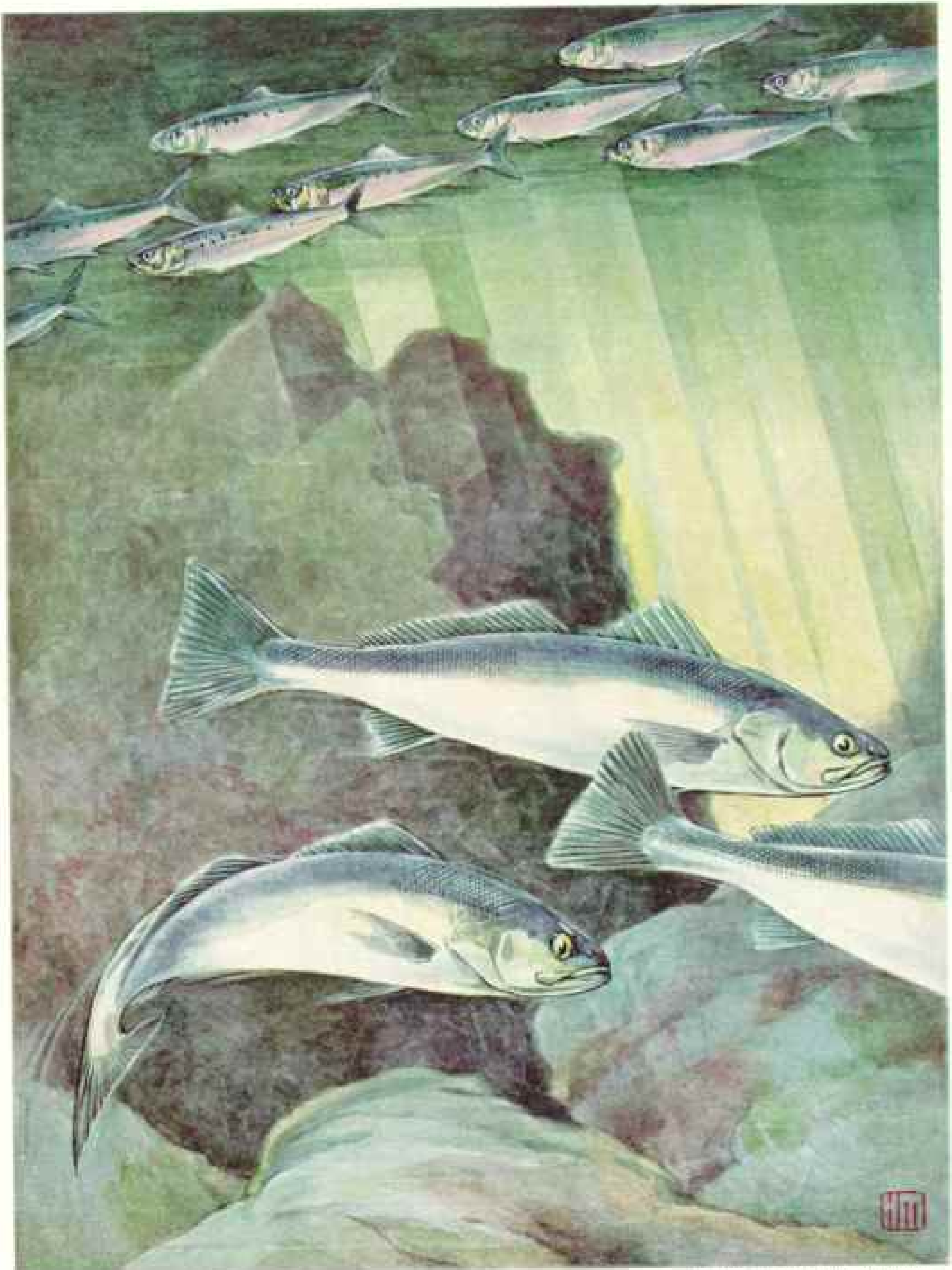
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Painting by Hashime Murayama

MALE RUBBERLIP PERCHES (UPPER) REVEAL THEIR SEX BY FLESHY GLANDS ON LOWER FINS.

Among most fishes males and females look alike, but sex of the RUBBERLIP PERCH (*Rhacochilus toxotes*) and other members of the surf-fish family (Plates III and XIII) may be determined externally. Thick, drooping, and ragged lips have given this shallow-water habitué its name. MARBLED SCULPINS (*Scorpaenichthys marmoratus*, below) also known as Cabezone or Blue Cod, have flaps of skin somewhat resembling feathers above their eyes and near the tips of their snouts.

GLEAMING FISHES OF PACIFIC COASTAL WATERS



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Painting by Hashime Murayama

STILL THRIVES THE SILVERY SARDINE (ABOVE), ALTHOUGH PREY FOR MAN, BIRD, AND BIG FISH

On moonless nights the luminous gleam of the water about the PILCHARDS (*Sardinops caerulea*) as they swim close to the surface betrays the presence of vast schools to fishermen. The fish feed on minute marine life, often close to shore. Yielding food, oil, and meal, sardines are the most important commercial fish on the California coast. The large WHITE SEA BASS (*Cynoscion nobilis*) frequently weigh as much as 80 pounds. They are related to the weakfish of the Atlantic.

depth off the Queen Charlotte Islands. Common in the bays about Puget Sound, they are frequently taken in seines, but are caught commercially in otter trawls, or on hook and line with artificial lures.

In the spawning season, from about the middle of December to March, both sexes leave the deep water and seek rocky areas where a strong tidal current flows. The female selects for her egg-laying a crevice in the reef or a position between two large boulders ten feet or more below the surface. Occasionally a mass of eggs is laid above the low tide level, but these eggs spoil from exposure. They are whitish with very thick, tough shells, and of a size larger than usual for fishes, measuring a little more than one-eighth of an inch in diameter when deposited.

The eggs are contained in two ovaries, and the number laid by one female each year depends on her size. Counts made by G. V. Wilby show that a 30½-inch female (total length) had about 60,000 eggs; one 36¼ inches long had 263,000, and one 41 inches long had 518,000.

The eggs, so firmly attached to the rocks and one another that they appear as a compact mass, are watched over and protected by the male, which keeps stirring the surrounding water with his powerful fins, vigorously driving off intruders by biting or bunting. A fish spear put down by Mr. Wilby to detach some eggs was so sharply bitten by the protecting parent that teeth marks were left on the wooden handle. It is thought the eggs require about six weeks to hatch. At the end of this period the male leaves the nest.

From early stages to full maturity these fish feed voraciously upon all kinds of organisms. The tiny young eat crustaceans or shrimplike animals, and the large immature feed on young herring, smelt, and other small fishes. The stomachs of large adults contain herring, anchovies, sand lances, cod, small flounders, crabs, shrimp, and squid.

### Kelp Greenling

(*Chiroptis decagrammus*)

The kelp greenling, sea trout, or rock trout, of the Pacific North American shores, belongs to the greenling family, Hexagrammidae, related to the ling cod, sculpins, and rockfishes (Plate VII). It differs from them and most other fishes in that it has five lateral lines on each side instead of the usual single one along the mid-side.

Living around rocks among rank growths of kelp and other seaweeds (algae) in bays, around islands, and off the coast from Kodiak Island, Alaska, to Point Conception, California, it is known to most anglers, who catch it on hook and line baited with clams, worms, or bits of fish. Although it reaches a length of 18 inches, it is unimportant commercially.

The color of the sexes is variable, that of the male brownish or coppery with iridescent bluish spots on the head and front part of the body. The females are grayish blue covered uniformly with round, reddish-brown spots.

### Ghost Shrimp

(*Callinassa californiensis*)

The ghost shrimp, family Callinassidae, lives in burrows in the mud and sand from Vancouver Island, British Columbia, to the mouth of the Tia Juana River, San Diego County, California (Plate VII). From these burrows it may be obtained by digging at low tide.

It is a very soft-shelled crustacean, more or less transparent, so that the internal organs and even the beating of the heart may be seen through its shell. Its crablike legs are used for seizing its food, which consists mostly of worms. The young are delicate orange to deep rose pink, but the adults are lighter.

Although used as bait, the ghost shrimp is disliked by oyster growers in the Puget Sound region of Washington because of the harm it does to spat, or small oysters. On bottoms where the creature lives, baby oysters are often smothered when its sand and mud mounds (4 to 8 inches in diameter and 1 to 3½ inches high) are washed over them by wave and tidal action.

The burrows also perforate artificial oyster-bed dikes, causing the water to drain out and subjecting the oysters to drying conditions. The Japanese oyster now so abundant on the Pacific coast in certain districts is not so much affected as the delicious little native oyster.

### Rubberlip Perch

(*Rhacochilus toxotes*)

The rubberlip perch, common from San Francisco to San Diego, California, belongs to the surf fish family, Embiotocidae, and its habits are similar to those of the blue perch and black perch (Plate VIII).

Its exceedingly thick, whitish or pink lips, silvery sides, bluish or blackish back (the scales often tipped with blackish), and the black tips to the median fins on the back and under side as well as to the pelvic fins, help distinguish it from other surf fishes of the region.

It reaches a length of a foot and a half, but forms only a small portion of the commercial catch of surf fishes along the coast. It is taken on hook and line similar to that mentioned for the other viviparous perch.

### Marbled Sculpin, or Cabezone

(*Scorpaenichthys marmoratus*)

The marbled sculpin, or cabezone, also known as the blue cod and bullhead, is one of the commonest of the shallow-water sculpins, family Cottidae, found along the western coast of the United States (Plate VIII).



Photograph by Gabriel Moulin

#### ANOTHER NETLOAD OF SARDINES FALLS INTO THE FLOATING HOPPER

From a scoop net the pilchards are plunged into the vessel, later to be transported a quarter of a mile to the cannery on shore. One of the principal California sardine fishing grounds is in Monterey Bay (page 463). There a large percentage of the catch is made within two miles of the canneries.

Most of its hundred or more relatives are less than eight inches long and as a group are of slight commercial importance save for bait.

The cabezone, however, reaches about two and one-half feet in length, and many weigh 20 to 25 pounds. The only other species of its family that attains this size on the Pacific coast is the giant sculpin.

The flesh of the cabezone is often of a slightly bluish tinge but is highly esteemed by anglers. The fish is caught readily on hooks baited with parts of clams or fish. It occurs from Puget Sound to San Diego, California.

Its color is highly variable, usually mottled with rich dark brown or reddish brown, and greenish above, lighter below. It is often variously spotted with reddish or creamy yellow. Fish living in the kelp and fucus beds are usually predominately brownish, while those inhabiting green algae or eelgrass are mostly greenish. In fact, the marbled sculpin imitates the colors of objects in its immediate surround-

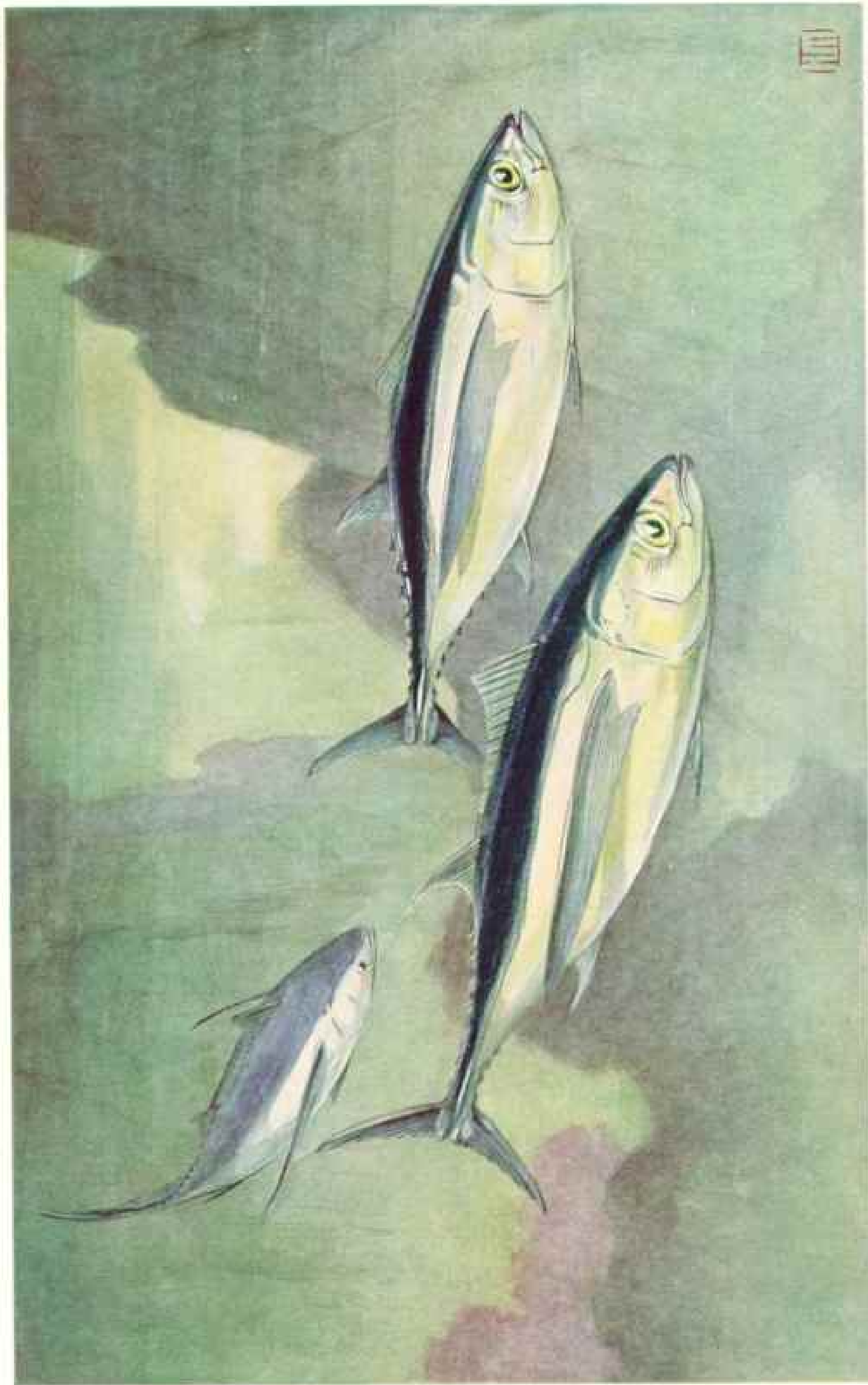
ings so well as to be difficult to see except in motion.

The skin, without scales, has a wrinkled appearance. The head is large, with numerous spiny projections, as in most other marine sculpins. The mouth, too, is large, with sharp teeth, enabling feeding on anything available, such as small fish, sculpins, crabs, and shrimps. Above the eyes and on the snout are large featherlike flaps of skin, or tentacles.

The marbled sculpin in the Puget Sound region has been found to spawn during the spring, usually March and April or later. It deposits its eggs, poisonous if eaten, on the tops of large rocks or old piling extending from six inches to a foot or two above the beach. The eggs, small and variable in color, but usually yellowish to wine red or purplish, adhere to one another compactly.

At low tide a single exposed rock or pile may display several distinct batches of eggs, each batch varying in color and in a different stage





Painting by Hashime Murayama

MYSTERIOUS AND ERRATIC IS THE PRIZED ALBACORE. "CHICKEN OF THE SEA"

Where the ALBACORE (*Genus albatunga*) spawns and breeds, no one knows, nor where it goes when it leaves United States shores. Originally it was the only tuna used for canning, 25,000,000 pounds of "white meat" being tinned in one year. But so scarce did they become in 1928 that the wholesale price rose to \$300 a ton. Smallest of the tunas, it is an excellent fighter on a light tackle, and will take a trolled lure at speeds of 8 or 10 miles per hour.

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WITH EYES OF OPALESCENT BLUE, GREENFISH SURVEY THE HAUNTS OF LURKING ROCK LOBSTERS

Painting by Hashime Murakami

In tide pools along the shores from Cape San Lucas to San Francisco, *Girella nigricans* are abundant. They are a branch of the rudder fish family and feed mostly on seaweeds covered with small marine animals. In crevices dwell SPINY LOBSTERS (*Homarus interruptus*), eagerly sought by fishermen. So great have the annual catches of these crustacean delicacies become that California has enacted conservation laws to protect them.

of development. Eggs laid a week or more are in an advanced stage, and if placed in a jar of sea water, after exposure to sunshine, they will hatch immediately, like popping corn. The larvae, pale greenish and nearly transparent, swim about actively in the jar. If not too crowded and if kept cool they will live for several days. Along the beach in the vicinity of the piling, older larvae have been taken in plankton nets.

### Pilchard, or California Sardine

(*Sardinops caerulea*)

Called pilchard in Washington and British Columbia, and California sardine in California, this fish belongs to the great group of herring and shad classified in the family Clupeidae (Plate IX). Its close relatives are the anchovies, tarpon, gizzard shad, and numerous others. Fossil herringlike fishes are found in the Green River shales of Wyoming, indicating the great age of the ancestral stock.

The most northerly record of its occurrence is off the Queen Charlotte Islands, and the most southerly in the Gulf of California (page 480). Throughout this area it occurs in large schools. The fish are caught in purse seines 1,200 to 1,350 feet long and 120 to 130 feet deep, fitted with purse lines or drawstrings.

In daylight schools of sardines are detected by black spots they cause in the water or by their breaking the surface from jumping; and at night by the luminescence they cause in the water when swimming. After the school has been caught, it is hauled into the boat or on scows towed for that purpose (page 485).

Single catches up to 100 tons are made, but the average haul off British Columbia is 35 tons. This represents an enormous number of individual pilchards, since the average size is about 10 inches and the average weight about 4 to 4½ ounces. In California the sardine is caught in a similar manner.

The commercial catch for the United States averages from 300 million to 500 million pounds annually, the greatest weight taken of a single species among all commercial fishes in North America. Almost the entire catch is reduced to oil or meal.

An examination of the stomach contents of sardines has shown that about 100 species of floating or suspended small plants and tiny animals are eaten. Small one-celled green plants form nearly 40 per cent of the total food, and the remaining items are tiny animal organisms.

The California State Fisheries Laboratory and the Province of British Columbia have carried on extensive studies of the pilchard fisheries as well as of the life history of the species. The age of the fish cannot be read from the scales or "ear bones" with certainty. The maximum size attained by this species is about 16 inches.

### White Sea Bass

(*Cynoscion nobilis*)

The white sea bass is really not a bass at all but belongs to the croaker family, Sciaenidae. On the Atlantic coast this species has a very close relative, the weakfish or spqueteague, well known to anglers and commercial fishermen (Plate IX).

The members of this family are carnivorous, feeding largely on fish and crustaceans. They are abundant in warm and tropical seas, with 45 or more species off Central America. All the croakers and weakfishes are classed as food fishes and some of them as game fishes.

The white sea bass ranges farther north along our coast than any other member of the family, being common off Vancouver Island at certain seasons, but it is only a tourist in southeastern Alaska. To the southward it does not go beyond the Gulf of California.

Off California it is one of the valuable food fishes, reaching a weight of 90 pounds or more. It has firm white flesh that is delicious. The average annual catch is between one and two million pounds.

### Albacore

(*Germa alalunga*)

The albacore, family Thunnidae, is closely related to the mackerels, all of which have crescent-shaped tail fins that furnish strong motive power for swimming (Plate X). It may be distinguished from all other tunnies or mackerel by the great length of the pectoral fins, which reach past the front of the anal fin and are nearly half the length of the fish without tail fin.

It inhabits all warm oceans, and is not common in the Atlantic off the coast of the United States. Southern California waters have it in abundance, but off Oregon and Washington it appears only occasionally in warm summers. Like most of its relatives, it is a denizen of the open seas and seldom enters bays or comes close into shore.

The albacore fishery is dependent to a marked extent on the activity of the fish, its acute vision, and its hunger. Large seagoing powerboats, carrying several men and plenty of ice, go long distances for the catch. Live bait, such as sardines and anchovies, are caught and kept in live tanks on the boat. In the ocean the albacore feeds on sardines, anchovies, squid, and other small fishes of the high seas.

As the boats progress seaward, rag lures or "jigs" are dropped a hundred feet or so astern and towed rapidly just below the surface until a strike indicates that a school of these beautiful dark steel-blue fish are at hand. Live bait is thrown quickly overboard in dipnetfuls while the boat is being stopped. "Chumming" with live bait attracts and holds the school of albacore near the boat (page 465).

Hooks tied on hand poles and lines are baited and dropped overboard into the school, which swims about violently beside the boat. As long as the fish remain, they take the bait rapidly, but they disappear as swiftly as they came, and trolling with the jigs must be continued.

These schools of albacore are most abundant from May to December, though a few may be taken off southern California all year round. The average weight is about 20 pounds, but certain individuals weigh as much as 80 pounds.

As a food fish the species has gained importance since it has been canned under the name of tuna. During the last few years the annual commercial catch has been from 300,000 to 700,000 pounds.

In recent years the demand for tuna has been so great that tuna boats capable of crossing the Pacific have been built and now they fish several thousand miles from their home ports. These modern boats are insulated with cork, being in effect huge refrigerators, and have bait tanks holding as much as six tons of sardines that will live for at least three weeks.

The albacore is taken by sportsmen and anglers on spoons, bone jigs, feathers, and bait, up to speeds of 8 or 10 miles an hour. It is an excellent fighter on light tackle.

Kite fishing for tuna and albacore along the Pacific coast is a well-known sport. When a school is sighted, the angler runs his boat downwind for a short distance, then turns it about and sends up a box kite. The kite string is tied to a small thread across a loop in the leader in such a way that the thread breaks when the tuna or albacore strikes the baited hook fastened to a line run out about 200 feet from the boat.

The boat is turned into the wind and steered so that the wake does not cross the school of fish, but the bait passes over it. When the fish strike, the kite is released and is recovered as soon as the albacore or tuna has been landed.

### Opaleye, or Greenfish

(*Girella neriocans*)

The opaleye belongs to the family Kyphosidae, or rudder fishes, which are mostly tropical shore fishes, both in the Atlantic and Pacific Oceans (Plate XI). Like other members of the family, they have incisorlike teeth and are herbivorous, feeding on green and brown algae that grow in the rocky pools in which they live.

The eye is opalescent blue, the body olive green, grayish brown below. The young have a whitish spot on each side of the back.

This species is of little value commercially, or to anglers, since it is caught irregularly, or only incidentally, in nets, and on hook and line baited with bits of clams, worms, or fish. Its maximum length is about 17 inches.

### Spiny Lobster

(*Panulirus interruptus*)

The spiny lobster, family Palinuridae, is common along the shores to a depth of 120 feet from Point Conception, California, southward to the coast of Mexico, but north of Point Conception it does not thrive (Plate XI). It lives among rocks, hiding in crevices and in kelp, which furnishes protection and food. It averages two or three pounds, the record size being 17 pounds.

The spiny lobster is caught commercially in lath boxes or other traps. Baited with decaying fish, the traps are set in 10 to 50 feet of water in the summer, but deeper in the winter.

The lobsters brought to market range in length from 10½ to 14 inches. In California the annual catch is about 1,500,000 pounds, and in addition many are caught off the coast of Mexico.

Spawning occurs from May to the end of the summer. The eggs are attached to the swimmerets, as in the fresh-water crayfish, and number from 250,000 to 500,000 on large females. They hatch in nine or ten weeks. The females seek the shelter of rocky places near shore during this period.

Larval crustaceans pass through several stages which are not at all like the adults. They molt, or shed their shell, any time when they are too big for it, by simply crawling out through a slit on the upper side near the first abdominal segment. The new outer skeleton is soft for a time, so that the spiny lobster is easy prey for its enemies until its shell hardens. There are several such molts before it reaches a commercial size at an age of 7½ to 10 years.

Spiny lobsters can walk forward, backward, or sideways, and swim backward powerfully by means of their tail fans.

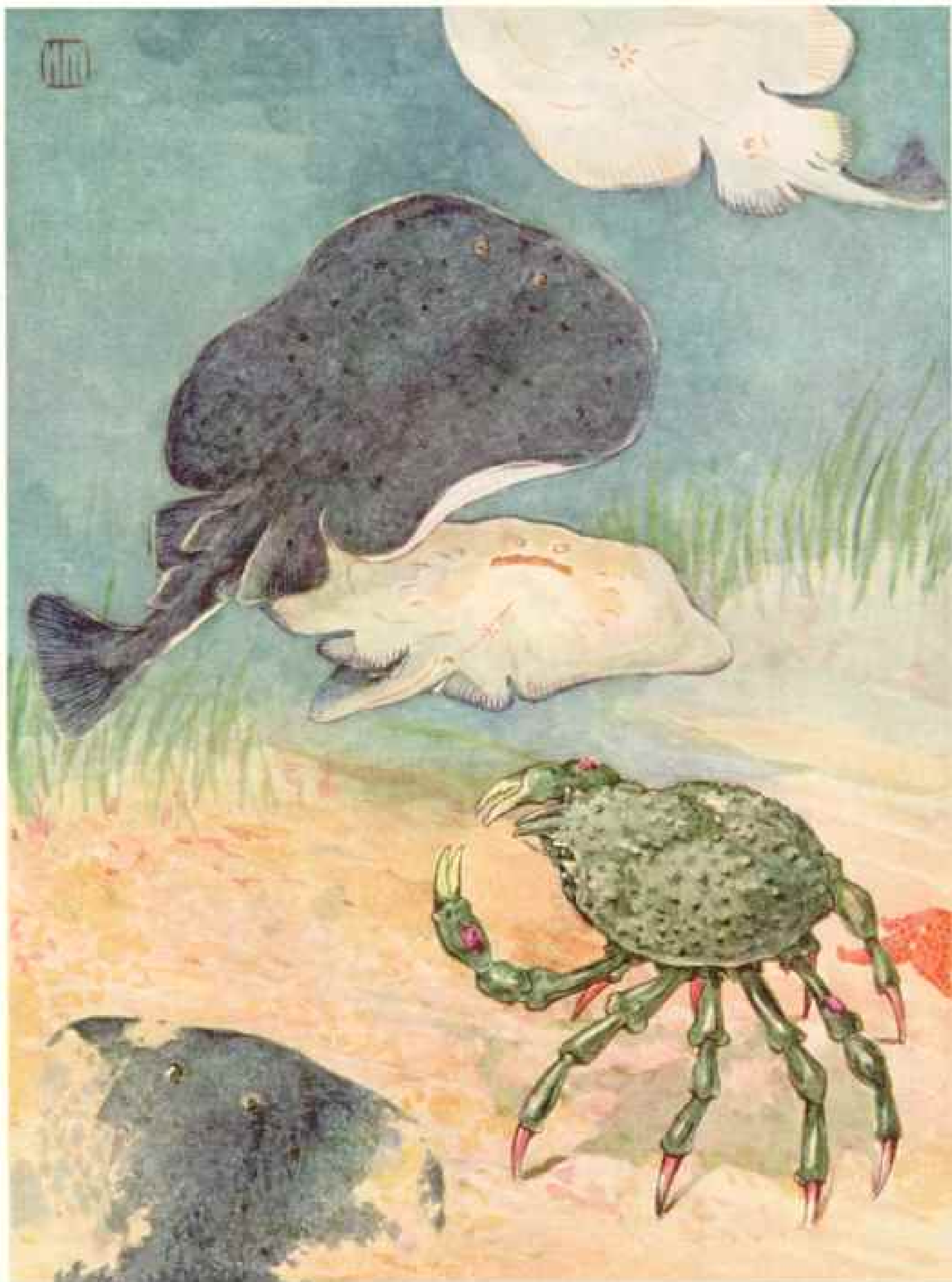
### Electric Ray

(*Tetranarce californica*)

The electric ray, or crampfish, only member of the family Torpedinidae, occurs along our Pacific coast in moderately deep to shallow water from Nootka Sound, Vancouver Island, to San Diego Bay, being very rare northward (Plate XII). Its close relatives are the skates, rays, and sharks, but on the Atlantic coast we find an electric ray or torpedo fish difficult to distinguish from the Pacific form.

The electric rays may be recognized by their broad, circular bodies and long tails, covered with smooth blackish skin above, whitish below. Placed at the sides of the head and gill chambers, the electric glands occupy a large portion of the region, extending nearly from the upper to the lower surface. Each organ is composed of several hundred large, honeycomblike cells, or vertical hexagonal prisms, filled with a nearly clear jellylike substance.





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Painting by Hashime Murayama

WITH POWERFUL SHOCKS FROM ITS "STORAGE BATTERIES" THE ELECTRIC RAY STUNS ENEMIES

Mysterious organs, lodged at each side of the head and gill chambers, discharge with great power when the fish is stimulated by anger or fear. Scientists have not yet determined the nature of the electricity thus generated by the ELECTRIC RAY (*Tetranarce californica*). Sometimes three feet long, this member of the torpedo-fish family lives at the bottom of the ocean. The ludicrous SHORE CRAB (*Loro-rhynchus grandis*) treads the kelp beds on its long legs with deliberation. On its shell back it collects barnacles, marine animals, and seaweed.

GLEAMING FISHES OF PACIFIC COASTAL WATERS



BLACK PERCH, GIVING BIRTH TO THEIR YOUNG IN A PAIL. FIRST REVEALED THAT SURF FISH DO NOT SPAWN

Until Dr. A. C. Jackson accidentally discovered this mammal-like trait in the BLACK PERCH (*Embrioloca jacksoni*) 85 years ago, ichthyologists thought the family deposited eggs as do most other fishes.



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Paintings by Hashime Murayama

MALE PIPEFISH INCUBATE EGGS AND REAR THE YOUNG IN A KANGAROO-LIKE BROOD POUCH

Responsibilities of the female Pipefish (*Syngnathus griseo-lineatus*) end when she deposits the eggs in her mate's sac, formed by two folds of skin. Long, narrow bodies, covered with bony rings, merge with the eel grass. The BLACK-TAILED SHRIMP (*Crigo nigricauda*) fades into its sandy bottom home.

The whole gland is covered with skin and is not easily apparent externally, but the electric shock it generates is sufficiently strong to be disagreeable and painful to the hands or to the bare feet of bathers. Fortunately for the bathers who frequent the southern California beaches, few of these torpedoes are hiding partly buried in the sand.

This living battery shows all the properties of electricity, the discharge registering voltage and current on electrical instruments. Although the shock is powerful enough to render man uncomfortable and perhaps to stun fish, it is not so strong as that of the South American fish known as the electric eel.

The electric ray ranges in length from a foot (average) to three feet and a weight of 75 pounds or more. It is common from central California southward to Santa Barbara Channel and is of no commercial value at present.

### Sheep Crab

(*Loxorhynchus grandis*)

Sheep or kelp crabs belong to the family of spider crabs, Majidae, with numerous members occurring along the shores of Pacific North America (Plate XII). They are noted for their habit of masking themselves by placing, with their long, ungainly legs, bits of seaweed, sponges, or other objects on their backs.

The sheep crab is a large species that reaches a length of 8 inches across the back. It is found from San Francisco to Port San Bartolomé, Baja California, down to a depth of some 400 feet. Fossil spider crabs occur in Fresno County, California, indicating that this area was covered by sea at one time.

Although these long-legged crabs are abundant, their slender legs do not contain much meat compared with those of the market crab. Even those in Alaska that measure about 3½ feet between the tips of opposite legs are not caught commercially and are used only locally.

### Black Perch

(*Embiotoca jacksoni*)

Not a true perch, the black perch of the surf fish family, Embiotocidae, belongs to that peculiar group of shore fishes that give birth to their young (Plate XIII). They inhabit the North Pacific and are found nowhere else in the world. The strikingly colored black perch, which reaches a length of 14 inches, has considerable commercial value. Anglers catch it on hook and line baited with bits of clams or worms.

### Pipefish

(*Syngnathus griseo-lineatus*)

Related to the sea horses and sticklebacks, the pipefish belongs to the family Syngnathidae, members of which are found in all warm and temperate oceans of the world, usually inhabiting the shores among seaweeds (Plate

XIII). Some pipefishes have been reported to ascend rivers in China and India.

The color of these fishes changes with the seaweeds among which they feed, and in eelgrass they are bright to dark green. Once the author found one of a dark reddish hue in a rock pool lined with dark-red coralline algae.

Although there are several other pipefishes along our coast, this one is the largest, reaching a length of a little more than a foot. It occurs abundantly in bays from southeastern Alaska to Monterey Bay, California.

In the third century B. C. Aristotle wrote: "That fish which is called Belone, at the season of reproduction, bursts asunder and in this way the ova escape; for this fish has a division beneath the stomach and bowels like the serpents called typhinae. When it has produced its ova it survives, and the wound heals up again."

That probably was the first account of the remarkable method of reproduction in the pipefishes.

The two sexes may be readily distinguished because the male has a pouch under the abdomen where the young incubate. For once Nature has made the male the nurse and evened things up a bit in caring for the babies.

When the eggs of the female fish are ready to start development into young pipefish, the two sexes come together, and after a short period of courtship the eggs, instead of being laid in the water, are transferred to the pouch of the male. There they soon develop into tiny embryos, later into baby pipefish, much as the baby kangaroo develops in the marsupium of its mother.

In the Puget Sound region of Washington the young pipefish escape from the pouch in June, July, or later in the summer, at a length of about an inch or more.

The pipefish feeds on small crustaceans, shrimplike animals, and tiny marine worms. Because of its small mouth at the end of a long snout, it is not adapted to voracious habits and is a slow swimmer, quiet, inconspicuous, and easily overlooked. It is of no economic value, but it makes an interesting inhabitant of an aquarium.

### Shrimp

(*Crago nigricauda*)

Often called by fishermen deepwater, black-tailed, and black shrimp, this is one of the most important species of shrimp in the commercial catch. It is known from Alaska to Baja California (Plate XIII and page 496).

The chief method of capture of shrimp is the trawl, with a beam of 15 to 25 feet, fitted into an iron frame to which is attached a funnel-shaped net about 60 feet long. After being dragged over the bottom for an hour or longer, the trawl with its contents of shrimp and fish is hauled on board. The annual catch of shrimp along the Pacific coast of the United States



Photograph by Ewing Gallaway

#### HALIBUT AND SALMON FLEETS TIE UP IN SEATTLE

Purse seine boats such as these, at the Municipal Fishermen's Dock, are in general use in fishing operations on Puget Sound when the salmon run is on. Many devices are employed to catch these valuable food fish, but commercial fishermen principally use trolls, gill nets, purse seines, and traps (page 466).

has been from 1,500,000 to 3,000,000 pounds.

This shrimp spawns from spring to autumn, and the eggs hatch near the ocean in water of high salinity where they are probably laid. The larvae occur in the plankton, the suspended small living organisms in the sea, but later advanced stages are found in the shallow water of the bays.

They breed at the end of the first year of life and soon afterward are no longer caught. What happens to them is not definitely known. The adults reach a length of about 3 or 4 inches, the females being 25 per cent larger than the males.

#### Starry Flounder

(*Platichthys stellatus*)

The starry flounder, a characteristic flatfish of the Pacific coast, belongs to the family Pleuronectidae (Plate XIV). It may be distinguished from all other flounders by the rough star-shaped scales on the eyed side and the sev-

eral black bars on the fins. This species is the commonest one along the beaches in the sand of the United States and occurs from Japan to Alaska and southward to Santa Barbara County, California. Along our coast as far north as southeastern Alaska about one half have the eyes and color on the right side and the other half on the left side.

In Faise Bay, San Juan Islands, Washington, the author found starry flounders abundant in the shallow water at low tide. They were partly buried in the sand, and he had no difficulty in capturing enough for a big dinner by the simple expedient of slipping up and stepping on them.

The starry flounder, taken commercially throughout most of its range, makes up a large part of the 10 to 12 million pounds of "sole" and flounder caught annually in Washington, Oregon, and California. It reaches a length of nearly three feet and a weight of 25 pounds. The larger fish are offered as "fillet of sole" and





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COCK-EYED FLATFISH AND FISH-EATING CRABS WITH SAND FILTERING SKULL ON THE PACIFIC FLOOR

Painting by Hashime Muroyama

When hatched, the Striped Flounder (*Paralichthys oblongus*, lower), and the Mottled Sand Dab (*Chlorichthys torridus*, right) swim normally. As they grow, they lean more and more on one side until their position is horizontal. Gradually the skull twists and one eye migrates close to the other until both are on the same side of the body. Blotches on this "eyed" or "top side" soon harmonize with the sea floor, while their "bellies" become silvery white. The Mackerel Crab (*Cancer magister*) lives in the sand. Teeth along the shell edge keep coarse granules out of the gills.



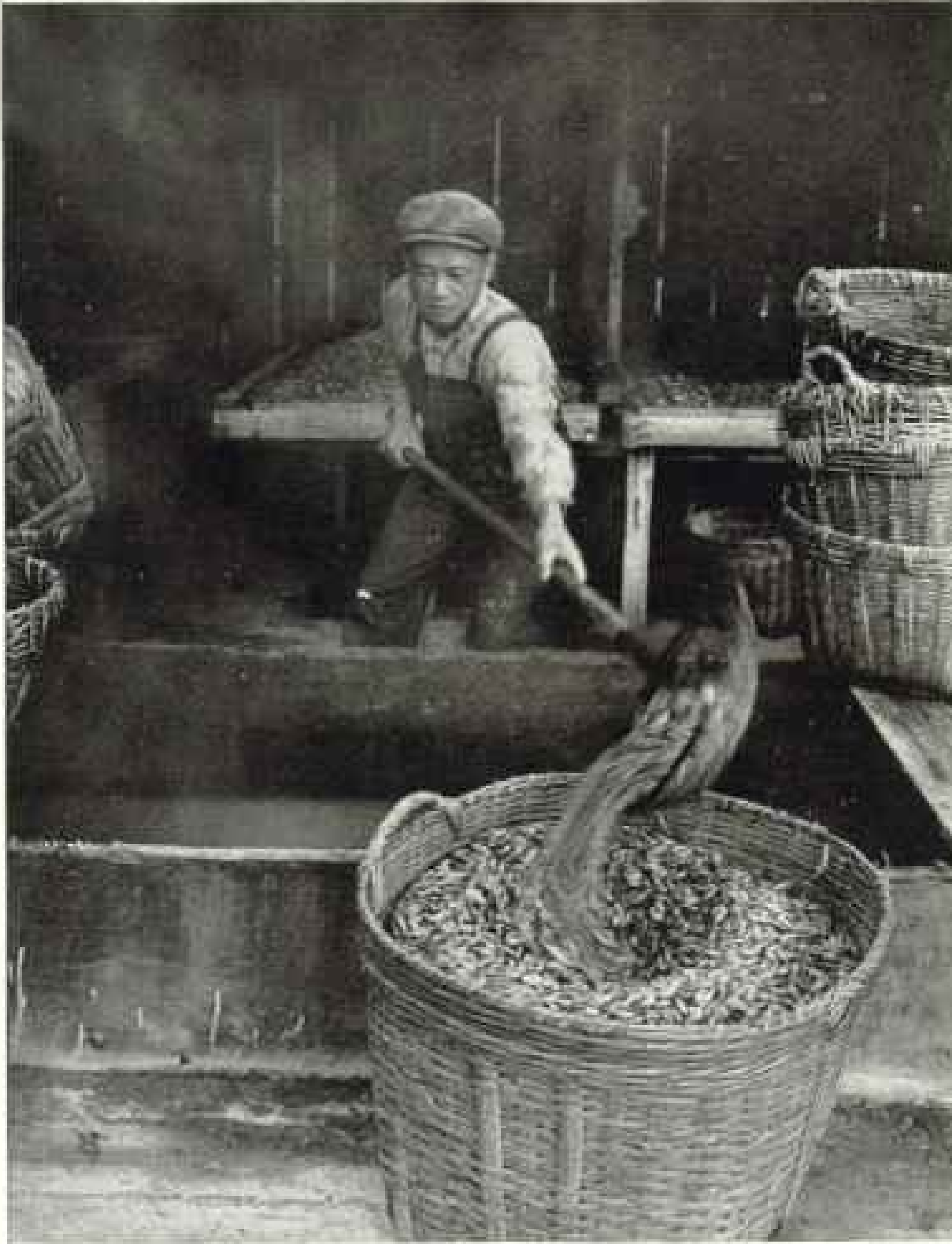


Painting by Hashime Murayama

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LEOPARD SHARKS FEED VORACIOUSLY ON OTHER FISHES BUT ARE HARMLESS TO MAN

Seldom does the Leopard Shark (*Triakis semifasciata*) exceed five feet in length. It is not related to the great white shark, or "man-eater," that occasionally has injured bathers along the Pacific coast. Black bars across its back and upper sides distinguish it from the dangerous species. When the Leopard Shark becomes entangled in a sardine purse net, it can do much damage, for needle-like spines cut the twine mesh.



Photograph by B. Anthony Stewart

#### SHRIMPS SOON GET INTO HOT WATER!

As they drifted with the tide along the bottom of San Francisco Bay, the crustaceans were netted by a Chinese fishing crew and brought in large wicker baskets to the camp tender at Hunter Point. The shrimps were immersed in a caldron of boiling water and now are being transferred to another basket in a shallow scoop of copper wire. Before marketing, the catch will be screened for size (page 492).

the smaller ones are skinned and sold as flounder on the fresh fish market.

In the Puget Sound region this species reaches sexual maturity in its third year and spawns in February, March, and April. The eggs and larvae are pelagic, floating suspended in the water. Embryos have normal eyes, one on each side of the head, but after a short time one eye, together with all of the bones about it in the region of the snout, migrates to the other side of the head. Shortly after this adaptation to life on the ocean floor, the half-inch fish settle to the bottom to live blind side down and eyed side up.

Their food consists mainly of worms, crus-

taceans, and small fish. Often the necks of clams, which they have bitten off as they protruded out of the sand, appear in their stomachs.

#### Mottled Sand Dab

(*Citharichthys sordidus*)

The mottled sand dab belongs to the family Bothidae (Plate XIV). Members of the family resemble the flounders, but may be distinguished from them because one of the pelvic fins is on the median ridge of the abdomen, the color is on the left side, and the scales are rather large.

The mottled sand dab occurs from Kiska Island (Aleutian chain), Alaska, southward to Cedros Island, Baja California. From British Columbia southward it abounds in water of moderate depth, often being taken commercially in trawls at 240 feet. It inhabits sandy and muddy bottoms, feeding on small organisms, including shrimp and worms.

Recent research on this species by Richard T. Smith of Seattle indicates that it first spawns when about two years of age. The spawning period is during March and April in the Puget Sound region. The females, larger than the males, reach a length of more than 15 inches and a weight of about two pounds.

#### Market Crab

(*Cancer magister*)

The market crab, belonging to the crustacean family Cancridae, is closely related to lobsters, shrimp, and crayfish (Plate XIV). Of the same family are several other smaller species of crabs of little commercial value.

*Cancer magister* is found from Unalaska Island, Alaska, to Magdalena Bay, Baja California, but is common only at Monterey Bay and northward. It lives on sandy bottoms to a depth of 60 feet, and reaches a length of 8 inches, measured across the back. The females, protected by law, can be distinguished from the males because their abdomens are broader.

Along the Pacific coast of the United States the commercial crab catch averages about five million pounds annually. Equipment has varied, but the baited hoop net is still used in the northern area. These nets are set in kelp areas, among rocks, and on sandy bottoms, but will not work satisfactorily in soft mud or ooze because they sink beneath its surface.

In Monterey Bay the bottom is of soft ooze, and the hagfishes, voracious eel-like creatures, are so abundant that they eat the bait before the crabs have a chance. Fishermen of southern California necessarily have devised a new type of equipment and method of fishing, the Monterey Bay crab net, adapted from the sea bass gill net. Made of 9- or 10-inch mesh of light linen thread, it measures about 15 by 30 feet. Several such sections are fastened together and set on the bottom of the bay like a fence, the ends being anchored and a marker attached to a float to indicate location.

The task of extracting a live and struggling crab entangled in a fine linen thread gill net is a remarkable feat, appreciated only by those who have watched it. In this work the fishermen are aided by the use of buttonhook-like tools.

When placed together in the boats, the crabs go after one another furiously, but only legs are lost. These would soon regenerate if the creatures were permitted to go free.

### Leopard Shark

(*Triakis semifasciata*)

Known from San Francisco Bay to Ballenas Bay, Baja California, the leopard shark may be distinguished from other sharks in the family Galeidae by conspicuous black bars across the back and upper sides (Plate XV). Along the lower sides are round black spots mostly opposite and between the ends of the crossbars. It is one of the commonest species in the markets of southern California and is frequently taken on hook and line by anglers.

The male shark may be distinguished from the female by the claspers, long, armlike organs extending backward from the inner edge of the pelvic fins. Claspers occur on skates, rays, and practically all species of sharks. They are used in copulation at breeding time.

Methods of capturing sharks are varied. The hand-thrown harpoon, or lily iron, is effectively employed by experienced shark fishermen. Lines of rope, 1,500 feet long, with wire leaders at 12-foot intervals fitted with large fish-baited hooks, have proved their worth; and troll lines are used also. Most successful, however, are gill nets. These vary in length from 600 to 3,000 feet and 18 to 24 feet deep,

with a mesh about 20 inches stretched. They are set on the ocean bottom and anchored at each end. A buoy with a flag as a marker is fastened to one or both anchors.

The leopard shark in west coastal waters is a small species that does not reach a length of much more than five feet. It feeds mostly on fish and is perfectly harmless to man.

### Ocean Sunfish

(*Mola mola*)

To a group of specialized fishes called headfishes, family Molidae, belongs the ocean sunfish. The one illustrated on Plate XVI occurs in all temperate and tropical seas of the Atlantic and Pacific Oceans and along the Pacific coast of North America from southeastern Alaska southward. They are fish of the high seas, but venture close into shore.

Often ocean sunfish, floating at the surface as if asleep, make excellent rifle targets. Two observers who watched several two or three feet long swimming at a depth of a fathom in Monterey Bay report:

"The swimming appears to be accomplished almost exclusively by the lateral sculling movements of the dorsal and anal fins, although body movements may assist. The fish were more active than their ungainly form would seem to permit, easily avoiding oars with which we attempted to touch them. A number were seen to leap into the air, at least one entirely clearing the surface."

The peculiar shape, all head and practically no tail, accounts for the name "headfish," and the habit of lying at the surface almost motionless resulted in the name "ocean sunfish."

Occasionally large specimens are found. One mounted in the American Museum of Natural History, New York City, measuring 10 feet in length by 11 feet vertically, was taken off southern California in 1910. One mounted in the United States National Museum, Washington, D. C., measures 6½ feet in length and 9½ feet vertically.

Although ocean sunfish reach a large size, they are harmless creatures and of practically no commercial value.

### Opah, or Moonfish

(*Lampris regius*)

The opah, or moonfish, one of the most beautiful and graceful fishes in the ocean, belongs to the family Lampridae (Plate XVI). It has been reported singly and in schools in the open seas in widely scattered areas of the Atlantic and Pacific Oceans, and along our Pacific coast it has been taken as far northward as off Yakutat, Alaska.

There is a single living species which reaches a length of about six feet and a weight of 600 pounds. The flesh has been described as being of a salmon-red color, tender and oily, with a delicious flavor.

Because of scarcity and irregularity of occurrence, the moonfish is not sought commercially on the Pacific coast.





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Painting by Hadime Murayama

GIANT OCEAN SUNFISH BASK LAZILY NEAR THE SURFACE OF THE OPEN SEA

Big fellows, when fully grown, may measure fourteen feet and weigh two tons. OCEAN SUNFISH (*Mola mola*, young, upper pair) have thick, rough, leathery skins and are not edible, although the Japanese consider the liver a delicacy. Tiny suckfish use the monster's gill cavities as homes. Flesh of the smaller ORAN or MOONFISH (*Lampris regius*, adult, lower foreground) is tender, rich, and oily. These 500-pounders are said to travel in schools, going as far north as British Columbia and Alaska.

## THE FARTHEST-NORTH REPUBLIC

### Olympic Games and Arctic Flying Bring Sequestered Finland into New Focus of World Attention

BY ALMA LUISE OLSON

THE first time I visited Helsinki (Helsingfors) I had come by air from Stockholm, and it seemed to me that in this brief flight I had entered a wholly alien world, so unlike the West that it was hardly a part of it.

In the language there was scarcely a word, a syllable, that suggested English, Latin, or anything Scandinavian, not to mention German or the Romance tongues.

Everywhere the arrestingly Finnish way of life caught my attention.

At the lively market along the shore line I saw weather-beaten faces, sturdy frames of fishermen, blue-eyed young girls with straight blond hair drawn back from the forehead and with pronounced high cheek bones tinged with a healthy glow, as if they had just stepped out of the Finnish steam bath (pages 525 and 531).

There was something almost mystic in the striking contrasts—in the open Big Square with its reminders of tragedy and triumph in the fight for freedom from Russia, in the frosted gray dome of the Russian Church, in the mixture of extreme blond and swarthy types among the populace.

We drank our hot tea, with lemon, from tall glasses, and the delicious pastry we munched naturally suggested Russia.

"Oh, no, we really learned nothing from Russia," protest the Finns cheerfully, "except to come late for dinner and to smoke between courses."

#### SUOMI COMES OF AGE

On a second visit to Helsinki, staying longer and talking with Government officials, bankers, and other business men, with women at work or in their homes, I heard insistently the brave story of a new state in the making—and the city which will be the world athletic capital when the Olympic Games are held there in 1940 (pages 526 and 531).

"We have had much to do," said the leaders. "It was first in 1918, you remember, that we captured our independence as a nation. We have had to formulate our ideal of statecraft, establish a domestic and foreign policy, stabilize our currency,

"Except for our forests and our water power, we have not been blessed by a bountiful Nature. We are studying new developments elsewhere and are adapting them to our native needs and national industries. We are still such a young country!"

Noting the eagerness in their faces, I was often tempted to exclaim, "How American!"

There was, however, one reservation: the tempo of life was more leisurely than in the United States. It happened to be election time. The total electorate was more than a million and a half. It was taking from ten days to a fortnight to count the returns.

On a third visit, following a tour of the Baltic states,\* I came by boat to Helsinki, and this time, after the cities of Latvia, Lithuania, and Estonia, it suggested a sort of homecoming. It reminded me of Sweden, where I had been living.

#### THE SURGE OF NATIONALISM

True, the names of the streets are in Finnish; but there is also the Swedish version, just as "Helsingfors" has equal official status along with "Helsinki" as the name of the country's capital.

With the breakfast coffee there was a morning newspaper in Swedish. In a population of more than 3,800,000 the Swedish groups in Finland constitute one tenth.

The surge of Finnish nationalism is strong, and university instruction seems to veer toward more use of Finnish.

As for the alleged refusal of taxi drivers and others to understand, even if they do know some words of the minority language, you can make your own test. Begin by speaking English—perhaps French or German also evokes the miracle—and then if you do not make yourself understood you can tactfully and unobtrusively slip in a word of Swedish, and often the formula works.

For centuries Finland was a buffer state, lying between tsarist Russia and the West,

\* See "Flying Around the Baltic," by Douglas Chandler, NATIONAL GEOGRAPHIC MAGAZINE, June, 1938.



Photograph by Gustav Heurlin

CAPTURED IN BRONZE IS THE SPEED OF "THE FLYING FINN"

Väinö Aaltonen sculptured the larger-than-life figure of Paavo Nurmi, his springing form entirely supported by the toes of the right foot (page 531). The statue of the fleet runner stands in the Athenaeum, Helsinki's gallery of art. In 1930 he held more than 30 world records; three remain unbroken. Retired from the track, now the proprietor of a Helsinki haberdashery, the famous star will be an inspiration to his youthful successors at the Olympic Games in 1940. Finland will be host to the athletes of the world then and the contests will be staged in the capital's new stadium,

and as such was a possession of Sweden. Then came a little more than a hundred years as a duchy of Imperial Russia.

Now, in 1938, Finland has rounded out the second decade of its freedom. It was during the two decades before 1918 that the new spirit, truly Finnish, neither Swedish nor Russian, welled up from the people and found release in a demand for independence (page 523).

Suomi, the Finns call their country,

As they say it, there is a ripple of suave vowels, like music. They are extremely tolerant if a stranger comes and reveals a startling ignorance of their land. They know it lies remote. And they are often the first to speak of their country as small. Yet it is about the size of Poland.

Despite the modern airplane, and the ice-breaker plowing through what was once an ice-locked Baltic in the dead of winter (page 506), the isolation is actual. In the main, the land boundaries touch wilderness.

Far to the north the Arctic wastes of Norway and Sweden lie to the westward, and the uninhabited tundras of upper Soviet regions to the east. Down on the southeast land border there is the one gateway, the railway line running from Helsinki to Leningrad (map, page 502).

As a result of World War readjustments, Finland received a direct outlet to polar seas when Russia gave up the Petsamo District. An arm of the beneficent Gulf Stream makes

itself felt even here, and the fiord of the Arctic Ocean that washes the shore of this narrow wedge of land is always ice-free.

VACATIONING ON THE ARCTIC OCEAN

In summer, liners filled with vacationists round the North Cape and push east to give Petsamo and surroundings a lively cosmopolitan atmosphere. From polar coasts a motor highway brings you down to railhead and easy ways of reaching towns and cities.

Until transportation facilities are more widely extended, these upper regions can normally have but limited economic significance. However, now that the Soviets have taken to flying across the North Pole and setting up a weather station there, we are looking at slices of the globe from new angles.\* We are thinking more and more in terms of high latitudes. The whole "hood" of the Fennoscandia peninsula is coming in, like some novelty in styles for headgear.

Still, speaking of today and not of tomorrow, it is Helsinki that remains the focal, central point of Finnish life, a role it wrested from the historic, seven-century-old Turku (Åbo), on the southwest tip, more than a hundred years ago (page 511).

There was a time when just the word "Finland" to Americans by and large, dependent on temperament or taste, suggested vaguely or variously something remote, such as the Finnish epic *Kalevala* or even Longfellow's experiment in *Hiawatha*, with its borrowed rhythm; or the now-obsolete experiment, like our own, with prohibition; or Nurmi; or the Finnish steam bath; or the invigorating freshness of Eliel Saarinen's architecture; or a symphony by Sibelius (pages 527 and 530).

A few years ago came the news that Finland was paying its debts. At regular



D. V. from Black Star

#### THREE GRACES FAR REMOVED FROM ANCIENT GREECE

Training in posture, rhythm, dance interpretation, and gymnastics for girls has been stressed for half a century. In 1891 Finnish women appeared in an exhibition of gymnastics at an international festival in Stockholm. Elementary school children devote three hours a week to gymnastics and athletics.

intervals in the daily press Americans read that Finland had again met its postwar obligations promptly.

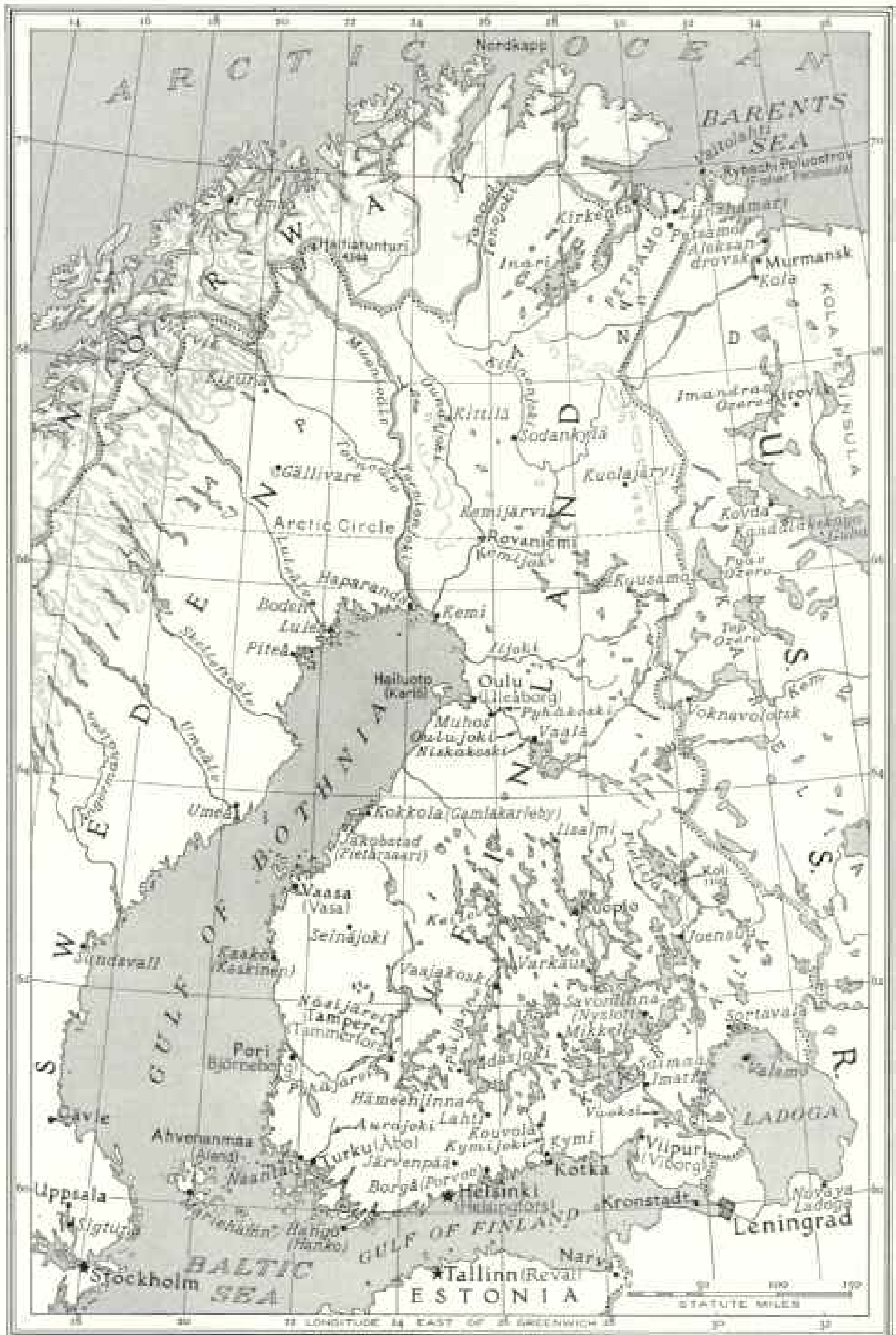
#### HELSINKI HAS LIFE AND COLOR

Now plans have been drawn for a new American Legation building to be erected in Helsinki. That Legation will be a symbol of integrity as well as a building adapted to diplomatic needs.

Helsinki is cosmopolitan, more so than

\* See "Our Search for the Lost Aviators," by Sir Hubert Wilkins, NATIONAL GEOGRAPHIC MAGAZINE, August, 1938.





Drawn by Ralph E. McAleer

MYRIAD LAKES AND ISLANDS MAKE CENTRAL FINLAND'S MAP LOOK LIKE THE CROSS SECTION OF A HONEYCOMB

A list of the country's lakes, printed one name to a line, would fill about 110 pages of the NATIONAL GEOGRAPHIC MAGAZINE, for there are more than 65,000 of them and the islands far outnumber the lakes, since there are some 100,000 islands.



Photograph by Gustav Hearlin

## LUMINOUS GIANTS GUARD THE PORTAL OF HELSINKI'S ROSE-GRANITE STATION

Friendly beams from lamps held in huge hands shine upon travelers. Eiel Saarinen, eminent architect now head of the Cranbrook Academy of Art, Bloomfield Hills, Michigan, designed the massive structure which typifies Finnish aspirations (page 527). Every year he returns to his native land for a six-week sojourn at his estate near the capital. Trustees of the Berkshire Symphonic Festival chose him to design the permanent summer music pavilion near Stockbridge, Massachusetts.

many a larger city. Always there is that reminder that this was once buffer country.

If you come to Helsinki from Stockholm or some other west Baltic port, as the traveler usually does, your boat may slip into the South Harbor late enough to prolong your stay on board all night.

In the morning you will find the wide, hospitable curve of the waterfront crowded with steamers flying flags of many nations. You walk from deck into the bustling market square and are at once in the heart of a city waking to life with a new day (Plates II, V, VIII, and pages 505, 524).

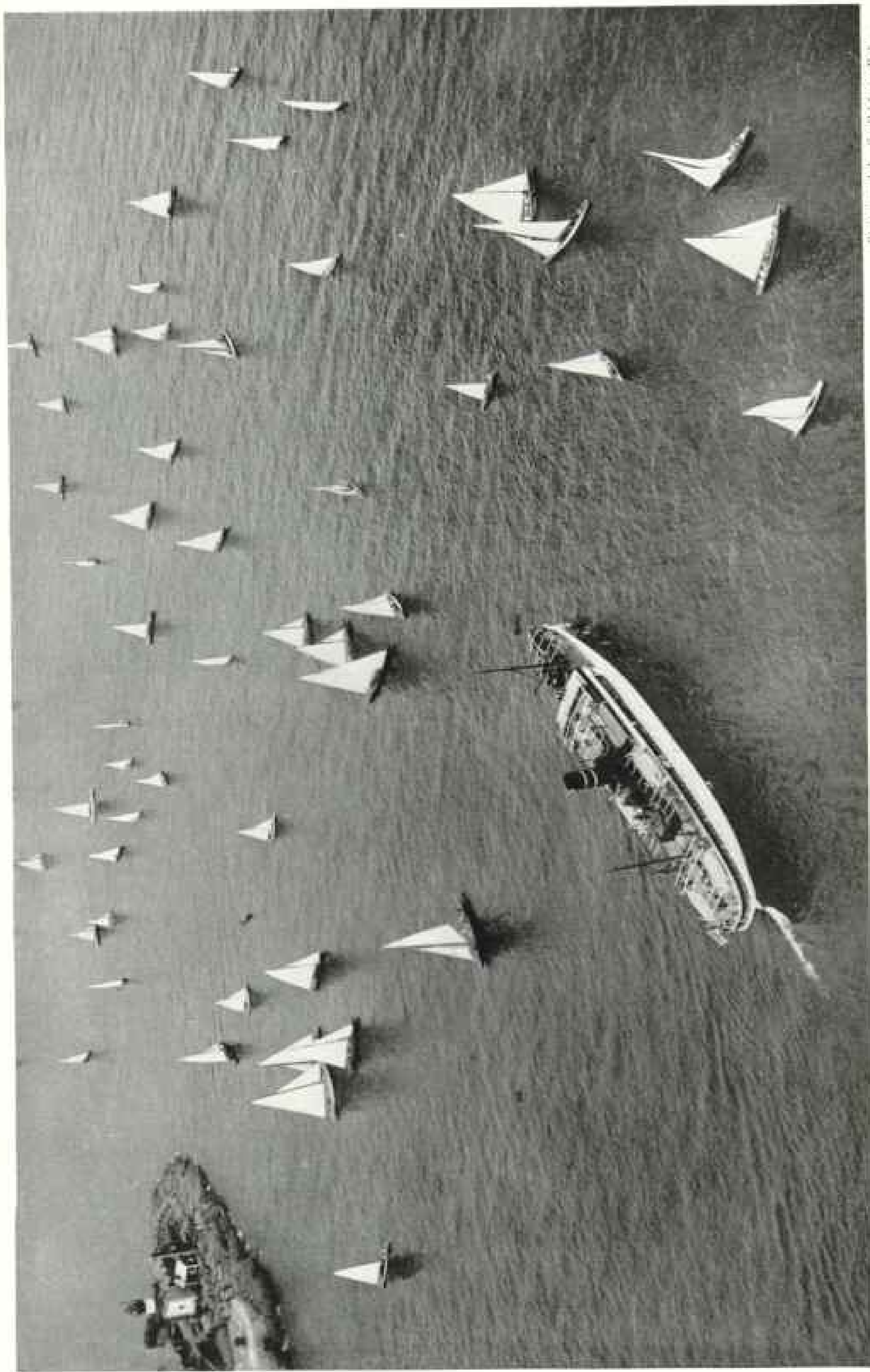
On the stands or in canopied stalls vendors of fish and fruits and flowers display their wares. It might all be a canvas by such an artist as Albert Edelfelt spread before you. Overhead, silently, watchfully, wheel the sea gulls.

The South Harbor fascinates by its fluent, changing pattern. The waters are practi-

cally tideless, but life itself ebbs and flows. The tramp steamer calls and slips out again into the blue. By noon, if you return, you will find the docks vacant, the passenger boats departed. The market square will be emptied and clean-swept.

Tomorrow the flower girl, the apple woman, the fisherman, will be back. The fruits will not be so luscious as those of the south, but the roses and pansies and begonias will have the typical brilliant coloring of northern latitudes. The *muikku*, (whitefish) caught during the night and brought down from Päijänne waters will be temptingly firm and white.

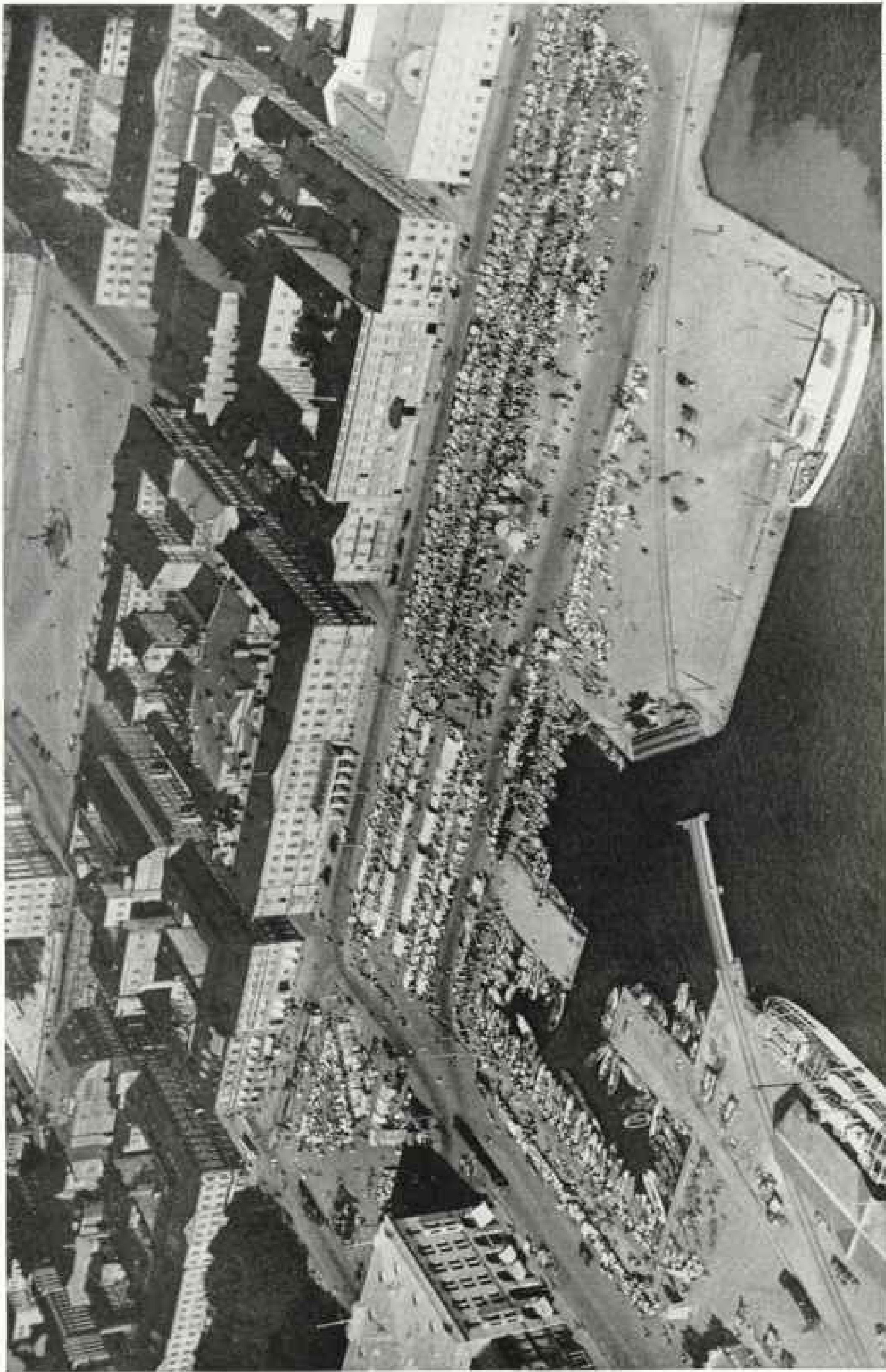
From this market square leads the wide tree-lined Esplanade, the "Main Street" of Helsinki. It was in this much-frequented boulevard that I first tried to identify the different types of Finland's population—the Finnish, the Swedish, the blend that reveals Russian heritage. It is not always



Photograph by Saalhi from Echo

"O'ER THE BLUE BACK OF THE WATERS, SAILING THROUGH THE DUSK OF EVENING"

Just as the hero Waldamoinen sailed "through the azure vapors" in Finland's great epic, *The Kalevala* (page 523), so every Finn who possibly can possess one, sails a boat. Here about 30 yachts are competing in the annual spring regatta outside Helsinki's harbor. On Sundays and holidays thousands of boats glide along the coasts, inlets, and lakes.

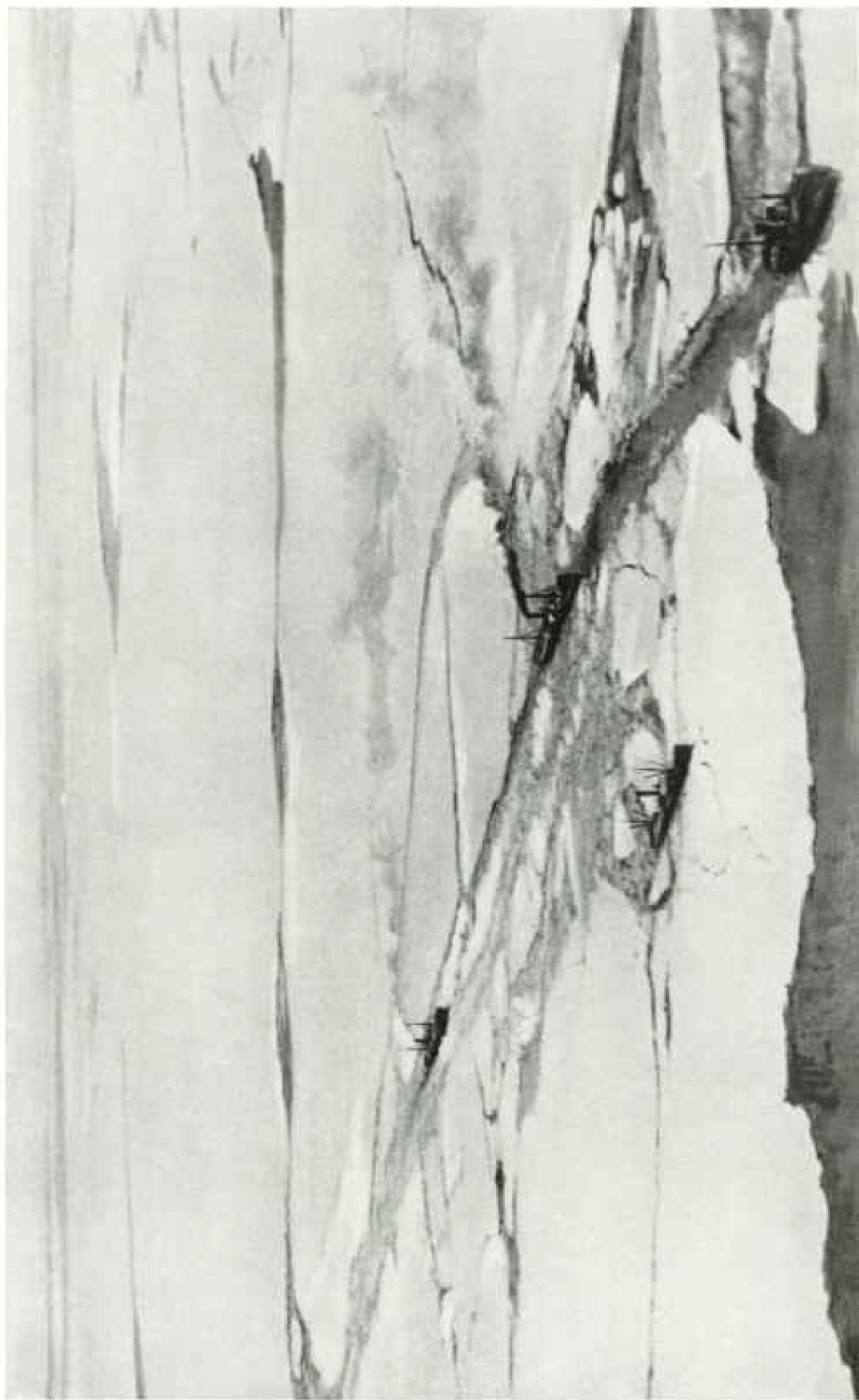


© Neufot from Eikon

ALL HELSINKI GOES TO MARKET ALONG THE HARBOUR FRONT ON WEEKDAY MORNINGS

As if by magic, curbs and stalls appear in the early dawn and boats from near-by islands tie up in the basin. Housewives of the city converge upon the square with its abundant offerings of foodstuffs and flowers. Marketing is finished early and by noon the vendors have disappeared (Plates II and VIII and page 505).





Photograph from Wide-World

ACROSS THE GULF OF FINLAND AN ICE-BREAKER CRASHES ITS PATH THROUGH A GREAT WHITE WAY TO TALLINN, ESTONIA

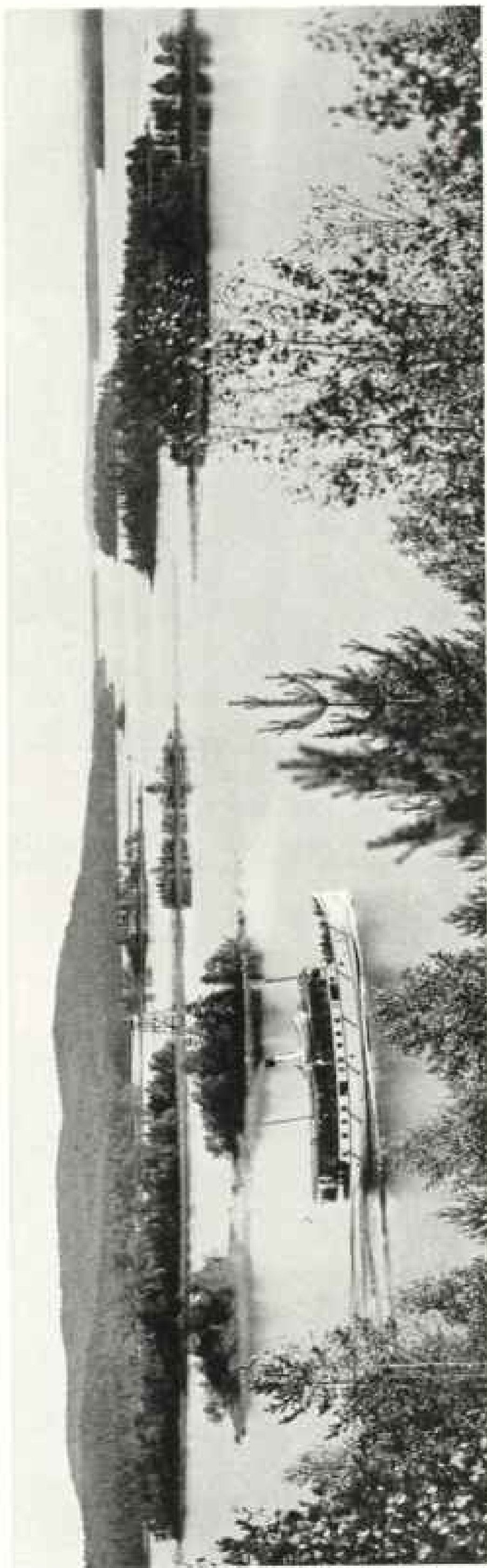
Following in the channel of open water plies a procession of ships bound for the harbor. The biggest ice-breaker in Finland is the *Jääkärin*. The engines of the powerful boat develop 9,700 horsepower. It can forge through clear ice three feet thick and smash through pack-ice belts from eight to ten yards in one drive.



Photograph by E. Mikkoja from Saamen-Markat.

**"SEATS OF THE FOUR WINDS," LAPPS CALL THEIR BROAD, FOUR-CORNERED HEADGEAR, TRIMMED WITH RED PIPING**

Long, dark-blue tunics, embroidered with red and yellow braid, are their summer costumes. The reindeer herds, rounded up in autumn, are turned loose in May and wander north to the Arctic Ocean, foraging for reindeer moss (page 533).



© Saamen-Markat by P. Puckholz

BROAD WATERS OF LAKE PÄIJÄNNE ARE A CONNECTING LINK IN A VAST NETWORK OF CHEAP WATER TRANSPORTATION (PLATE VII)



Photograph by J. Nyberg

MOST OF FINLAND'S STALWART YOUTH WOULD RATHER BE KOLKHMAINEN AND NURMI THAN PRESIDENT

Some of these runners may represent their nation when the Republic is host at the 1940 Olympic Games in Helsinki (page 531). All over the land, Boy Scouts and other groups hold cross-country runs, developing the peculiar rolling stride that has taken the measure of other runners in international competition. In love of sports, writers have compared present-day Finland to the Greece of the fifth century, B. C.

easy to differentiate, for passing years have assimilated former contrasts.

"THANKS FOR THE FOOD"

In homes where I have visited, the customs have seemed much like those in Sweden. For the second breakfast, or noonday meal, you are likely to encounter the well-known *smörgåstårter*, less elaborate perhaps than in Sweden (this comment by no means implies criticism). The children rise from the table and say "Thanks for the food," as they shake hands with their parents, and it is also good form for guests to express their thanks for the food in the same way to hostess and host.

The Swedish school system became firmly rooted here during the many centuries when Finland formed a part of the Swedish kingdom. Usually in their teens the young men and women pass examinations and are then, as in Sweden, entitled to wear the white student cap with differentiating insignia.

"We study Finnish in schools, and Swedish also—and once we had to include Russian," someone exclaimed impatiently. "And at that, with the three of them, we had not yet begun with one of the accepted world languages!"

More and more, in public life, Finnish is crowding out Swedish. Many families are converting their Swedish names into the Finnish equivalent. In the Parliament the two languages may be heard, but it is no longer required, nor does it seem necessary, to translate from Finnish into Swedish.

A LANGUAGE EXPERIMENT

The Finnish tongue is generally admitted to be difficult for the outsider to master.

"There are fifteen cases," laments the beginner.

"We have practically no need of prepositions," is the way the Finns put it.

Spelling and pronunciation are logical, and since the speech as a whole is onomatopoeic, a leading industry is word-making.



Photograph from Ewing Galloway

#### LEGISLATORS VOTE BY ELECTRICITY IN FINLAND'S NEW PARLIAMENT BUILDING

On each member's desk in the Diet chamber are two buttons, one for a "yes" vote and the other for "no." Pressure on the buttons is recorded on a large glass panel visible to all. Pushing both buttons at once means "present but not voting." Vote on a bill or motion by the 200 members may be completed and totaled in 90 seconds. The imposing structure was designed by architect J. S. Sirén and is built of Finnish granite (page 527).

Length of sound is invariably indicated by doubling of vowels or consonants. The accent is on the first syllable, and the net effect is a curious and not unpleasing staccato.

One rainy morning, facing a three-hour wait between trains at a small junction, I set out to order my lunch in Finnish with the help of the menu and my guidebook with its list of phrases the traveler might need. Words sound the way they look, I remembered, and the sound also often suggests the innate quality of the thing you are talking about.

So I mastered *kahvia*—coffee—even to the guttural "h." Then there was a choice of *Ranskanleipävoileipä vasikanlihan ja kurkun kera* or *Kääresylttyvoileipä punajuuren kera*, and I was being tempted by doubtless a choicer if not bigger mouthful in *Sianliikkiö tai maikunmätivoileipä*.

How easy it was to imagine that I was specializing on items with the ingredient of *voileipä* (suggesting a textile) or *voileipä*. And yet I capitulated. A waitress came with

the ubiquitous tray of sandwiches, and I pointed to the one I wanted.

#### FINNS ARE LEISURELY—EXCEPT IN A RUNNING RACE

As if to offer visitors special dispensations, in view of these linguistic complications, the pace of life is leisurely. "Time is always before us," is a favorite saying. Another Eastern import is, "God created time but said nothing about hurry."

It is only on the old roadbeds, heritage of Russian days, that the traveling is hard and tedious. The unevenness made any sort of speed out of the question. After my first hour or two on one of the local, inland trains, I supposed I knew why Finland had developed its magnificent race of long-distance runners—youth of a century ago, that is, speeding on ahead to say that the old Russian rolling stock was coming.

However, that pleasant theory breaks down in the face of the fact that far back in the Viking Age the sagas told of the storied speed of the Finns.



At some little station it was picturesque, I grant, to see a miniature engine sidle off on some sidetrack to have its tender refilled with—logs. There are no coal deposits in the country, and in remote interiors the forests and an abundant manual labor supply the motive power. But on the main lines imported coal is burned.

By night on the Saimaa Lake system, the large water plateau of southeastern Finland, which offers a continuous natural waterway for some 186 miles, I was roused from sleep by the thud of logs sliding down into the hold of the boat that had stopped for refueling.

The railways are in the hands of the Finnish State, and on the main lines you find all the modern improvements.

#### FINLAND IS THREE-QUARTERS FOREST

Through its forest and water-power reserves, the country is turning gradually from agriculture to manufacture. Relatively, Finland is one of the most densely forested lands in Europe. Of the total area, nearly 75 per cent is under forests, and more than 75 per cent of this in turn is productive forest land. Timber and pulp and paper figure prominently in the industrial output and in export trade.

Through national conservation, serious waste of raw materials is being eliminated. Now the annual growth in the forests is slightly in excess of annual consumption.

Of the various products, pine and spruce dominate, and silver birch is next in importance. As raw material, the latter is in demand for the manufacture of a superior quality of plywood. Birch logs have been the traditional fuel of trains and lake and river boats.

Cut birch has also less severely utilitarian uses. At the Midsummer celebration, throughout all the countries of the north, graceful waving branches of silver birch adorn every doorway, outline the decks of pleasure steamers and turn motorcars into moving groves of green.

I recall many Midsummers in Europe—one in Dalecarlia in Sweden made vivid by the gay Rättvik and Leksand peasant costumes; a Midsummer Eve in Rome with a glimpse of high mass in St. Giovanni in the Lateran, with a carnival spirit in the square outside, with its processions, its terra-cotta bells, its populace drinking beer and eating snails; an unnoticed June 24 on one of the Channel boats on a journey from Paris to

London: an evening brilliant with sunlight and rainbows over the Bergen hills as the boat, at 10 p. m., set sail for Iceland.

There is also a memory of a Finnish Midsummer. It began at Viipuri (Viborg) a little in advance, where early of a morning I stepped out from the station and engaged a drosky to take me to the magnificent park, Mon Repos. The clocks may have been striking five, but I heard only the clatter of the horse's hoofs on the cobbled streets as I clutched the springless seat of the vehicle.

We passed the market square of this historic city, once the trading post for the whole of Karjala (Carelia), where for centuries Finns had brought down tar and lumber to barter for salt, cloth, and other Russian and German wares.

Now we saw dozens of peasant carts bringing in sweet-scented loads of young silver birch. To this season the birch is the important commodity that the spruce is at Christmas time. And on my return to town after the drive of a couple of hours, the transformation of doorways along the narrow streets had begun.

Down from Imatra the next day, as I was changing trains for Sortavala, a puffing locomotive pulled into the station. The engineer, tall, black-bearded, loomed like a giant against his background of the little locomotive adorned with the sparkling emerald of silver birch. It was like a stage set, an idyllic version of Birnam Wood descending upon Dunsinane.

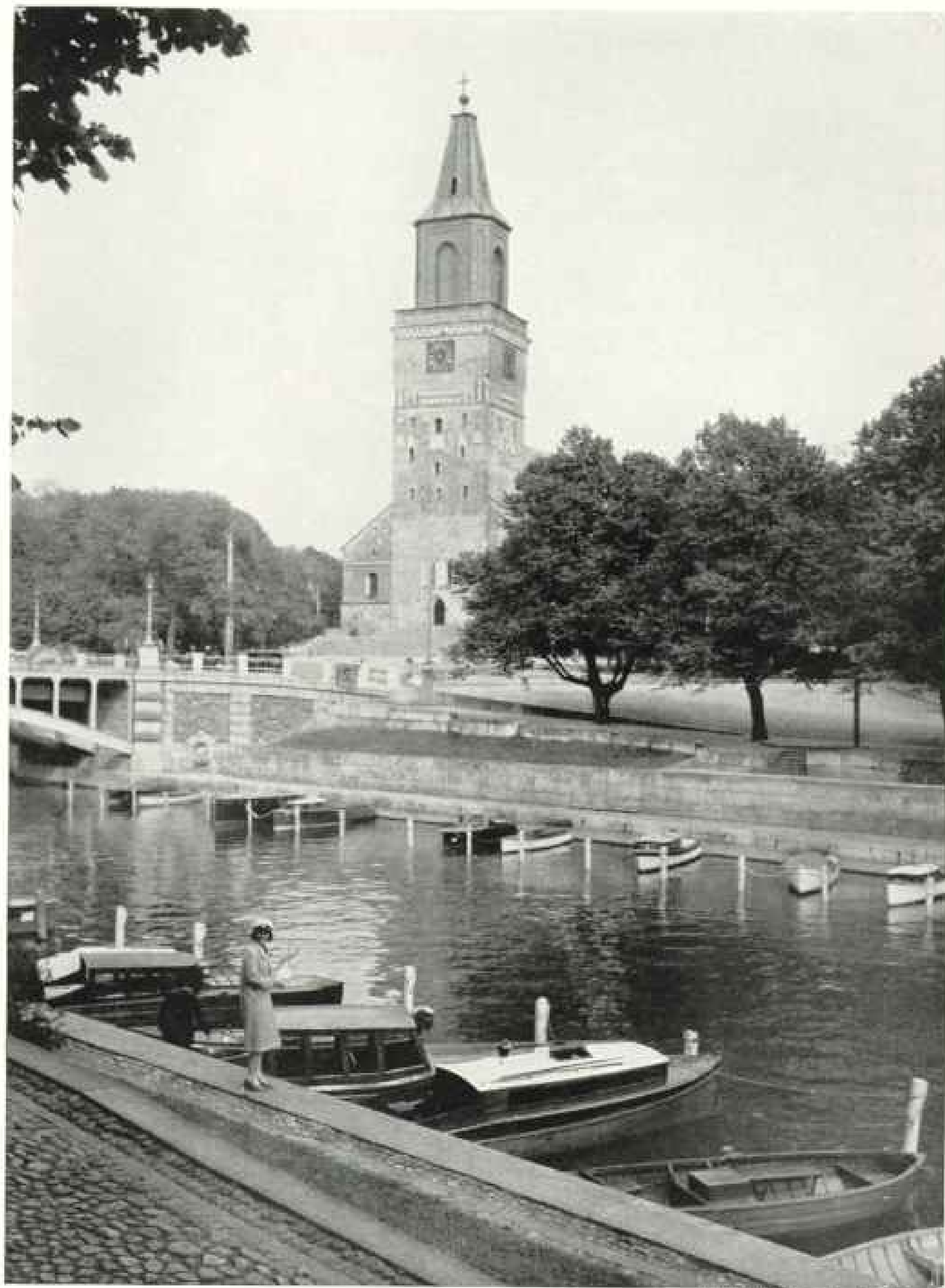
#### FIRES FOR MIDSUMMER EVE

Then comes Midsummer Eve at Sortavala, on Lake Ladoga. From a hill park loitering crowds are watching the lighting of the *kokko*, or Midsummer fire. The twilight itself is luminous and un fading. Waiting piles of birch twigs and other wood are kindled, and here and there someone sprinkles tar on the logs.

Now one, now two and three, now a dozen fires leap up. These flaming tongues of red contrast startlingly with the cool white dusk of the green and shadowless valley, and wavering pillars of heavy smoke rise from their fiery base.

Someone pushes an improvised raft filled with tar-sprinkled wood out upon the water. On Ladoga, largest lake in Europe, floating fires glow like burning eyes. There is hot passion in this pagan ceremony surviving from Viking days.

From afar comes the sound of singing.



Photograph by Gustav Heurim

TURKU CATHEDRAL, MOTHER CHURCH OF FINLAND, IS THE NATION'S "WESTMINSTER"

Sarcophagi of royal and noble families rest in the seven-century-old structure on the banks of the Aura River. Often ravaged by fire and pillaged, the edifice has been rebuilt and extended many times since the Catholic Bishop Thomas of England selected the site about 1230. The Finnish Diet appropriated funds in 1923 to have the old building, now the seat of a Lutheran archbishopric, completely restored (page 523).



Photograph from Durfen Leigh and Black Star

#### NOT SANTA CLAUS, BUT A LAPLAND MAIL CARRIER ON HIS DAILY ROUTE

Even the loneliest settlements in the frozen north get letters and newspapers regularly. To drive a one-man reindeer sled on a level stretch is not difficult, but special technique to avoid spills is required for bounding journeys over hill and dale. In descending a very steep grade, the reindeer is hitched behind the sleigh. The animal resents being pulled by the head and digs his forefeet into the snow, thus providing effective brakes.

Youth dances. All of life—human life—and all of Nature are throbbing with the intensity of existence at its fullest.

Fires slowly darken and go out. For another year, until another Midsummer, the silver birch is back in its role of Cinderella of the fireside or raw product of manufactures.

#### WEALTH FROM WATER

Next to forest products comes water power.

There are some 65,000 lakes in the country. Add to this the fact that the lakes are actually outnumbered by the islands—the 100,000 are mostly concentrated in the long archipelago of the southwestern coast—and you can visualize the topography of the country.

Long before good roads were known, the natural inland waterways served man's primitive needs. Today the total length is about 3,100 miles, and artificial canals supplement the service on rivers and lakes. There are three distinct waterway systems

in southern Finland: the Saimaa, the Päijänne, and the Pyhäjärvi-Näsijärvi (map, page 502). Between the latter lies Tampere, on rapids that furnish power for this foremost industrial city of the country.

Down the rivers float timber rafts, with men aboard deftly guiding their course. Even in rapids one often sees someone skillfully balancing himself on a log.

The Oulu River, in the west-central regions, has long offered adventurous transit on seething, boiling rapids. In the south, the Imatra Rapids have been harnessed, and by means of modern technical skill about half of their total strength has been converted into "white coal" for a coalless land.

Fully two centuries ago skilled boatmen first perfected the river craft still in use on the Oulu rapids, craft that would carry them safely down the surging stream with their cargoes of tar brought from the upper forests to Oulu.

In our age the set of river boats operated by the Finland Travel Club has been mostly



Photograph by Dorothy R. Switt

LARGE, SWEET "RINKELIÄ" PRETZELS FIND FAVOR AT THE JOENSUU MARKET

Turned-up toes of the customer's cowhide boots serve a useful purpose. When this northern Karjala farmer puts on his skis in winter, the simple bands with which they are fastened over the instep cannot slip off. At this annual fall event, many spinning wheels are sold.

for pleasure-seekers. The starting point is Vaala, north of the "great divide," and the river journey, taken in two laps, ends at Mubos, an hour by train from Oulu (Uleåborg).

The boats are slender craft 39 to 46 feet long and little more than a yard wide and a yard deep.

SHOOTING THE RAPIDS OF THE OULU

On the morning we set out from Vaala the scene at the boat landing was very calm, and the flaming orange or red of the boats was reflected in a shimmering surface of blue. At the stern stood the certified pilot guiding our course by means of the *mela*, a paddlelike steering oar. His companion at the prow kept steadily rowing and so made the momentum of the boat exceed that of the river current.

At a turn of the river, we were caught in Niskakoski, the first of the rapids. Foam sprayed our faces; the eyes of the pilot narrowed as with deft craftsmanship he steered the boat from side to side to avoid the heaviest onslaughts of the seething mass.

His father, we learned, had been an expert pilot, and at one landing place the venerable old man came down to meet us and display his medals. A grandson was at the oars. It was a matter of pride to them all that the skill was so being handed down through the generations.

After calm intervals, or smaller rapids, comes the largest, Pyhäkoski, near the end of the day's voyage. Within a distance of 11 miles the water drops more than 183 feet. We of today are used to spectacular sights and so comment only casually on the 75,000-horsepower generated by the boiling current, but the generations that worshiped the force of Nature suggested the awe this scene inspired through their name—Pyhäkoski, or "Holy Rapids."

Tossed from side to side, we seemed to make no progress. But we needed only to glance at the opposite bank to estimate the speed with which we were being hurled downstream.

There was never a hint of danger. But there was that one crowning moment, the passage through the narrowest, most tumultuous channel enclosed by sheer cliffs on the



sides, with its exhilarating sensation of oneness, of complete abandon, in primeval wildness and very majesty of the universe.

At Imatra, by contrast, man has stepped in, and a modern power plant supplies current. To the fraction of a second, whole torrents of the foam-tipped cascades of the Vuoksi River obey man, his finger pressing a button, and so Nature is made to serve his needs.

The bitter cold of December, 1928, was record-making, and for a time even the ice-breakers were blocked in the harbor.

The city of Turku, on the southwest coast, was running short of fuel for its power plant. The chief source had been imported coal, and for several days a freighter had been lying just outside the harbor with the needed supplies. The threatened fuel famine could be averted only if this coal could be obtained or if electrical power could be released from Imatra in time.

#### TURBINES SING "SUOMI'S SONG"

The work was rushed, and it grew to be a matter of hours. And Imatra won! Before the imported coal could be unloaded, Turku had been put in direct contact with the new power plant that was utilizing the bountiful reserves of Finland's own natural resources.

To me that episode, as told by engineering experts at Imatra, seemed symbolic and prophetic. A new Finland has been arising and developing direct from native latent strength. Years ago a Finnish poet heard "Suomi's Song" in the magic and the sorrow of Nature, as through words he harvested a handful of the melancholy wildness and its beauty. I remembered his melodious verse as I stood down in the lowest engine room of the Imatra power plant.

The roar of the turbines was deafening. "Also *this* is Suomi's song," those massive wheels seemed to say—a song of modern industry, of a free Suomi working for its own people and therefore finding joy in work, finding satisfaction likewise even in industrialization.

Less than a century ago the country was almost entirely agricultural, and dairy products are still a leading item of export, not to speak of consumption, but it is chiefly industrial growth that has put national wealth sharply on the increase.

It is not trusts and cartels so much as co-operatives that have made Finland interna-

tionally famous and nationally a factor contributing new methods to the economic pattern. The pioneering co-operatives society, "Pellervo," dates from the year 1899, and one of the first handsome office buildings in the modern style in Helsinki belongs to the co-operative group "Elanto."

In less than twenty years the number of co-operative dairies was doubled and the number of co-operative banks rose from about 600 to more than a thousand.

#### WOMEN ARE CONDUCTORS AND BUILDERS

At least in those first years of building a new and independent state there was work for all, and so women came to play an active part in public life, alike in the professions and the trades. Streetcar conductors are women (page 529). They figure prominently in the building trades.

Women of Finland were pioneers in achieving universal political suffrage. They have had the vote since 1906, but instead of increasing their representation in Parliament they seem to concentrate more and more on community work and co-operative endeavor.

Eagerly they study problems of diet and nutrition, housing, modern pedagogy, "planned economy" for homemaking. The Martha Leagues, for instance, are flourishing organizations, with large memberships, which were organized in 1899 to offer women training in gardening and domestic science. In these far-northern latitudes, gardening suffers many setbacks from late springtime or early frosts, and group endeavor does much to stimulate the required added effort.

Of late the Martha groups are reviving home industries, and teaching the making of dolls or other toys in the homes.

Another organization of women in Finland is the Lotta Svärd Society, which co-operates with the volunteer Civic Guard. The women, dressed in a simple gray uniform, train in providing first aid and food supplies, and prepare to give any aid they can, though not the bearing of arms, to their country in time of need (page 529).

The volunteer Civic Guard for men supplements the Regular Army, which conscripts the youth of Finland for a short term of military service and training. Emphasis on voluntary training has been continuous since the time Finland became independent, when it found itself also in the throes of civil war and revolution.

One must keep in mind the outstanding

FINLAND: LAND OF SKY-BLUE LAKES



FINLAND POSTERS FLAXEN TRESSES AND WILD STRAWBERRIES

Rural boys and girls in this north European republic, northeast of the Baltic Sea, sell fruit at railway stations and steamboat docks. Cranberries and blueberries also grow wild in abundance.



© National Geographic Society

Kodachrome Photographs by Dr. Konstantin J. Kostich

"BETTER DO THE POLKA IN THIS PINERY! WE CAN FOX TROT TONIGHT!"

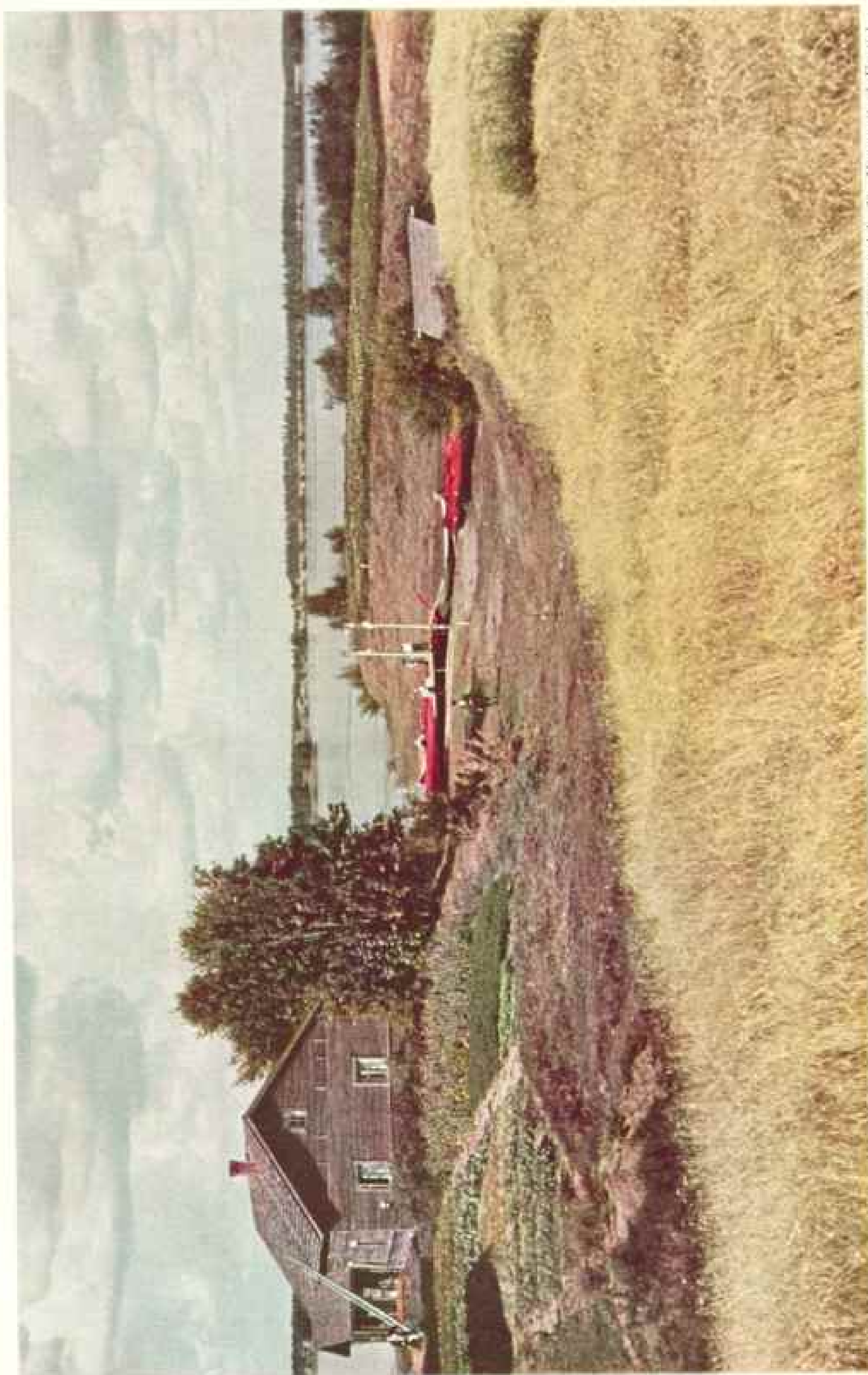
Groups of young people in Helsinki, Finland's capital, perpetuate folk dances at the Outdoor Museum, where a collection of national costumes is preserved. But modern steps are popular evenings.



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Kocheltrone Photographs by Dr. Kolumian J. Kaschich

HELSINKI TRIPS FROM THE WAVES IN THE GREAT MARKET PLACE OVERLOOKING THE SOUTH HARBOR OF FINLAND'S CAPITAL. During the morning shopping hours, vendors with horse carts crowd about Vallgren's fountain, and mass in lines down to the waterfront, where fishing and garden boats moor. Behind the statue gleams the white City Hall. The Swedish Legation and the domed home of the Supreme Court rise beyond it, slightly to the right. The old red brick Uspenski Cathedral, with gilded cupolas, is a reminder of the days of Russian rule.



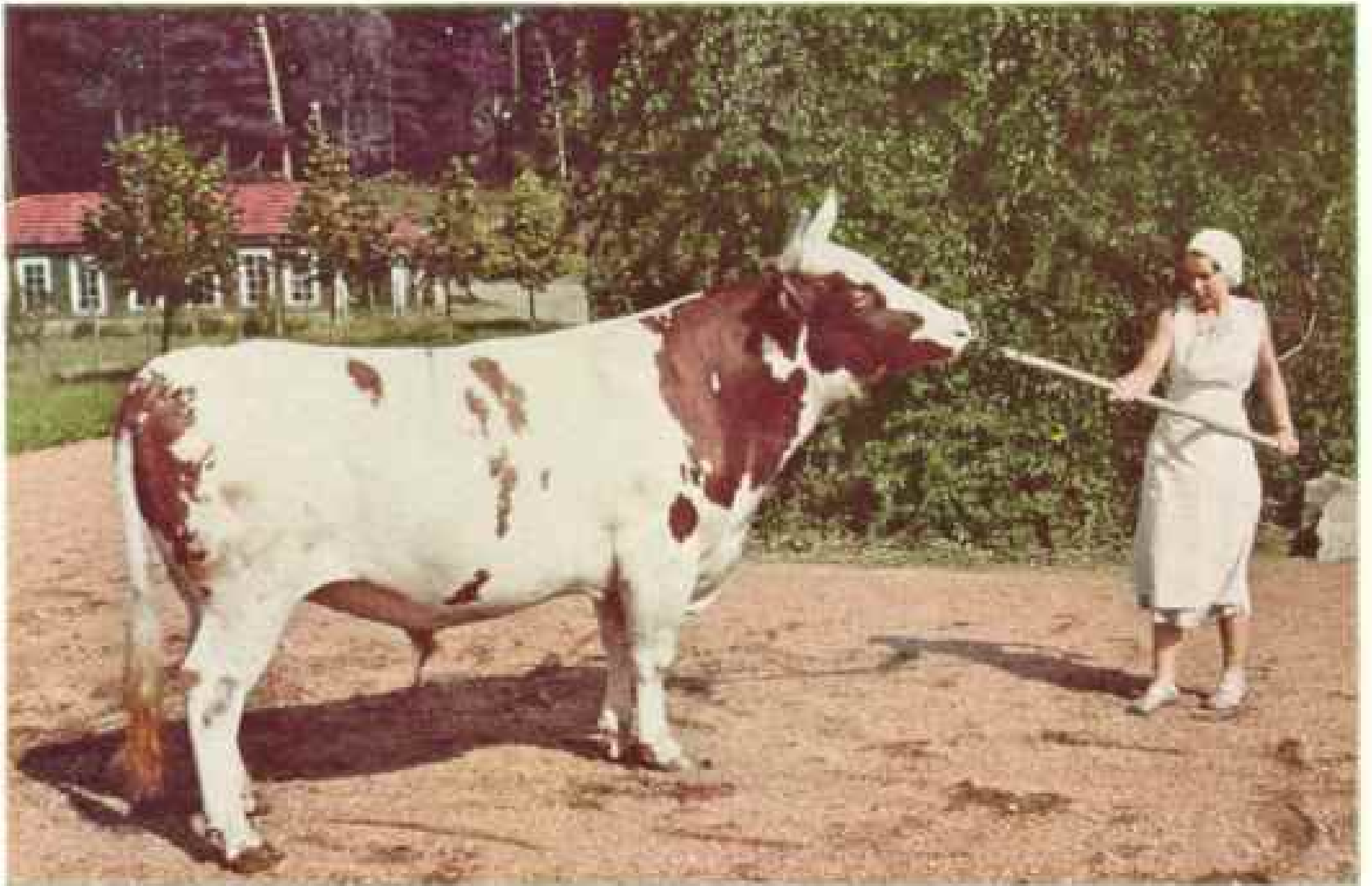
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Kodachrome Photograph by Dr. Konstantin J. Kostich

**BETWEEN WAVING FIELDS OF WHEAT AND THE WELL-STOCKED OULE RIVER CONVENIENTLY LIVES A FARMER-FISHERMAN**

He cultivates little grain, for hay is the important crop. Fishing boats lie in an inlet close to his home. Down this stream half a century ago scores of tar boats shot the rapids each year. In one season, four million gallons of black liquid were exported. Thousands of pine trees were ruthlessly cut and burned in tar pits. Today forest depletion and strict conservation laws have reduced this trade to one-fifteenth of its former volume.





A FINNISH LASS KEEPS AN AYRSHIRE BULL AT BAY.

Only in southern Finland are imported dairy strains common. Finnish cattle, of a breed native to the Baltic area, greatly outnumber all others. Half the farm land is given over to the dairy industry. One tenth of the Nation's exports are milk products.



© National Geographic Society

Kodachrome Photographs by Dr. Konstantin J. Koutch

ICE CREAM PATTIES COMPETE WITH CONES IN FINLAND

Thin, cup-shaped containers of pastry, heaped high with "vanilla" or "strawberry" are popular. The proprietress sets up her spotless stand near a Helsinki suburban railroad station.

FINLAND: LAND OF SKY-BLUE LAKES



VENDERS IN HELSINKI'S MARKET PLACE IMPORT MOST OF THEIR FRUIT

Apples and pears are the principal tree crops, but cherries, plums, and peaches are also home-grown. Oranges come from Portugal and Palestine. Grapefruit from Florida keeps its American name in both Swedish and Finnish.



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FLOWER STALLS SURROUND "THE THREE BLACKSMITHS," MONUMENT TO LABOR

Felix Nylund's modern statue stands in front of Helsinki's largest department store. Here is located the Academy Bookstore, carrying one of the best stocks of books in English on the Continent.



Kodachrome Photograph by Dr. Konstantin J. Korotich

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FROM THE BALD PEAK OF KOLI, SCORES OF WOODED ISLES "FLOAT" ON THE BROAD SURFACE OF LAKE PIRENEE

Highest point in southern Finland, land of uplands, plains, and lakes, is this glaciated knob, only 1,102 feet above sea level. Although the country is styled in Finnish "Land of a Thousand Lakes," there actually are more than 65,000. One of the three large settlements of Finns in the United States is located in northeastern Minnesota, where lake density also is high. Grouped along the coast and fishing in lakes are 100,000 islands.



Kontichuum Photograph by Dr. Kumpulainen J. Kontio

ON THE RIPPLED WATERS OF LAKE PÄIJÄNNE, FINLAND CENTERS AN ISLAND WAYRWAY SYSTEM 362 MILES LONG

The Kymi River, connecting this body of water, second largest in the country, with the Gulf of Finland at Kotka, has been canalized. The lake itself consists of long, rocky basins, stretching side by side like the ribs of a fish for about 75 miles. Enormous quantities of logs are floated over this network to the sea. Timber is the Nation's principal export.





FLOATING FLORIST SHOPS TIE UP BY HELSINKI'S MARKET PLACE.

Chrysanthemums, hydrangeas, geraniums, and other cultivated ornamentals are carried by boat from near-by island and mainland hothouses into the inner basins of South Harbor. Early in the morning the flower markets arrive and by noon the stock is sold.



© National Geographic Society

Kodachrome Photographs by Dr. Konstantin J. Kostich.

FISHING BOATS REPLACE FLOATING GARDENS IN AUTUMN

Sailing craft from the Åland Islands, last home of the square-riggers, push into South Harbor in October for the fish fair, and each vessel becomes a stall. Black-coated townspeople come aboard to purchase their winter's supply of salted Baltic herring.

fact leading up to that situation to fathom the deep currents of Finnish life today. As early as 1154 the Swedish armies crossed into Finland to carry the gospel of the "White Christ" to pagan wilds by force.

With the battle-stained waters of the Aura River they baptized western neighbors and kinsmen of a people who had raised the faithful Wainamoinen to the high position of godhead. This sweet singer and inventor of the *kantele*, a native five-stringed instrument, had been telling his people that not force but harmony rules the world, and that the word, spoken or sung, is all-powerful.

Trade follows the cross. On the site of what is now Turku, third largest city in the country, semiannual fairs were held for the travel-stained pilgrims who came to visit the grave of the first martyr, Henry, English Bishop of Uppsala, who accompanied the first Swedish crusade to Finland. The majestic Turku Cathedral dates from the 13th century (page 511).

In the meantime, from Russia to the east, had come zealous champions of the Greek Orthodox faith. According to written record, the first blood was spilled in Ladoga in 1164—that is, this was the first conflict between Sweden and Russia, between the Eastern and Western churches. From the regions that now form the Republic of Estonia, bands of pirates penetrated into Sweden and destroyed Sigtuna, an early capital. Mostly, however, it was Finland, the buffer territory, that became battle-scarred.

#### VALAMO, RELIC OF OLD RUSSIA

Valamo is a strangely alien institution in the Finland of today, since its traditions are wholly Russian. On a cluster of islands in the northern part of Lake Ladoga stands this venerable monastery of the Greek Catholic faith.

As I remember my first impression of it when we came by steamer from Sortavala, at a distance the contrasting blues and greens and henna and gold of turrets and roofs suggested something breath-taking, like a Persian miniature enlarged and set in a landscape of groves encircled by blue waters. The cupolas were a brilliant blue topped with gold. Here and there came a glimpse of brick walls, vivid and warm, a coloring peculiar to the products from the kilns and brickmakers on the islands.

At the docks and in the grounds the monks move slowly, somber figures in their

long robes of rusty black. Their hair must never be cut, and they wear it in long curls down their backs. It has a soft chestnut coloring and yet there is a suggestion of venerable age. Though the monks smile cheerfully, underneath the routine of life there is an atmosphere of gloom.

From the Soviets can come no novices, and though there are a few Greek Orthodox congregations in Finland, the surviving monks of the old order oppose taking new members from what is to them an alien populace. So thousand-year-old Valamo, I was told, is dying.

The monk who took us for a drive in the two-wheeled drosky complained because the good old days were no more and because the breed of horses was deteriorating.

Through the night the multitudinous bells call the monks to Mass. All around are the workshops where the monks practice the trades and crafts that keep the place going.

It was interesting to see the suite of rooms that Tsar Alexander I occupied when he visited Valamo in 1819 and where Alexander II lived when he came in 1858. Compared with the austere cells elsewhere, they have an impressive elegance. They seem to stand waiting, listening for the old benefactors to return.

It was Alexander I who became the Grand Duke in 1809 when Finland was lost by Sweden and passed under Russian control. Later came the gentle Alexander II, who was immensely popular, and even today in tribute to his memory fresh flowers are often laid at the foot of his statue which stands in the Big Square in Helsinki.

#### FINLAND'S FIGHT FOR FREEDOM BEGINS

A change for the worse came in 1894 when Tsar Nicholas II ascended the throne. Four years later the new Governor General, Nikolaj Ivanovitj Bobrikov, addressed the Senate and pledged the Finns sternly to loyal support and love of their common fatherland—Russia.

On that day a storm began to gather. Early in 1899 came a manifesto designed to deprive Finland of its constitutional rights. And now begins a dramatic and stirring era of passive resistance, exercised by a whole people united by a common cause.

Much had happened beforehand to pave the way. Out of Sweden's ineffectual resistance to Russia early in the century had come the blazing conviction of the poet,



Photograph by Dorothy R. Swift

EVEN ICE CREAM WAGONS ARE CONTROLLED BY A CO-OPERATIVE ASSOCIATION

Busy stands such as this at the edge of the Helsinki market place, beside South Harbor, became a new branch of co-operative enterprise two years ago. It was then that Valio, the association which handles 90 per cent of Finland's butter and half of its cheese exports, went into the ice cream business. "Co-ops" enter importantly into nearly all phases of Finnish life (page 514).

Johan Ludvig Runeberg, writing in Swedish, who used that warfare as matter for his verse and immortalized for Finland and also Sweden some of the heroes who had died.

His anthem, "Vårt Land" (Our Land) tells of poverty, of hardship, yet with all this of a surging love.

Elias Lönnrot had spent many years in the eastern province of Karjala, and the folklore and legend he gathered resolved itself into the great national epic *Kalevala*.

In time Akseli Gallén-Kallela came to use it, and his many superb canvases and murals are brilliant pictorial representations of these *Kalevala* motifs. Jean Sibelius was only twenty-six when his *Kullervo*, growing out of these same myths, was first played

amid tremendous enthusiasm in 1892.

The day, in this running narrative of events, is February 15, 1899, and Governor General Bobrikov has just returned from St. Petersburg (Leningrad) with the ominous manifesto that in its workings threatened to deprive Finland of all the rights of its Constitution.

The consternation is great, but it is only a few days before the residents of the capital gather for a mass meeting. They decide to appeal to the Tsar in a formal petition containing the signatures of hundreds of thousands to be presented to him in person by a delegation of 500 men of Finland.

PAUL REVERES ON SKIS

It was a gigantic undertaking. The petition had to be written and distributed by



Photograph by P. J. Bögelund

SMUDGE FIRES PROTECT FINNISH CATTLE FROM INSECTS IN SUMMER

Milk is the nectar on which Finland's runners thrive. Nurmi's diet, while he was in training, consisted principally of milk, vegetables, and hardtack (*knäckebröd* in Swedish).

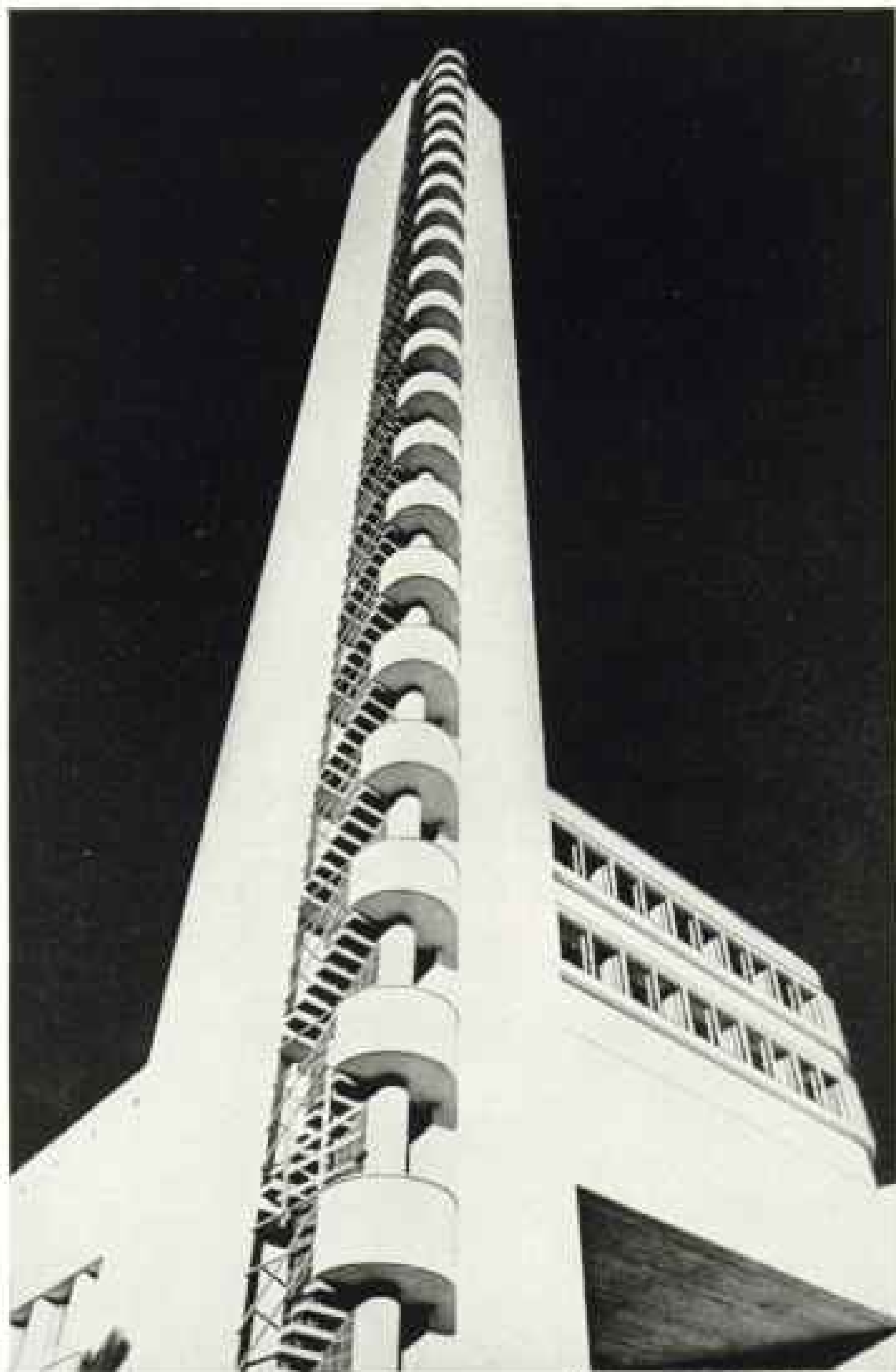


© Suomen-Markat by Aarne Pietsinen

THE "SAUNA," OR FINNISH STEAM BATH, IS A NATIONAL INSTITUTION

Every farm has its bathhouse, usually built of logs (page 531). Within is a wooden gallery and a fire hold of field stone. When the stones are very hot, cold water is dashed upon them and clouds of vapor rise. The bathers sit or lie on the gallery, amid the rising steam, and are laved in rivulets of perspiration. As the steam subsides, the bathers beat themselves with birch twigs until their skins glow. Then they plunge into a lake in summer, or roll in snow in winter.





Photograph by Aarne Piirtinen

ATOP HELSINKI'S NEW STADIUM TOWER PERCHES A RADIO STATION TO BROADCAST NEW OLYMPIC RECORDS

Modern to its very tip is the imposing structure within which the 1940 Olympic Games will be held (page 531). Radio transmitters will flash the progress of international track and field competition to all the world from this vantage point in the sky. Press representatives will view the events from the tower's lofty boxes.

hand, for espionage forbade the use of the telegraph, post office, and printing press.

By couriers even to the farthest outposts, the news of Finland's great need was made known. Over glistening February and March snows and ice-locked waterways sped swift ski runners. Villagers sent word to more remote neighbors, and local

messengers took up the cause so that the plea could penetrate Arctic regions.

In the Helsinki archipelago a thousand names were picked up by young students—skaters and athletes who had formed themselves into a flying squadron.

Within one week, over a total territory of some 150,000 square miles, largely wilderness, out of a population of two and a half million, a list containing the names of almost 523,000 men and women had been drawn up. It was all done so quietly that Bobrikov had no idea of what was happening.

Even the plan to send the five hundred to St. Petersburg materialized. After the train had left the station, filled with tense and loyal supporters of the departing delegation, the Governor General learned about it and telegraphed the Tsar.

The Tsar refused to receive the delegation. But, though they had failed to get an audience from the one person they were seeking, they had captured the attention and the good will of some of the

foremost men in twelve countries of Europe.

By June a list had been drawn up in all these countries, and among the 1,050 signatures were scores of famous names. Eight were selected and six journeyed to St. Petersburg to plead for Finland. And the Tsar, of course, refused to receive them.

At a concert in April, 1899, the First



Photograph by Dorothy R. Swift

BLOND TRESSES BOB AS GIRL LUMBERJACKS KEEP THE LOGS FLOATING ALONG

Defly the feminine "log rollers" balance themselves on the drifting spruce and pine, moving in slow currents near Vuajakoski. Here, at the head of Lake Päijänne (Plate VII and page 507) enormous rafts are made up and floated the full length of the lake to the mills. Girls pilot the timber only in these quiet waters, giving way to men in the rushing streams and swift rapids.

Symphony by Jean Sibelius was received with tremendous enthusiasm and by many interpreted as an expression of the surging nationalism.

MUSIC HELPS FREE A NATION

Then came the music to the *Song of the Athenians* and *Finlandia*. With the latter's beauty, tumult, and haunting resistance, it made known to the whole world the story of Finland's determination to triumph over tyranny.

Events gain momentum. An Activist Party springs up and sets out to work with the revolutionist groups in Russia. The unexpected happens: on a sunlit day in June, 1904, a young zealot, Eugen Schauman, walks out on the steps of the Senate House in Helsinki face to face with Bobrikov, shooting him and then himself, so giving a life for the life he had taken. Today Schauman rests in a patriot's grave in Borgå (Porvoo), near the capital.

In 1905 came an ominous threat for the Tsar in a universal strike of a week's duration. And in 1917, out of the ravages of the Russian Revolution and the ashes of

the World War, stepped a free and independent Finland.

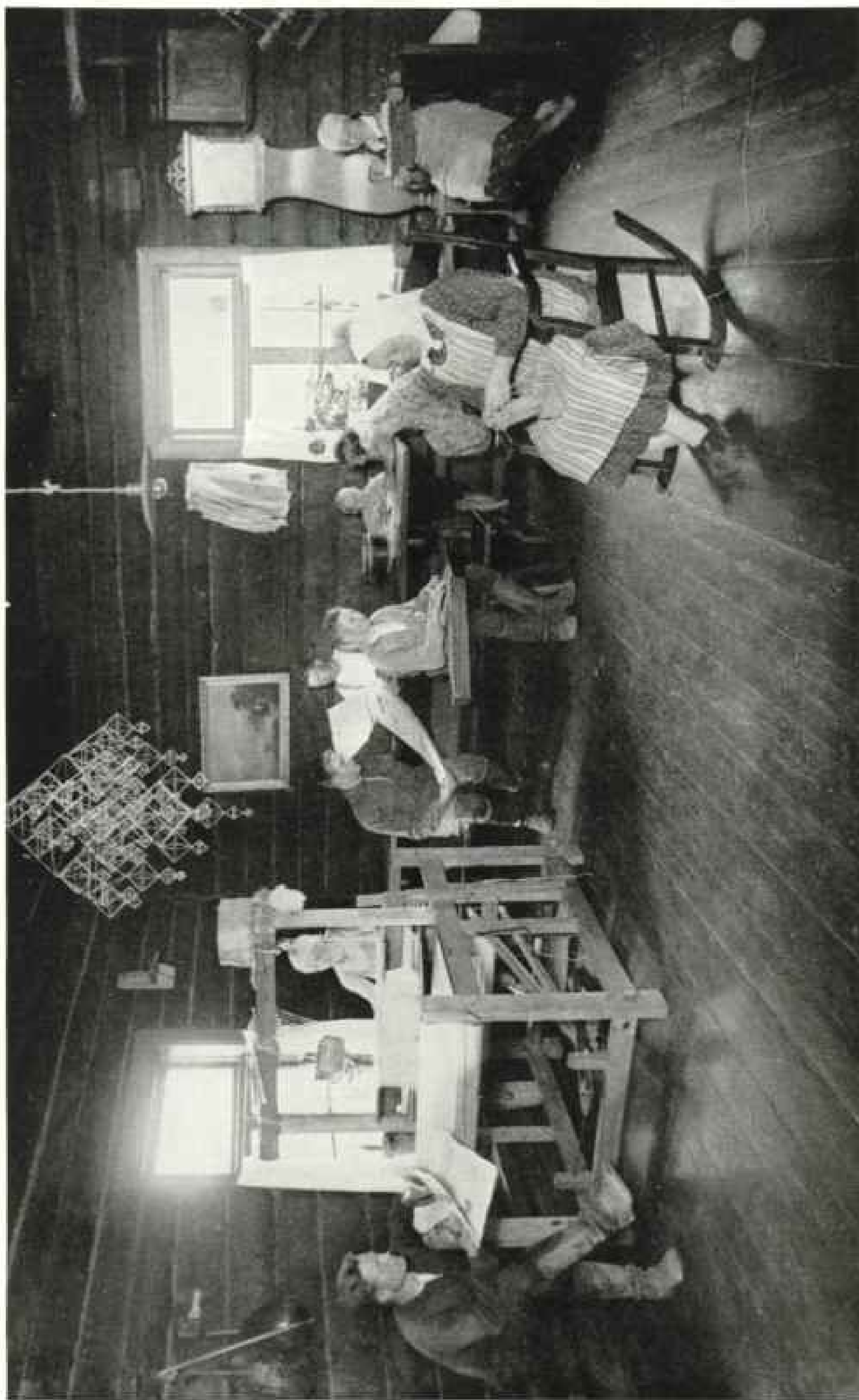
But before the fruits of freedom could be enjoyed, there came a split between White and Red. Martial aid came on the one hand from Germany and on the other from Russia. It took a civil war, with months of bloodshed and terror, before the White Armies triumphed over the Red.

ARCHITECTURE FULL OF LIFE

In the living Finland of today there is arresting, monumental achievement. On an eminence in Helsinki stands the new Parliament Building, with its colonnaded front, by the architect J. S. Sirén (page 509).

Elsewhere in apartment and office buildings the modern or functional style of architecture prevails. To an earlier period belongs the outstanding name of Eliel Saarinen, who has lived in America for more than a decade and now is the head of Cranbrook Academy of Art near Detroit.

For the railway station in Helsinki he effected a brilliant stylization, through simplicity and strength, of the two features, the lofty tower and the wide-spreading arched



© Suomalais-Matkat by Anttoni Pietikäinen

EVENING HOURS IN A FINNISH FARMHOUSE—READING, WEAVING, AND KNITTING TO THE MINOR TONES OF THE "KANTELE"

Saltly the boy in the center strums the traditional stringed instrument (page 523) he holds across his knees. Mother operates the loom and grandmother fashions a sock, while one daughter amuses the young boy. Four members of this Pudasjoki farm family are reading, typical of the zealous Finnish quest for knowledge. The fragile, woven, weblike *hönnemäki* suspended from the ceiling, put there at Christmas time, is made of wisps of straw, sewn together with bits of colored twine.



© Noodin from Echo

**SOLDIERING CAN WAIT FOR A PRETTY GIRL AND A CUP OF COFFEE!**

Young men voluntarily enlist in the Civic Guard, supplement to Finland's Regular Army. The Lotta Svärd Auxiliary, made up of girls of good families, operates the Corps canteen service (page 514). It is named after a woman army sutler, heroine of Runeberg's poem, *Tales of Eriqen Ståhl*.



Photograph by Gustav Heurilin

**GIRLS COLLECT THE FARES ON HELSINKI TROLLEYS**

More women than men are found in tellers' cages in Finland's banks. Feminine invasion of the building trades started more than a score of years ago and girl bricklayers and hod carriers work on the new buildings (page 514). Women also have won distinction in creative work, especially in writing and painting.





Photograph by Gunnar Heurlin

YOUTH DONS MEDIEVAL GARB IN VIIPURI'S ROUND TOWER

Finnish maids attired in period costumes wait upon diners in the restaurant on the top floor of the old structure. The tower is the only remaining part of the girdle of walls and turrets that once fortified the town. In such historic surroundings meals are served to the accompaniment of a jazz orchestra.

entrance, that prevail in the architectural landscapes of eastern Finland (page 503). The tower, once identified with fortress or castle, has a true function in a country like this, with practically no natural elevations to produce altitude. And the other feature, the widely accentuated entrance, is really a heritage of the hospitable countrysides.

A vague mysticism noticeable in Saarinen's work reappears in other Finnish art. In modern literature, for instance, there is a shift from the realism of a novel like *Seven Brothers*, by Aleksis Kivi, to transcendence

and idealism. In work by Jarl Hemmer or F. E. Sillanpää, it is often man's aspiration, the spiritual quality of humble endeavor never fully expressed, which is portrayed.

In stories by Sillanpää, who seems to be the Nation's popular choice for a future Nobel prize in literature, the atmosphere is ethereal, haunting, and hard to translate. With her one novel *Katrina*, the young writer Sally Salminen has given the Ahvenanmaa (Åland) Islands a place in modern literature.

Or, taking the world of music, we find that same mystical quality of light and radiance, even triumph, in such compositions by Sibelius as the Second Symphony, or the Third with its increasing clarity. Since he has retreated to his home in Järvenpää, a little north of Helsinki, his sweep of deep originality grows more pronounced.

The compositions of this reticent, recluse composer have won first place in popular request programs of

American orchestras, and several of his songs were sung by the Helsinki Male Chorus on their recent visit to the United States.

There has been mostly French influence in painting and sculpture up to the turn of the century, but a transition and new national conviction begin to show in the later work of Albert Edelfelt, who painted native countrysides populated usually by the simple-hearted peasants.

Both in smaller canvases and in his murals, Gallén-Kallela excels in his pic-

torial versions of the *Kalevala* myths. A vogue for newer realism comes in the work of Magnus Enckell, Tyko Sallinen, Pekka Halonen, Juho Rissanen, Marcus Collin.

#### "THE PHANTOM FINN" IN BRONZE

The sculpture of Walter Runeberg and Ville Vallgren betrays foreign influence, French or classical, but the newer note comes in the powerful statues by Väinö Aaltonen. The Finnish monument unveiled at Crozer Park, Chester, Pennsylvania, on June 29, 1938, at the tercentenary celebration of the landing of the first Finnish settlers in America, is his work, and he is also well represented in his bronze figure of Paavo Nurmi, the long-distance runner, once international champion, which has prominence of place in the Athenaeum, the main art gallery in Helsinki (page 500).

That work of art symbolizes all the attention the Finns as a race have given to the development of strength and liveness.

At the Olympic Games of 1912, Finland emerged in the field of athletics. Now the Nation is preparing to be host at the 1940 games, awarded to Japan but transferred to the Finns when Tokyo asked to be relieved of the responsibility.

#### NEW STADIUM FOR OLYMPICS

The new stadium in Helsinki, designed by Jäntti and Lindgren, is virtually completed, but changes in its construction have been started, to increase the seating capacity to 50,000 for the great event (p. 526).



Photograph by Dorothy R. Swift

#### LITTLE PIGS NOW GO TO MARKET IN FINLAND

In recent years home-raised shoats have become numerous on farms. In earlier days they were almost unknown in many parts of the country. This lively porker is a center of interest at the annual fall market in Joensuu, commercial hub of northern Karjala (page 513).

Fleet Finns who will compete there against the pick of the world's track and field athletes will have high tradition to maintain. Not only Nurmi, but Hannes Kolehmainen, Albin Stenroos, Ville Ritola, Volmari Iso-Hollo, and Gunnar Höckert, other great distance runners; Matti Järvinen, champion javelin thrower; E. R. Lehtonen, Pentathlon victor in the 1920 Olympics, and other stalwarts are recorded in any list of athletic records (page 508).

The Finns trace their physical vigor and endurance to an institution peculiar to the country—the native *sauna*, or Finnish steam



Photograph from Durien Leigh and Black Star.

#### REINDEER AND SLEIGH PENETRATE THE SNOWBOUND, TRACKLESS NORTH

Vast stretches across Lapland to the Arctic Ocean have no motor roads. Horses cannot break through the deep snows. Clad in cap, coat, puttees and moccasins of reindeer fur, the Lapp traveler and his antlered steed can traverse the long white path from Rovaniemi to Linnahamari, 330 miles, in less than five days and nights.

bath (page 525). No outsider should attempt to describe it. They themselves will joke when assuring you how this sauna works miracles.

The zest for running is not confined to selected persons or occasions. Though this happened long ago, I cannot resist the temptation to tell it. A group of Finnish singers was touring Stockholm. They had asked no special favors, even when they drove by bus past the new Concert Hall or the Royal Opera in the Swedish capital, but when they reached the Stadium they wanted to stop to see it from the inside.

The driver set out to find the gateman. Meanwhile, one of the entrances, it seemed, had not been closed securely. The Finns entered and set out on a run.

When the astonished driver and more astonished gatekeeper arrived, the young men were already at the opposite end of the running track!

But all this mock levity must not be misunderstood. Out in the country it has happened that a family has built its sauna first and lived in it until the home proper was ready. In cities the modern sauna is

equipped with comforts and modern appurtenances, and visitors also indulge in the bath with considerable pleasure.

#### STEAM BATH ENDS WITH A PLUNGE IN THE SNOW

In the more primitive type, a kiln built of rough stones occupies the greater part of one end of the main room and a gallery for the bathers the other. Before they arrive (the word is always plural and the gender may be common, for this sort of bath is a community matter that often takes little regard for differences of sex), the fire is started. Blackened walls reveal that there is no chimney, as the smoke escapes the best it can through a small hole in the ceiling.

As the bathers take their places in the little gallery, the steam begins to rise, for the attendant has commenced to throw cold water on the heated stones. She passes from one to another in the gallery and with fragrant birch whisks whips up their circulation and sets their blood tingling as the brisk blows strike the sensitive skin.

The whole ritual ends, in winter, if the



Photograph by Gustav Heurlin

TODAY CHILDREN BESIEGE GLOOMY OLAF'S CASTLE, MEDIEVAL SWEDISH FORTRESS

Stones for building the island frontier barrier to check the Russians were ferried across Kyrönsalmi Strait at Savonlinna 463 years ago under fire of the enemy. Because it dominated the channel, the fort was the scene of battles for 300 years. So swift is the current in the strait that this best preserved of old Finnish castles, now demilitarized, is never icebound.

bather is intrepid enough, by his running out and rolling in the snow.

FROM SLEIGH TO SAILING SHIPS

The extremes of Finland's territory produce striking contrasts. In the southeast is the Karjala that has enriched national life with the *Kalevala* myths and the bewitching folk songs and music in minor strain. Along the west coast the population has been prevailingly Swedish. The Åland Islands, which the League of Nations assigned to Finland following the World War, still retain the Swedish language and the old customs.\*

Far to the north is the Finnish section of Lapland, with a population of some 2,000 Lapps, part of a group which stretches into Sweden and Norway and also into the Kola Peninsula. Very few of the Finnish Lapps are still nomadic. Nearly all of them now live in log cabins, with a potato patch and a cow or two. Much of their wealth is in reindeer herds, though some live also by hunting and fishing (page 507).

With increasing holiday traffic, now that the route down from the North Cape to

Kirkenes in Norway and to Petsamo in Finland is becoming a main-traveled sea lane in summer, they grow used to alien intruders and are very friendly.

COFFEE AND CAKES IN LAPLAND

Some years ago when a member of the Finland Tourist Association came up here to open trails and plan for touring stations or hotels, he tactfully called not on one but on all the Lapp families in a village. The day began by his being asked to partake of coffee and cakes, and it continued the same way until by evening he found that twenty-seven times in the course of his calls he had been invited to drink coffee!

Modern Finland faces westward. The five countries of the north—Finland, Sweden, Denmark, Norway, and Iceland—are trying to break down border and trade and customs barriers, to codify their laws, to emphasize cultural likeness in ideals. And this they are doing without sacrifice of the charm of national distinctions.

\* See "Where the Sailing Ship Survives," by A. J. Villiers, NATIONAL GEOGRAPHIC MAGAZINE, January, 1935.





© Donald McLeish

ROME'S OLDEST BRIDGE LEADS TO THE SHIP-SHAPED "ISLE OF THE TIBER"

Built in 62 B. C., the Ponte Fabricio crosses to Tiberina, anciently surrounded with a stone bulwark giving it the appearance of a ship. Blocks under the mortgage of the square-towered Church of San Bartolomeo used to form the "prow." An obelisk represented the "mast" of the island that, in antiquity, was sacred to Aesculapius, god of medicine and healing. Three centuries before Christ, according to the story, a snake of Aesculapius was brought to Rome to allay a plague. Upon arrival, the serpent promptly swam to the island.

# AUGUSTUS—EMPEROR AND ARCHITECT

Two Thousand Years Ago Was Born the Physically Frail But Spiritually Great Roman Who Became the Master of His World

BY W. COLEMAN NEVILS, S. J., D. D., PH.D.

WE ALL possess a certain admiration of him who overcomes difficulty; there is unmistakable delight in Nature's paradoxes, and in all contests greatest applause is given when weakness downs strength or the seemingly impossible is accomplished.

Perhaps it is all due to our eagerness to see the unexpected; better still, we may owe it to a higher emotion, our brotherly sympathy, which enjoys another's triumph over failure.

These months of 1938 are commemorating the 2,000th anniversary of the birth of a man who started the battle of life with almost everything against him, but who in the end achieved a prolonged, unparalleled victory (page 549).

At the early age of nineteen he was hurled into the most appalling maelstrom of civic, political, and military confusion, and yet in a comparatively short time he drew order out of chaos, scattered peace among war-worn nations, and created calm at home and abroad where storms had been most lowering. And all this was done during a lifetime of constant ill health.

## WEAK OF BODY, STRONG OF SPIRIT

Frail of frame, he was subject to fever and most sensitive to climatic changes, a prey of stomach and kidney disorders which at any moment might have proved fatal; yet for forty-four years he successfully ruled the ancient world's greatest empire up to that time, and laid the foundations of a sovereignty which was to last more than four hundred years (pages 538 and 541).

He began his public career a mere youth against the opposition of practically all the middle-aged and older leaders of civil, political, and military life. He was not of the recognized aristocracy, yet he became the acknowledged master of the blue bloods of Rome. Originally known simply as Gaius Octavius and later as Octavian, he won from the Roman Senate a name almost of reverence—Augustus.

He was small of stature, about five feet seven inches in height; his rather delicate, almost girlish appearance, blue eyes, curly brown hair, mild expression, and tender voice would ordinarily have repelled the rough and ready Roman who boasted of his big frame and sturdy endurance.

## JULIUS CAESAR CHOOSES AN HEIR

Two thousand years ago, September 23d, in the sixty-third year before our Christian Era, was born a son to Gaius Octavius by his wife Atia. The mother of this predestined boy was the daughter of Julia, the sister of the greatest of Romans, Julius Caesar; the father belonged to a municipal family of the Volscian town of Velletri.

It was not until 46 B. C. that the conquering dictator made acquaintance with his grandnephew; but then, with all the keenness with which he was so highly endowed, he saw at once possibilities in this young man of seventeen years. The following year he sent him to Apollonia in Epirus to begin his military career, and, secretly altering his will, adopted Octavius as his son, though the young man himself was not apprised of this.

At the news of the assassination of Caesar on the ides of March, 44 B. C., Octavius left Greece and presented himself in Rome, with no definite reason for believing that he would be called upon to assume his grand-uncle's political heritage; he was shrewd enough to suspect that he might have been remembered in the will, and he wished, if so, to watch his own interests at home.

On discovering that he was Julius Caesar's chief heir, and that he had even been adopted as his son, he most wisely, as well as fitly, took the name Gaius Julius Caesar Octavianus.

That "vilest of men," Mark Antony, whose pre-obituary notice was written by Cicero in his famous Second Philippic, and who is so well known to us in two of Shakespeare's great Roman tragedies, was the executor of Caesar's will.

Mark Antony was a giant in many ways



Photograph by Bernard F. Rogers, Jr.

AFTER 2,000 YEARS THE TWINS WERE REUNITED WITH THEIR LEGENDARY  
FOSTER MOTHER

Etruscan craftsmen of the 5th century B. C. fashioned the bronze Capitoline She-Wolf. Not until about 1500 A. D. were the cherubic Romulus and Remus added to illustrate the tradition that Rome's founder and his twin brother were suckled by such an animal. The treasured group is the central exhibit of one hall in the Palace of the Conservators, on Capitoline Hill.

when compared with Octavius, but he lacked the very thing which was to be the latter's greatest strength—moral stability. He was gross, not knowing even the elements of culture, generally in debt and always in debauchery, a blustering bully, the antithesis of the delicate and somewhat fastidious Octavius.

STRIPLING VERSUS BLUSTERING GIANT

Yet he wielded real power. His prepossessing and magnificent stature, his good-fellowship and marked ability for leadership made him readily popular, and rather appealing to the Roman soldiery.

Octavius was keen enough to see that he must act cautiously as well as firmly toward this popular giant who was already squandering his rightful inheritance; nor was he hesitant as to the necessity of making a strong first impression on Mark Antony.

The young Octavian, as he then began to be known, went to Antony and immediately claimed his share of the estate; the latter tried to put off the youthful suitor

by a rude and boisterous refusal. He soon discovered he was dealing with a man of many parts, whose character was resolute and persistent.

The Julian heir had been received with enthusiasm by the troops upon his landing in Italy, and, with his soul-stirring name through adoption, it was clear from the start that he was not to be trifled with. He was keen enough to see how effective was the magic of his new title, how appealing it was to Caesar's old soldiers, who had already resented Mark Antony's initial indulgence toward Caesar's assassins.

This was the beginning of an epoch-making duel. However, since some of Caesar's former officers felt—and many of the army shared their view—that it would not be to their interest if Caesar's adopted son and the powerful Mark Antony were to come to blows, the feud was temporarily in abeyance.

The war waged by Antony and Octavian against the conspirators who had murdered Caesar on the ides of March has been made

familiar to us through Shakespeare's Roman masterpiece, *Julius Caesar*.

The year 36 B. C. marked the turning point in Octavian's upward career; it also marked the first stage of Antony's downfall. An Egyptian woman enters the scene—and here too we find the most dramatic portrayal in Shakespeare's tragedy *Antony and Cleopatra*.

The Battle of Actium in 31 B. C., between the forces of Antony and Cleopatra and those of Octavian, is one of the decisive battles of the world's history—not because in itself it was a notable military or naval victory, but because it marked a complete change in the Roman world, in men's minds, and in the ways of government. From then on, the life of Octavian was one series of victories in practically every field of statesmanship.

The secret of Augustus' success seems to have been his profound grasp of the practical, with his remarkable patience, pertinacity, and penchant for making capital of an opponent's liabilities.

In the choice of collaborators he was most happy as well as skillful, and those who served under him, for all their superior ability in a particular field, were ever willing to let him remain the master and chief executive.

Agrippa, his exact contemporary, was a born soldier and organizer, while Maecenas, his elder by a few years, was equally successful as a diplomat and promoter of the arts.



Photograph courtesy Royal Italian Embassy

**SYMBOLS OF PEACE AND TRIUMPH ADORN "THE AUGUST ONE"**

Excavators found this splendid statue among the ruins of the villa of the Emperor's wife, Livia, near Prima Porta. The central figures on the breastplate represent the recovery of the standards previously captured from Crassus by the Parthians. Above appears Jupiter with the chariot of the sun. Reclining below, the earth-goddess holds the horn of plenty, emblem of abundance. A bronze copy of this sculpture stands beside the Road of the Empire (page 541).

He pursued with urgency the great building scheme of Julius Caesar, and repaired the dilapidated temples which civil wars had neglected and in many cases ruined.

Large sums of his own private revenue he applied to reconstruction, to the completion of Caesar's unfinished buildings and to new public works. He encouraged his chief military officers to devote their share of the war booty to the adornment of the city.

He laid out a new Forum which bears his name—it is said he bought the ground





Drawn by Ralph E. McAtee

#### ROMANS KNEW THE MEDITERRANEAN AS "OUR SEA"

Under Augustus, the Roman Empire (area indicated by ruling over the modern map) almost encircled "Mare Nostrum." From its shores, Roman control reached back to include practically all of northernmost Africa, present-day Palestine, the Levant States, and most of Turkey, all of Spain and France. The Rhine and the Danube formed the northern boundaries in central Europe. Chief among Augustus' provincial reforms was the establishment of a line of strong "buffer states" on the north, from the Black Sea to the North Sea, as protection against threatening barbarian hordes.

space at the rate of \$2,500 a square foot in present-day value. He also used the vacant land in the Campus Martius for other new constructions (pages 543, 545).

No doubt he felt he had reared them all to last till the end of time.

#### MONUMENTS NOT OF MARBLE

However, it is no exaggeration to say that the greatest and most lasting monuments to Augustus have been reared by the two great Latin poets, Horace and Vergil.\*

It is in the first six odes of his third book that Horace reaches the sublime;

\* See "The Perennial Geographer (Vergil)" and "Horace—Classic Poet of the Countryside," both by Dr. Nevils, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1930, and December, 1935, respectively.

where he sings the praise of those cardinal Roman virtues which had made Rome great in the past, and to which the rising generation under Augustus should steadfastly cling to ensure the perpetuation of that greatness for the future: endurance and fidelity to a trust, steadfastness of purpose in a righteous cause, wisdom and deliberation in action, martial courage, reverence for the gods, for self, and for others.

But to no one did Augustus owe more than to the poet from Mantua. The complete change needed in men's minds and in the ways of government to preserve the Roman Empire, and the Mediterranean civilization with it, was brought about by Vergil, the greatest Roman poet, and by Augustus, the most fortunate and most

discerning of Roman statesmen—an empire that persisted for more than four centuries, a civilization which has been kept alive till our own day.

#### AUGUSTUS KNEW THE POWER OF PUBLICITY

First of all, he sought to train public opinion, and launched forth a patronage of men of letters never dreamed of by his predecessors and never equaled by those who inherited his power. He wished to veer the mental attitude of those worth while towards his own political plans.

He was quick to grasp the idea that he could make the acceptance of literature fashionable and popular, even though that same literature might be the purveyor of his pet schemes and his designs on posterity. Vergil should trace his Julian ancestry to the gods, and the highest respect should be given him as a somewhat divinely superior and reverend personage, though he was conservative enough to see the folly and futility of having divine honors bestowed upon him in life, as was ridiculously sought by most of his imperial successors.

It is in the greatest of Latin poems, of nearly 10,000 lines, the *Aeneid*, that with utmost skill and considerable plausibility, Vergil prophesies the glories of the godlike Julian gens which was to reach its zenith in the Golden Age of Augustus. Horace too, in most graceful lyrics and sublimest songs, treats the Emperor as divinely favored in birth and in destiny.

#### POETS SANG OF PEACE AND THE SOIL

Both Vergil and Horace utilized well the craving for peace which was felt by the Romans during the latter years of the First Triumvirate. Augustus had no yearning for war, and to no one were the delights of peace more delicious. While Horace sang of the charm of country life, in his felicitous odes, entertaining satires, and gentle epistles, Vergil chanted the pursuits of agriculture in his four books of the *Georgics* and his dozen or so of *Eclagues*, sometimes called *Bucolics*.

It was Vergil who encouraged a "back to the farms" movement, and with most picturesque and appealing language he attracted his readers to the delights of country life, the cultivation of the vine, the propagation of trees, the breeding of cattle, and even the rearing of bees.

All the while he is Rome's most vivid

and accurate geographer, an interpreter of Nature as seen in Italy, and this too from personal observation.

The waving wheat of Apulia, the busy bees of Calabria singing honey into combs, the luscious grapes of Falernia so sure to bring good cheer, and the seasoning oil of Venafrum—where, he asks, is there a land so full of plenty and so ravishingly beautiful, and who would not be eager to till such soil, so fertile, so charming, so gracious and grateful?

How he loves the two seas that wash her shores "above and below," and the lovely Lakes of Como and Garda. He delves deep into the land and discovers "within her veins streams of silver and copper and the flowing rivulets of plenteous gold." He calls Italy the land of vigorous manhood, "mighty mother of fruits, mighty mother of men."

While Vergil was carving in imperishable words a practical as well as a beautiful map for the farmer and attractive routes for the traveler, Horace was singing of the virtues of the mighty men of old whose lives had ever been held up as models of manliness. He not only "holds, as 'twere, the mirror up to nature, to show virtue her own feature"; he paints the prettiest of pictures of Italy's charms and from the Alban Hills sees the golden-red sunset scattering gems throughout the most precious land in all the world.

The writings of these two poets immediately enjoyed popularity and became school texts for the young. Vergil and Horace received the highest honors from Augustus and enjoyed his affection and admiration.

We are accustomed to speak of Octavius Caesar Augustus as the first Emperor, but it is not quite historical to do so, as the title "Imperator" had been bestowed by the Senate on his uncle, the great Julius, and in the same sense on Augustus; it merely meant that the chief military power of the state was invested in them, in a sense somewhat similar to our President's being the Commander-in-Chief of the Army and the Navy.

Before the days of Julius Caesar this title was originally for the holder of chief military command. In the days of the Republic it was a title of honor bestowed on a victorious general by acclamation of an army on the field of battle. After the time of Augustus the term came to acquire the meaning of "Emperor" and with this con-



Photograph from *Wide World*

#### AS ROME APPEARED IN THE "GOLDEN AGE OF AUGUSTUS"

A scale model, showing the grandeur of the Immortal City at the height of its power, was built for the Augustan Exhibition (page 549). The shrewd emperor-statesman found Rome a city of brick and left it a city of marble. In the foreground is the Theater of Pompey with the Circus of Flaminius beyond it. Beside the curving Tiber River (right) stands the Theater of Balbus and, above it, the Theater of Marcellus. In the left background appear the two summits of the Capitoline Hill with the great Temple of Jupiter and the Temple of Juno Moneta (left). The Circus Maximus occupies the upper right corner, while the Colosseum is just visible in the far left background.

notation it was added to the names of all his successors except Tiberius and Claudius.

Hence, in the full sense of an autocratic sovereign, the title was not used by the two greatest of the Caesars, Julius and Octavius, nor by their immediate successors. However, a title was conferred on Octavius Caesar which is at once the highest possible and the one whereby he is best known.

#### "THE AUGUST ONE"

It was in the year 27 B. C. that the Roman Senate bestowed on him the cognomen Augustus, and history has accepted this title, which carries with it a certain sacredness, declaring its holder consecrate and inviolate before gods and men. It is the sublimest and most majestic title ever conferred on mere man; it was suggestive

of the deification which followed, especially in the provinces and colonies.

To Augustus' credit is it recorded that he repudiated such follies. While he let the poets go as far as they liked in comparing him to the gods, he absolutely forbade formal worship. He aimed at a religious revival and sought to restore the official worshipings of the old-fashioned Romans—perhaps with as much faith as the French agnostic philosopher, Voltaire, who said: "If there were not a God we should have to invent one."

He recognized that the Latins crave some outward expression of their religious impulses; nor has the realization of this been lacking in present-day rulers of the land of Augustus. Whatever were Augustus' own religious convictions, he was a wise ruler.

Augustus' philosophy of life seems to



Photograph by Brannon De Cui

THE "MASTER OF ALL THINGS," SCEPTER IN HAND, FACES THE ROAD OF THE EMPIRE

By keeping his empire strong and united, Octavius Caesar Augustus preserved comparative peace for more than a half century. Virtually an emblem of the Roman state, the initials S.P.Q.R. (Senatus Populusque Romanus—the Senate and People of Rome) are still inscribed on monuments and buildings. Trajan's Column towers in the background above ruins of the Forum of Trajan. Trajan's figure originally was on top of the column, but long ago was replaced by that of St. Peter.

have been pragmatism; he was a realist of the first order. He would satisfy the natural longing for something higher and holier by honoring the ancient religion of Rome. He restored dilapidated shrines and temples and revived rites and ceremonies and festivals almost forgotten in a century of civil and military strife. He made worship a public duty and in all the great civic functions the gods of Rome were held in highest honor.

While the present structure of the Pantheon is due to its rebuilding by Emperor Hadrian, it is regarded as following the original plan of Marcus Agrippa, Augustus' most intimate friend and most valuable counselor, who in B. C. 27 reared it as a memorial to Augustus' victory over Mark Antony at Actium (page 544). It was dedicated to Jupiter the Avenger, to Mars and Venus, who were the tutelary deities of the Julian gens.

Theodosius the Great, toward the end of the fourth century, ordered the Pantheon closed as a pagan temple and in the year 609 Pope Boniface IV consecrated it as a Christian church. It is a triumph of architectural genius, with a majestic pillared portico 109 feet long and 45 feet deep; there are 16 monolith columns each 41 feet high. The diameter of the interior rotunda is 142 feet, crowned by an enormous dome of equal height. The pavement of granite and porphyry is particularly beautiful. A single round aperture in the ceiling, 28 feet in diameter, admits light and air, as there are no windows.

#### EMPIRE MAPPED IN MARBLE

Since 1878 the Pantheon has been used as a mausoleum of the kings of the House of Savoy. It is regarded as the most nearly perfect monument preserved from ancient Rome.

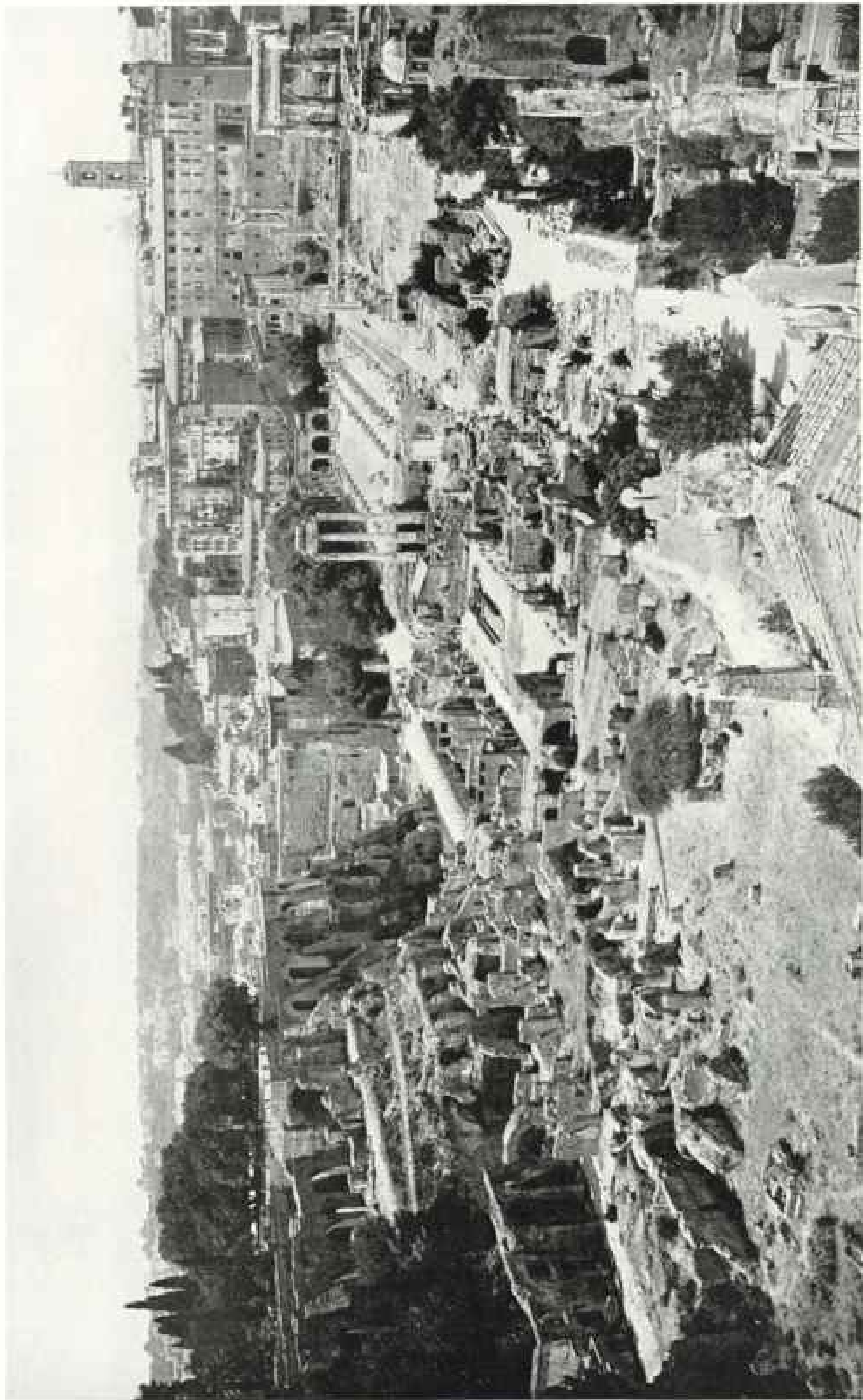




© Donald McLeish

**RAIN OR SHINE, THE VICTOR EMMANUEL MONUMENT ALWAYS GLEAMS IN FROSTY WHITENESS**

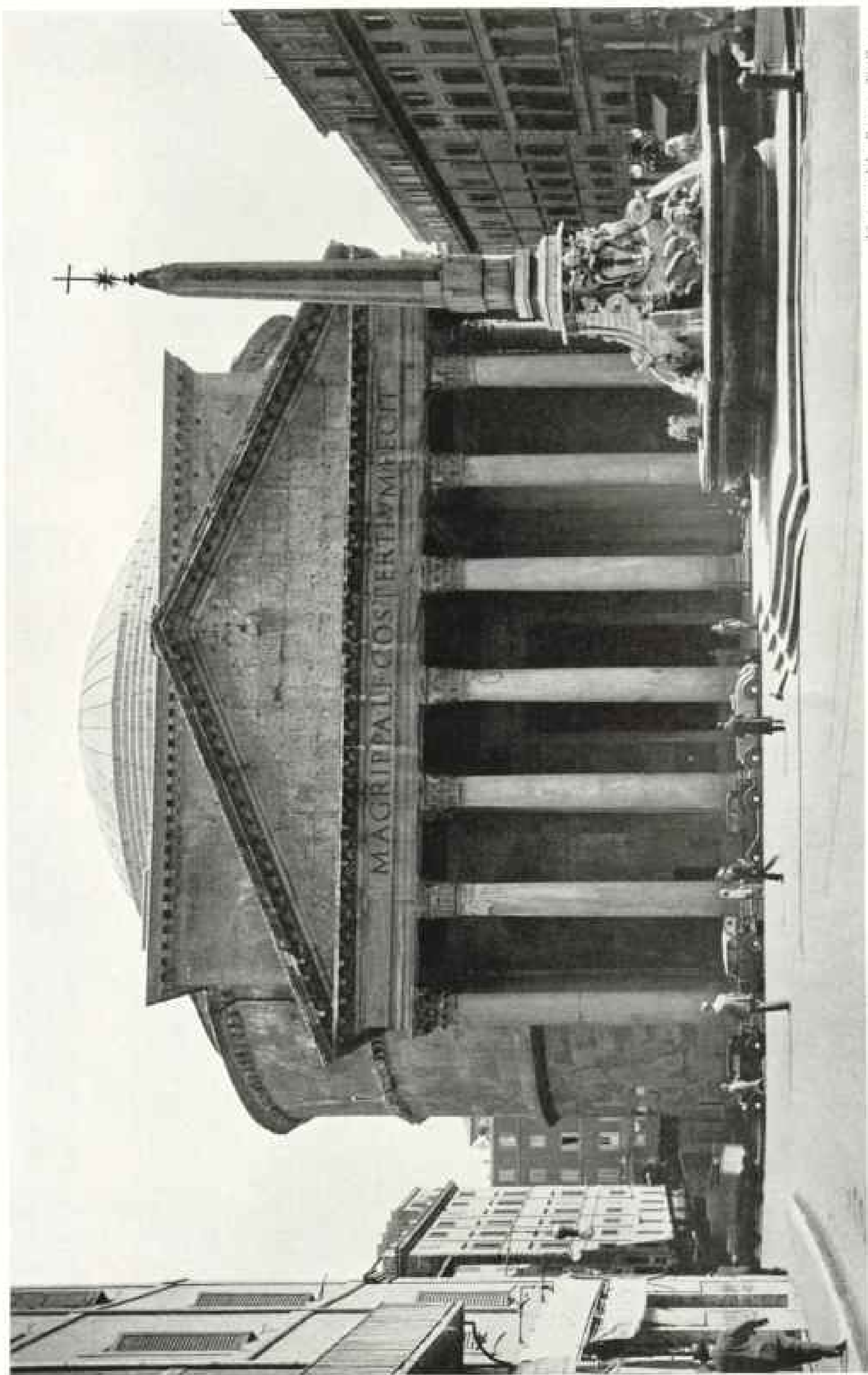
Parades and cheering throngs often crowd the broad Forum of the Fascist Empire below the colossal symbol of united Italy. A wealth of sculptured groups and reliefs in gilded bronzes and marble embellish the massive structure, built of a never-fading stone called *travertine*. Surmounting a lofty pedestal in the center is an equestrian statue of King Victor Emmanuel II. Below it are inscribed the remains of Italy's Unknown Soldier.



Photograph by LUCE from ENSTY

FROM THIS RUIN-STREWN PATCH OF GROUND, ROME FOR CENTURIES RULED THE WESTERN WORLD

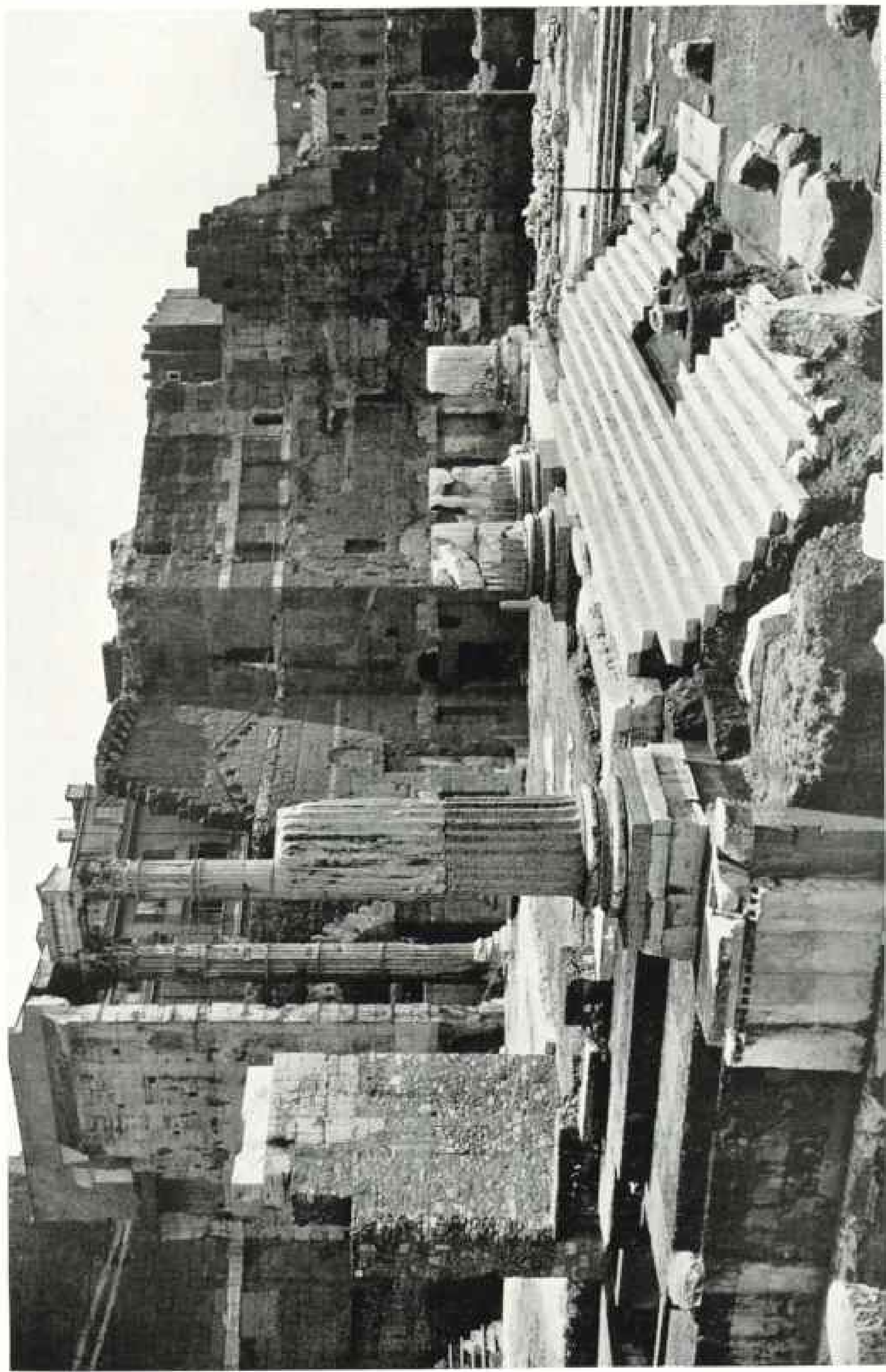
Reverently, Italian archeologists carry on the work of restoring and preserving the time-battered Roman Forum, built where a swamp once reared. The maze of shattered arches, temples, and basilicas includes parts of the structures of many centuries. At the left is the Palatine Hill where the Caesars lived. Beyond the three standing columns of the Temple of Castor and Pollux and ranked column bases of the Basilica Julia rises the Capitoline Hill. Iron bars help support statues.



Photograph by Bronson De Coo

MARCUS AGRIPPA REARED THE ORIGINAL PANTHEON TO COMMEMORATE THE DEFEAT OF ANTONY AND CLEOPATRA

Perhaps the most nearly perfect monument preserved from ancient Rome, the superb domed structure was built on foundations of an earlier temple erected by Augustus' son-in-law and trusted counselor to celebrate the Emperor's naval triumph over the fleets of Mark Antony and "the serpent of old Nile," Hadrian remodeled and enlarged the building. Within are the tombs of Victor Emmanuel II and Umberto I, father of the present King of Italy (pages 535 and 541).



Photograph by Bismarck De Cou

TO CELEBRATE THE CRUSHING OF BRUTUS AND CASSIUS, AUGUSTUS DEDICATED A TEMPLE TO "MARS THE AVENGER"

Of the majestic colonnade that once formed three sides of the temple, only three columns still stand. Two are visible.





© Donald McLeish

#### MODERN ROMANS STUDY AUGUSTUS' EMPIRE.

The Italian Government has erected four marble maps on a wall of the Basilica of Constantine and Maxentius to portray the growth of the ancient empire from a dot in central Italy to its greatest extent under Trajan (page 538). This chart, the third, shows in white the area of Roman territory at the height of Augustus' power. In 1936 a fifth tablet was added to show the present extent of the Italian domain.

We have said that Augustus was especially fortunate in possessing so fully the cooperation of Marcus Agrippa. While Maecenas was securing monuments "more lasting than bronze" in the literary products of Horace and Vergil, the ever-practical, efficient Agrippa by his engineering skill was equally valuable in rearing memorials in stone.

It was Agrippa who planned a survey of the Roman world and engraved in marble a map of these vast dominions with an appropriate commentary and notes; this was the inspiration and mainstay of all future

Roman geographers. The engraved map was made a permanent exhibit and open to the public.

However, this map and others, on parchment, were mainly for practical utility in administration—civil, military, and commercial. From the very few preservations, they seem to have somewhat resembled our road maps for automobiles, giving distances between stations and marking accessible roads. The Greeks and Egyptians had preceded with methods more scientific and in spite of many blunders were more helpful to subsequent cartographers.

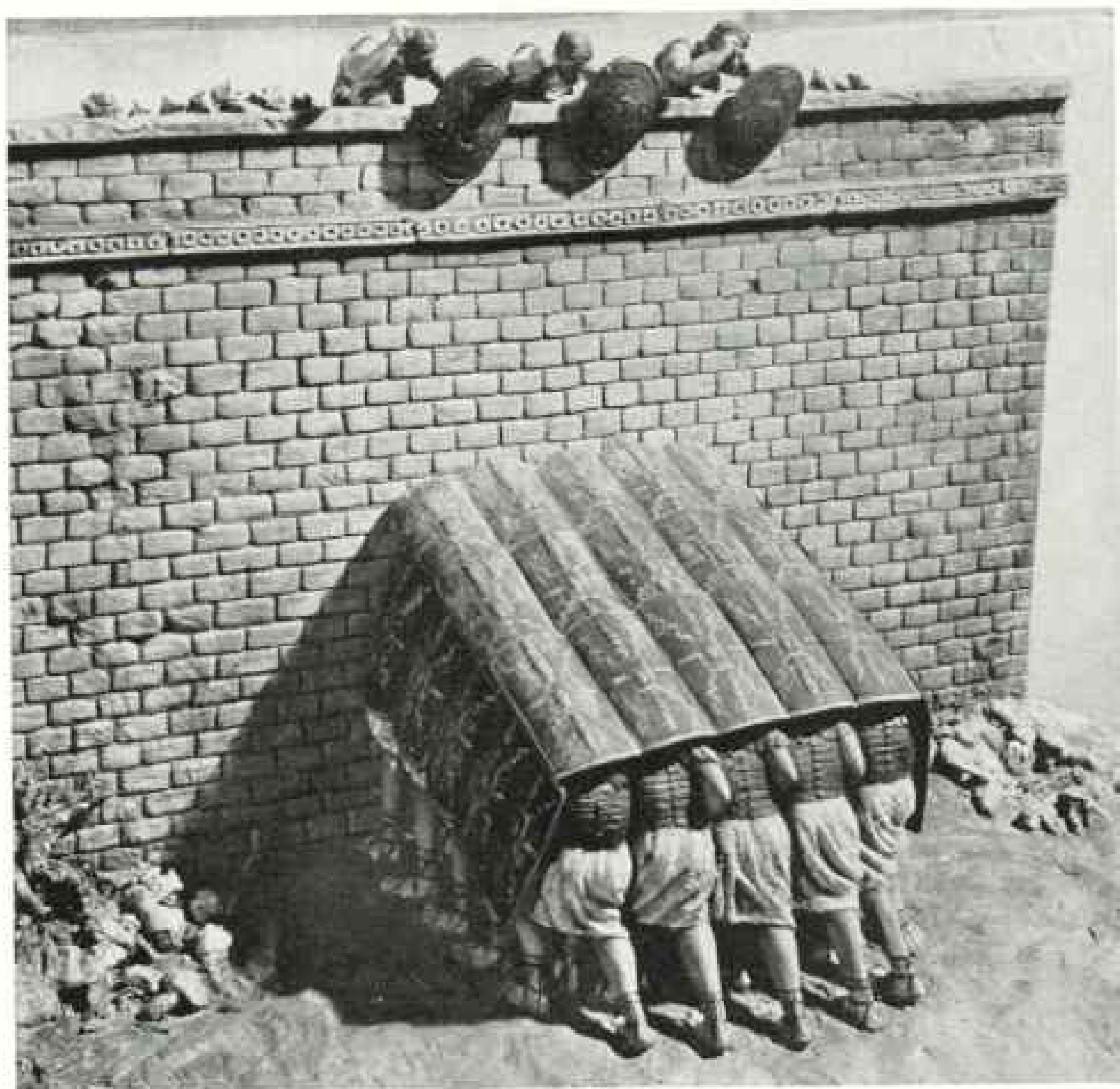
We are familiar with the wonderful fountains of modern Rome\*; however, it was Augustus' friend Agrippa who constructed more than a hundred fountains, and even a greater number of reservoirs with several hundred water-supply stations.

In his reorganization of the government Augustus had a much easier task with

the *populares*, or people's party, than he did with the *optimates*, or aristocracy. According to Suetonius, it was Augustus' ambition to be the originator of the best possible government and one that would last. How well he achieved this is written large in the annals of the four hundred years that followed his death.

A vast task lay before him, for his Empire extended from the Levant States to the Atlantic Ocean. While Egypt became his own private domain, he was pushing the

\* See "Imperial Rome Reborn," by John Patrie, NATIONAL GEOGRAPHIC MAGAZINE, March, 1937.



Photograph by LUCE.

#### BOMAN LEGIONARIES "TURNED TURTLE" TO ATTACK STRONGLY DEFENDED WALLS

A plastic model at the Augustan Exhibition (page 549) illustrates an ancient military maneuver named for the leisurely, hard-shelled reptile. Approaching the enemy wall, a small squad of soldiers would raise over themselves a tight "roof" of shields as protection from stones or spears hurled down by defenders above.

Roman Eagle northward to the Danube and for a while to the Elbe, thus creating central European boundaries which today are bristling with political anxieties. He made every effort to protect these wide and extensive frontiers with permanent garrisons to preserve law and order and uphold the prestige of Rome.

#### POPULATION TOTALED 100,000,000

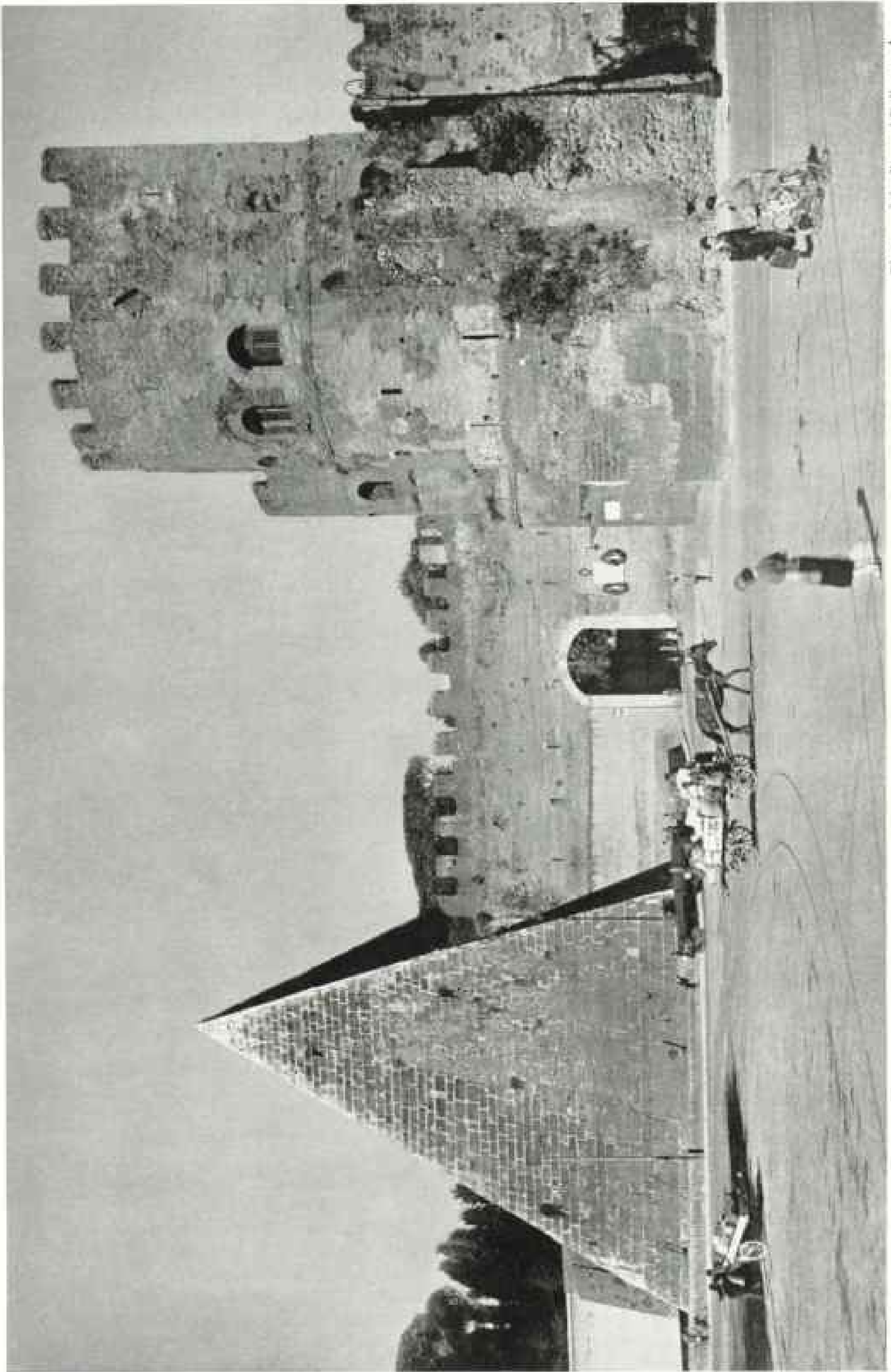
As the Mediterranean was completely under his control, he was able to expand the shipping and commercial interests of the Empire.

It is estimated that there were one hundred million inhabitants in the Augustan

Empire, of which about three-quarters were in the provinces.

Augustus wisely saw he must retain undivided control of the armed forces of the Empire. He reserved to himself the military and foreign policy of his government, but was satisfied with a general supervision of the civil administration. To the Senators and the equestrian order, the two traditional privileged classes, he left details.

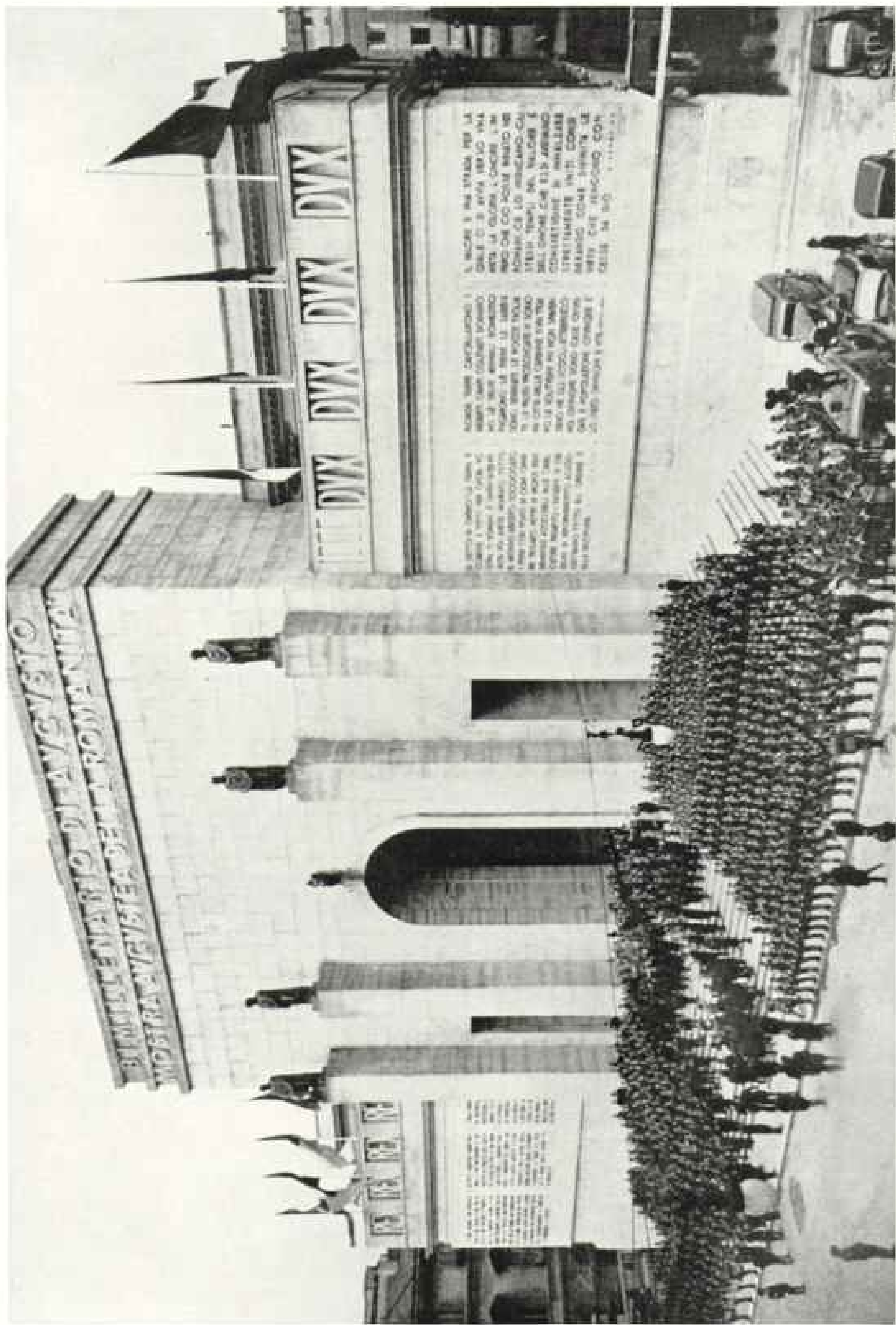
In evaluating Augustus' political prestige, we shall not be astray if we claim that the various contending parties regarded him as a necessity or at least as their hope of peace and prosperity; this Augustus himself realized and he continually strove to make



Photograph by Bernard E. Rogers, Jr.

TO INCLUDE THE PYRAMID OF CESTIUS, THE EMPEROR AURELIAN EXTENDED THE CITY WALL OF ROME

An inscription on the tomb of Gaius Cestius, praetor and tribune, says that it was built in 130 days. Inspired by Egyptian originals, the monument of brick, sheathed with marble blocks, stands 171 feet high. Massive towers of the Gate of St. Paul, the ancient Porta Ostiensis, loom above wheeled traffic of different kinds.



Photograph from White World

CELEBRATION OF THE 2,000TH ANNIVERSARY OF AUGUSTUS' BIRTH IS OFFICIALLY OPENED ON THE STEPS OF NEW EXPOSITION HALL



himself less and less a party leader and more and more the personification of Rome.

If ever a human being deserved the title of Peacemaker, it was he; but it was not peace at any price. His large, competent, well-trained standing army could repel every possible private force, yet he made it submissive to himself and not vice versa, and this was no slight victory.

The great political problem was to keep peace with both the aristocratic party, the optimates, and the popular party; the former gave greater difficulty. During the young manhood of Augustus the aristocrats had formed an oligarchy under the leadership of Cicero; during the conflict with Mark Antony they revolted against the Caesarian party and cast their lot with the latter, though they soon saw their mistake.

#### MONTH OF AUGUST NAMED FOR HIM

It was during January, 27 B.C., that Augustus read a speech in which he resigned all his authority to the Senate; he bade the Senators govern Rome as they had done in the past and restore the Republic; the extraordinary powers which he had enjoyed, he returned.

Some of the Senators were much astounded, and with reason feared civil conflict as of yore. There were others quite prepared, it would seem, for this emergency, and not only was the resignation refused, but greater honors were bestowed upon him.

It was at this time that our familiar month of August received its name in place of Sextilis, just as Quintilis had been changed to July after Julius Caesar.

As was usual with him, Augustus completed a work inaugurated by his grand-uncle, Julius Caesar. The organization of civil service had been planned but had not been practically efficient. To do this Augustus felt the need of local knowledge, and, with full confidence in the officials in Rome, he traveled extensively, selecting first the west.

In Gaul he established schools for the teaching of Latin and the Roman law and also provided for the natural improvement and enlargement of cities and towns.

Census was taken for taxation purposes and the entire financial system was readjusted. The mines of Spain and the gold productions of the Alpine valleys were evaluated and protected; these were the chief sources of Rome's mineral wealth. Here as elsewhere Augustus looked mainly

to the necessary adjustment of the financial system.

Augustus visited nearly every province under Roman control and for the most part he was highly successful in his reorganization of matters financial, political, and military.

#### GRAIN FOR THE POOR—AND CIRCUSES

Augustus knew how to conjoin the useful with the attractive, according to Horace's precept for writers:

He wins the day against competing foes  
Who loveliness with usefulness bestows;  
Gives great delight unto the reader's heart,  
But ne'er neglects a lesson to impart.

As marble statues and bronze ornaments, be they ever so beautiful, are not very nourishing or palatable, in fact rather indigestible, the Emperor remembered there is a lower, inner man as well as a higher. Being sole and supreme owner of fertile Egypt, he stimulated the growth of wheat there as well as in Numidia and other parts of Africa—all this in addition to the usual supplies from Sicily.

Nor did he neglect adequate service of transport and distribution. Realizing the danger of private dealers attempting to make a "corner" in supplies, he appointed a commissary general, called *praefectus annonae*, who, in addition to chartering necessary shipping, with proper provision for storage of imported foodstuffs, drove away the shadow of famine which had so frequently in the past stalked spectre-like throughout Italy.

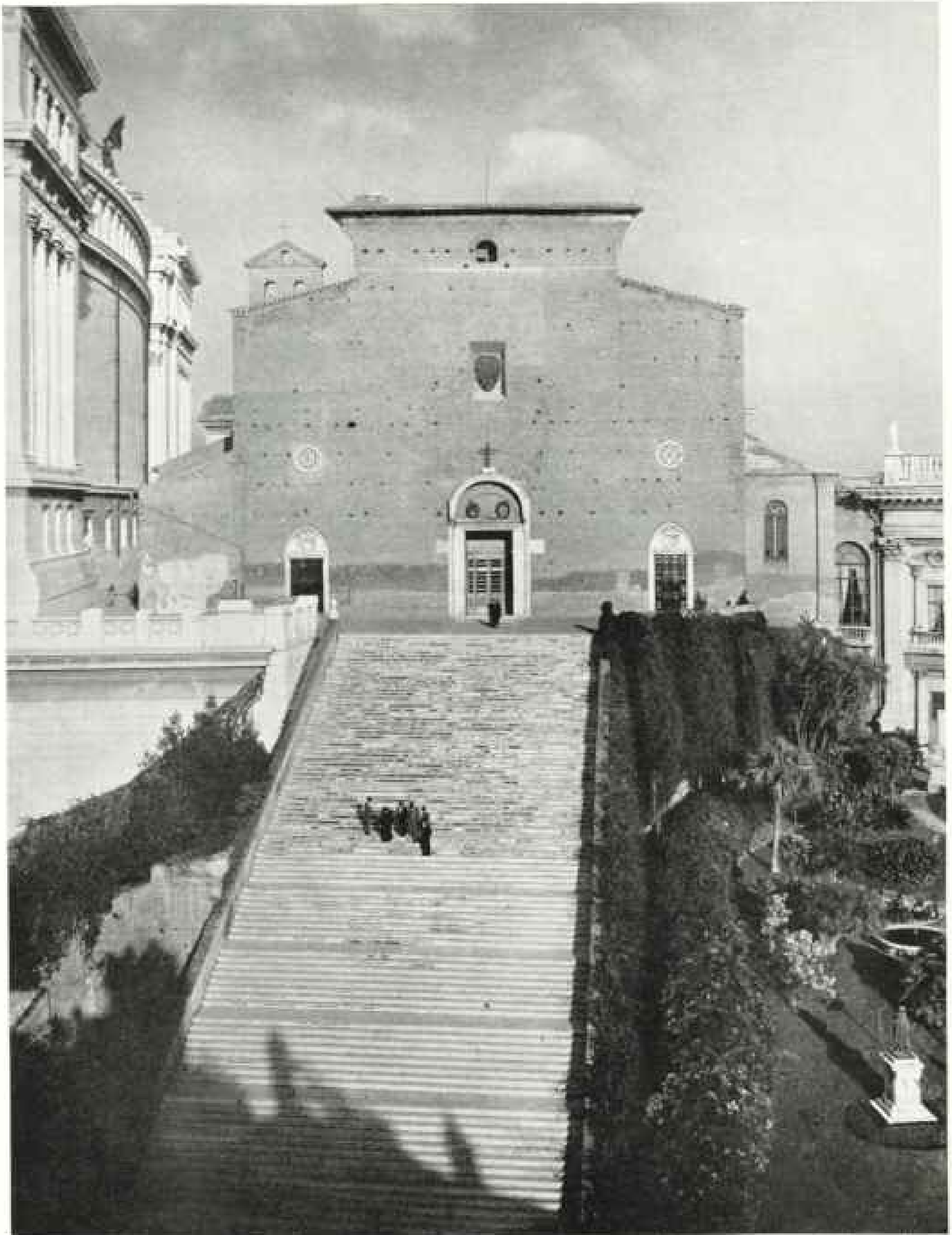
Nor was Augustus less perspicacious in the first appointee to this responsible position. A former governor of Egypt, Calus Turranius, held the post for thirty years, which is proof positive of his competency and reliability.

Free distribution of corn for the proletariat was kept under control, though the recipients numbered more than 200,000.

Augustus also knew that he must keep the public amused. The first permanent amphitheater was reared, and he encouraged the old-fashioned circus races, dramas, and the ever-popular gladiatorial contests.

#### POLICE AND FIRE FORCES STRENGTHENED

For years Rome had been subject to chronic disorder and rioting; to repress these he established an adequate police force. The commissioner of police, *praefectus urbi*, was a man of senatorial rank



Photograph by Bernard F. Rogers, Jr.

HERE, ON THE CITADEL OF PAGAN ROME, AUGUSTUS HEARD THAT CHRIST WAS BORN  
IN BETHLEHEM

According to tradition, the Emperor erected an Altar of the Son of God, after the Tiburtine Sibyl reported the birth of Jesus in Judea. Somewhere on the Capitoline Hill, and probably within the imposing nave of this Church of St. Mary of the Altar of Heaven, the English historian, Edward Gibbon, first conceived the idea of writing his *Decline and Fall of the Roman Empire*. A façade was planned but never added to the church's bare brick front. Upon the broad staircase, built in 1348 for the use of penitents going up to pray for cessation of a plague, the Roman populace is said to have slain the fanatical tribune, Cola di Rienzo (page 554). The back of the National Monument to Victor Emmanuel II abuts on the left (page 542).



Photograph by Bronson De Cou

CARACALLA, WHO BATHED ROME IN BLOOD, BUILT SUMPTUOUS PUBLIC BATHS

The extravagant emperor once ordered the mass murder of 20,000 supporters of a civil enemy. Elegant mosaic floors contrast with denuded brick walls of the once-luxurious halls that contained marble seats for 1,600 Roman bathers, anointing and massaging chambers, sweat baths, hot and cold plunges, and rubdown rooms. Marble wall facings, colonnades, sculptures, and frescoes have mostly been stolen, destroyed, or removed to museums.

who had under him three thousand custodians of peace, and order was organized in military fashion. In time of need these could be reinforced by the regular militia.

Thus it was that public disturbances at time of elections and disorderly demonstrations at festivals were, if not totally suppressed, rare incidents.

Up to Augustus' time no regular and adequate provision had been made for the extinction of fires in Rome. Considering the wooden tenements in the irregular narrow streets and alleys, a city conflagration was ever imminent. To obviate this he organized a brigade of 3,500 firemen and appointed a permanent commissioner at their head. A special corps of firemen was assigned to each of the fourteen districts he had mapped out for the city.

However, Augustus was faced by both an excess and a deficiency of water. The recurrent floods of the Tiber caused untold

suffering and did much damage, though widening the bed of the river brought at least a partial solution. Distribution of water presented a more serious difficulty, and to take charge of it Augustus appointed a curator of water supply who had a technical, publicly paid staff of 240 slaves.

Moreover, the ruler erected a magnificent bathing establishment such as only the Romans knew how to achieve. As we leave the Pantheon, we find behind a huge structure some detached fragments of these baths which are called after Agrippa; they show part of a great hall which seems to have been the tepidarium.

"SO NOBLE A LADY"

These relics are completely overshadowed by the interesting and extensive ruins of the baths of Marcus Aurelius, who was nicknamed Caracalla. Under this imperial sobriquet they have always been known.

A word about the lovely Octavia, the sister of Augustus, to whom history and drama pay scant courtesy, for she presents to us the old-fashioned ideal of the Roman matron whose sphere in life was the domestic hearth and whose place within the home was subordinate, it is true, but august and important. Plutarch has left a touching picture of her loveliness, and all historians praise the beauty of her virtues.

She was first married to Gaius Marcellus, a man of consular rank and every way worthy of her, and by him she had three children. Her son, Marcellus, was adopted by Augustus to be his successor, but he died as a young man B. C. 23.

Upon the death of Marcellus, Octavia was sacrificed to the exigencies of statecraft. As Plutarch says rather naively: "She was married unto Mark Antony as it were of necessity because her brother Caesar's affairs required it." He also adds that a special dispensation had to be obtained for her year of mourning, since it was against the law for a widow to be married within ten months after her husband's death.

By this union it was hoped to heal the existing differences between Antony and Octavius. Nor was this hope without initial fulfillment. When relations first became strained between the brothers-in-law, she played the part of peacemaker and successfully deferred the break.

She sought out her brother and told him she was now the happiest woman in the world; if war should break out between them, she said: "It is uncertain to which of them the gods have assigned the victory or overthrow. But for me, on which side soever victory fall, my state can be but most miserable still." By her urgent prayers they were appeased for the time.

To Antony she ever remained a most faithful wife of a most unworthy husband. Even while Antony was leading a life of pleasure with Cleopatra, she sent him letters, money, and troops. When Antony refused to receive her, the brother-Emperor stepped in and commanded her to leave her husband's house. Even then she begged him not, for the sake of a single woman, to destroy the peace of the world.

It is remarkable, even almost unbelievable, but this woman not only cared for her own two little daughters whom she had by Antony, but even bestowed motherly care on the education of the children whom

Antony had by his first wife, and after his death she fostered the children he had by Cleopatra.

Again Plutarch adds: "Howbeit thereby thinking no hurt she did Antonius greatest hurt, for her honest love and regard for her husband made every man hate him when they saw he did so unkindly use so noble a lady."

EXIT AUGUSTUS WHO "ACTED THE PLAY  
WELL"

Augustus died at Nola in Campania on August 19, A. D. 14, at the age of 76.

A short distance to the left as one travels along the Corso from the Piazza Venezia is Via dei Pontefici—so called from the series of papal portraits which formerly existed in the walls of one of its houses—but which have all been destroyed. Here we find the Mausoleum of Augustus. It was built 28 years before the Christian Era, and was destined by Augustus for himself, his family, and his successors. It is a large rotunda resting on a quadrilateral base.

Hard by the banks of the Tiber it stands—at one time a lofty marble tower with three retiring stages, each of which had its terrace covered with earth and planted with cypresses. These stages were pierced with numerous chambers, destined to receive row within row the remains of every member of the imperial family.

In the center of that massive mound the great founder of the Empire was to sleep his last sleep, while his statue was ordained to rise conspicuous on its summit, and satiate its everlasting gaze with the view of his beloved city.

Here was buried the Marcellus of whom Vergil speaks in the 6th book of his *Aeneid*, the pride and forlorn hope of Rome; here too Octavia was put to rest, the sister of Augustus and the spouse of the unworthy Mark Antony.

Here, A. D. 14, the last scene of the great life of the aged Augustus was enacted. It is said that his body was burnt on so huge a funeral pyre that his wife, Livia, watched for five days and five nights before it was cool enough for her to collect the imperial ashes. She too was to be buried in this Mausoleum, as well as Germanicus and Drusus and the future Emperors Tiberius, Caligula, and Claudius.

In the year 410, when Alaric the Goth sacked Rome, he rifled the Augustan Mausoleum. It served as a fortress for the





Photograph from Wide World.

"AS AN OAK ON MOUNT ALGIDUS, RICH WITH DARK FOLIAGE, PRUNED BY THE CRUEL AXE, GAINS STRENGTH AND VIGOR FROM THE VERY STEEL—"

In the Augustan Exhibition in Rome, a statue of the Emperor is posed as if he might be quoting the stirring eulogy inscribed above him. Extolling the Roman people in the words of Hannibal, their enemy, the Ode of Horace continues: "Drown it in the depths! It comes forth fairer. Wrestle with it! It throws with great acclaim a fresh victor, and wages wars for wives to tell of." Plaster models of imperial eagles flank a display of enlarged casts of imperial coins.

Colonnas in the 12th century. It may be that it was here that Stephen of Colonna is supposed to have dramatically answered his adversaries when they taunted him that his bulwark was wavering and asked, "Where now is your fortress?"

Striking his breast, he said: "Here, and one that will laugh a siege to scorn!"

Here too the last of the tribunes, Cola di Rienzo, was burned after his dead body had hung for two days before the door of St. Marcellus (page 551).

In still more modern times the Mausoleum became an open-air theater, known as the Augusteo, where Eleanora Duse and other noted actors appeared. In 1908 the Municipality of Rome converted it into a concert hall.

At no point of this vast universe can we utter with greater feeling the lines of Shakespeare's Jacques:

All the world's a stage  
And all the men and women merely players,  
They have their exits and their entrances.

Even more to the point is the report that when Augustus was dying he looked about him and said to the admiring bystanders: "Have I not acted the play well?"

As a tribute to the greatest of Roman emperors, and as part of the magnificent bimillennial commemoration, a remarkable restoration of the Augustan Mausoleum has been completed. It is an appropriate as well as an artistic appreciation of the present Romans to the man whose love of



Photograph by Bernard F. Rogers, Jr.

BELOW A WEATHERWORN BRIDGE, TIBER FISHERMEN PLY THEIR DIP NET

The ancient Flaminian Way, connecting Rome with routes leading to central and western Europe, spanned the Tiber River on a bridge upon whose crumbling foundations the Ponte Milvio was erected more than a century before Christ. Gaius Flaminius, for whom the road was named, crossed the river here with an army on his way to engage Hannibal, the Carthaginian general, and to meet disaster and death at the Battle of Lake Trasimene. Of the structure as it stands today, only the four central arches are antique.

Rome has been unsurpassed and whose aspiration to give eternity to the Seven Hills has been the inspiration of his latter-day followers.

IN A CORNER OF AUGUSTUS' REALM THE KING OF KINGS WAS BORN

The reign of Augustus was the turning point of Roman history; in fact, we might say it was the turning point of all history, for during his reign Christ was born in Bethlehem of Judea and from then on we mark all annals as B.C., before Christ, or as A. D., Anno Domini, in the year of our Lord.

In the old Roman Martyrology, which from time immemorial has been read on each revolving December 24 as an an-

nouncement of the morrow's great feast, we have the following solemn proclamation:

In the year, from the creation of the world, when in the beginning God created heaven and earth, five thousand, one hundred and ninety-nine; from the flood, two thousand, nine hundred and fifty-seven; from the birth of Abraham, two thousand and fifteen; from Moses and the coming of the Israelites out of Egypt, one thousand, five hundred and ten; from the anointing of King David, one thousand and thirty-two; in the sixty-fifth week, according to the prophecy of Daniel; in the one hundred and ninety-fourth Olympiad, in the year seven hundred and fifty-two from the founding of the city of Rome; in the forty-second year of the empire of Octavian Augustus, when the whole earth was at peace, in the sixth age of the world, there went out a decree from Caesar Augustus that the whole world should be enrolled.

During his long reign Augustus had thrice ordered such enrollment of the whole empire. The first was after his accession to the throne in the 726th year from the founding of Rome, which we denominate as the year 28 B.C.; the second was about twenty-one years later, and the third was three years before his death, which occurred 767 years from the founding of Rome and in the 14th year of our era.

But I would draw your attention to the second of these. In Syria this was made by Publius Sulpicius Quirinius, the Roman governor. Every one had to be enrolled in his own city. This requirement was not properly a Roman custom, but the Romans accommodated themselves in this regard to the Hebrew usage. The Jews still clung to their genealogies and to the memory of long-extinct tribal relations. Hence, those who belonged to the impoverished and obscured royal family of David were obliged to enroll at Bethlehem, the city of the Shepherd King.

Augustus is in Rome, comfortably closed within his Palatine home, reviewing, it may be, with pardonable pride the achievements of twoscore years as Emperor.

#### THE GRANDEUR THAT WAS ROME

Peering into the dim future, no doubt felicitating himself on the great men he has conquered in war and in peace, he feels he has been invincible—that pagan Rome will stand forever. Rome has become so great, so rich, so gorgeous that Greece shall be nothing beside her; Egypt shall dwindle to littleness, and the memory of Babylon be forgotten. Perhaps in supremest exultation he exclaims: "Ave Roma Immortalis!"

He scans the census of the world, the second of his empire, and sees kings and princes bow to his sway, here, there, and everywhere. He little weens that in an

obscure Judean town a name has been registered of a baby boy, one day old, who holds the universe in His puny little hands.

#### "HIM SHALL YE NOW ADORE"

In keeping with this great historic fact, there is preserved at Rome a legend beautiful connected with one of the eighty churches there dedicated in honor of the Madonna; it is Santa Maria in Aracoeli, which is situated just beyond the Capitoline Museum (page 551). It stands on the Arx, or citadel, of ancient Rome, where before the intrusion of the huge Victor Emmanuel Monument there was the most famous view over Rome.

Here it is said Augustus consulted the Tiburtine Sibyl when, restless with thoughts of the future of his great empire which he had gloriously founded with so much skill and patience, he asked: "Who after me shall rule the world?"

The answer was returned by Apollo himself: "A little child, a God himself, and stronger than all the gods, bids me leave the heavens to give Him place. Him shall ye now adore, but me invoke no more!"

The Emperor is supposed to have set up an altar to this Divine Child and the altar was called Aracoeli, the Altar of Heaven. What is supposed to be the original altar is in the transept chapel and bears an inscription signifying, "Octavian built this altar when the offspring of heaven appeared to him."

It would seem that this whole legendary story with all its loveliness is from the ingenious Roman mind of centuries ago, but at least we can pay tribute to it as significant of the supplanting of paganism by Christianity on the very citadel of Rome. At no spot in all this wide, wide world can we more fittingly and more feelingly exclaim: "AVE ROMA IMMORTALIS!"



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## ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded fifty 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 features. 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.

The Society cooperated with Dr. William Beebe in a deep-sea exploration of undersea life off Bermuda, during which a world record depth of 3,028 feet was attained August 13, 1934, enabling observations of hitherto unknown submarine creatures.

The Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and contributed \$100,000 to Admiral Byrd's Antarctic Expedition.

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 forest of the giant sequoia trees in the Giant Forest of Sequoia National Park 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.

On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to an officially recognized altitude record of 72,105 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.



# THREE *New Exhibits* FOR FALL that have the Style-world all agog!

**1** NEW! The LINWOOD (front and side views shown). Not only is the case curved to the wrist—the dial, too, is spherical in shape! Fits as though it were built right on your wrist. Streamlined as the new 20th Century. 17 jewels. 14K gold filled, natural yellow only. Applied gold numeral dial, \$52.50.



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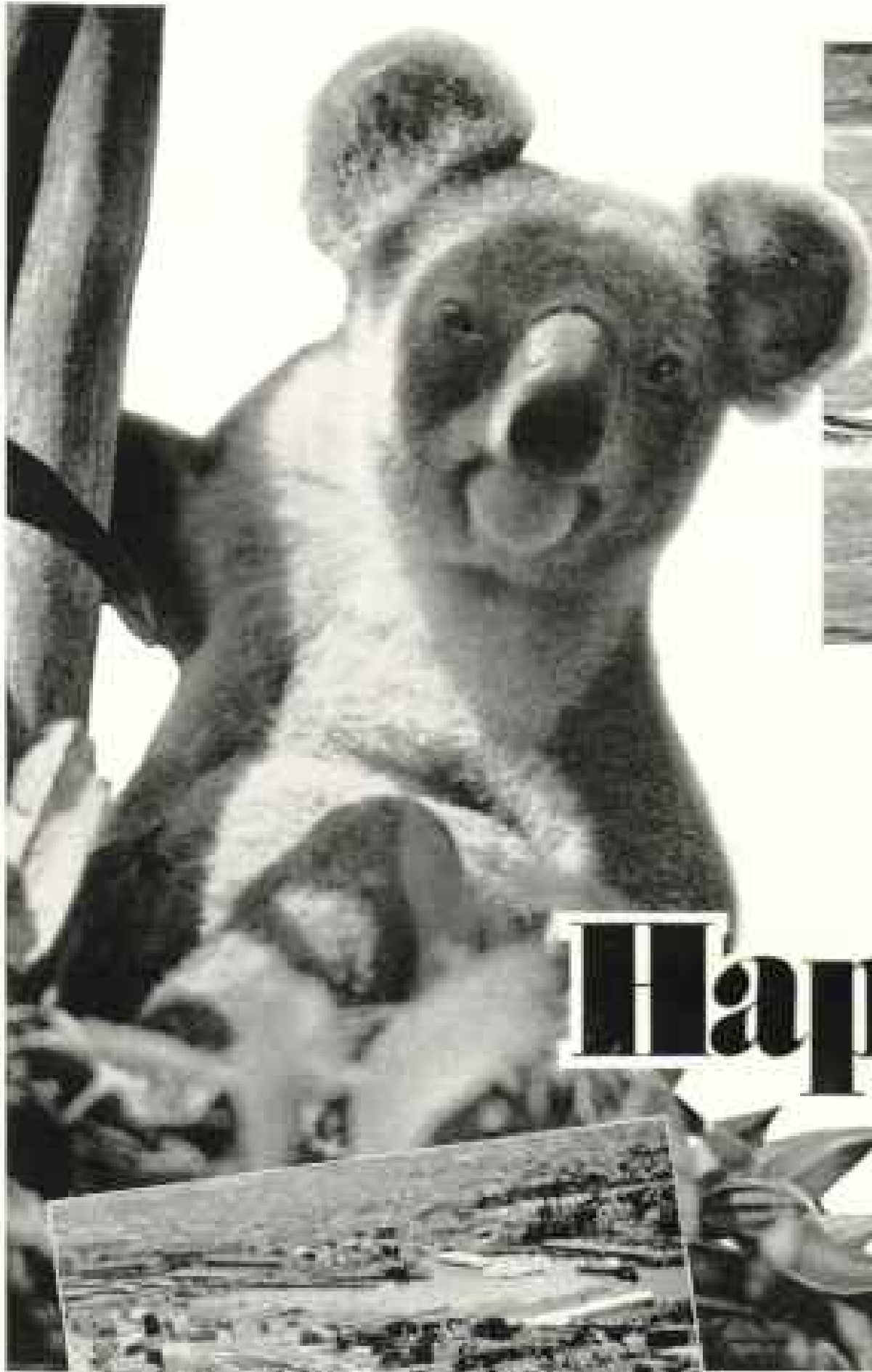
**3** NEW! The TRILBY. Tired of conventional lines, the same old thing? Very well, how do you like the novel design of the new Hamilton TRILBY? A clever new shape—exclusively Hamilton. 17 jewels. 14K natural yellow gold only. With gold fittings and applied gold numeral dial, priced at \$60.00.

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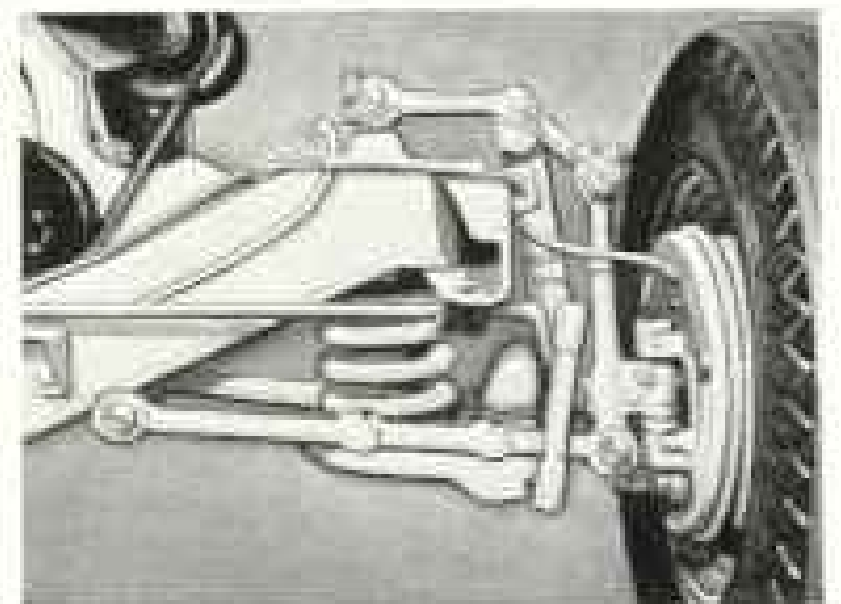
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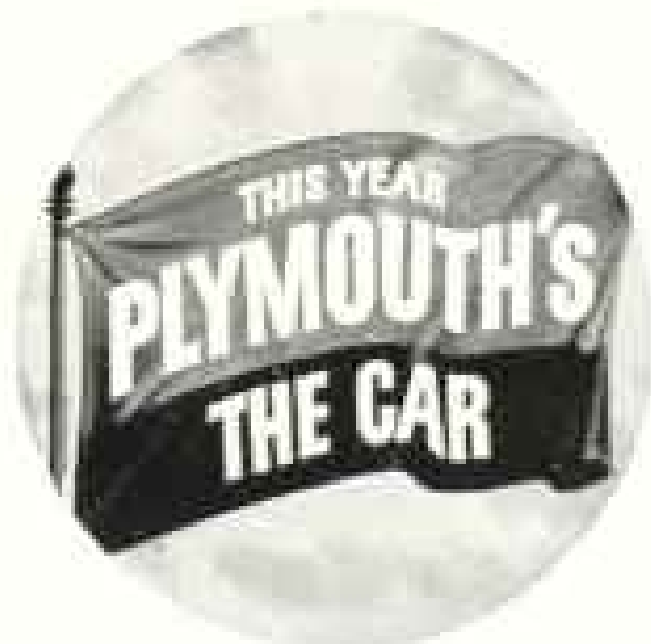
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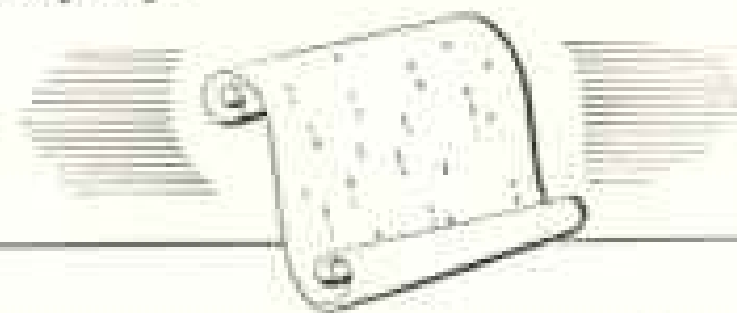
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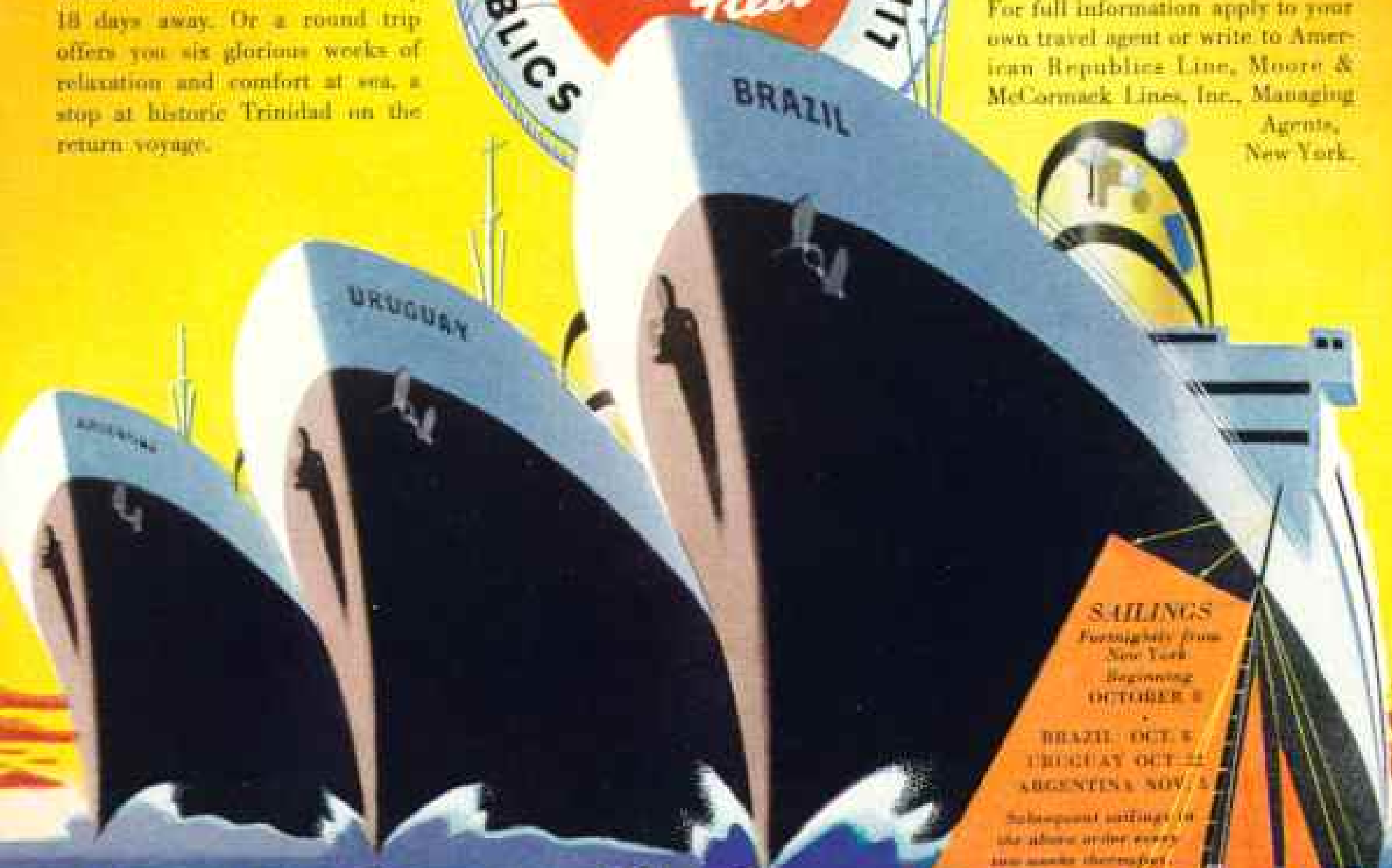
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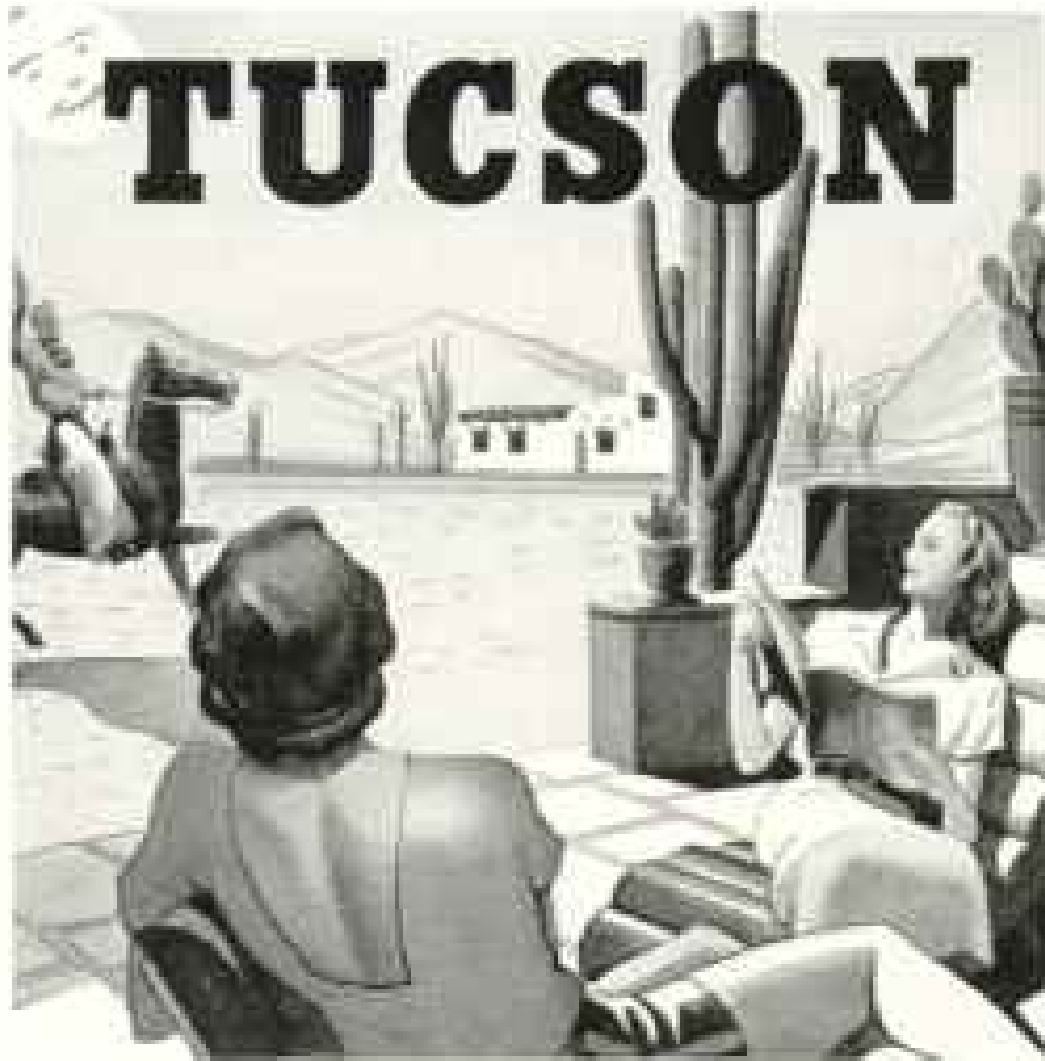
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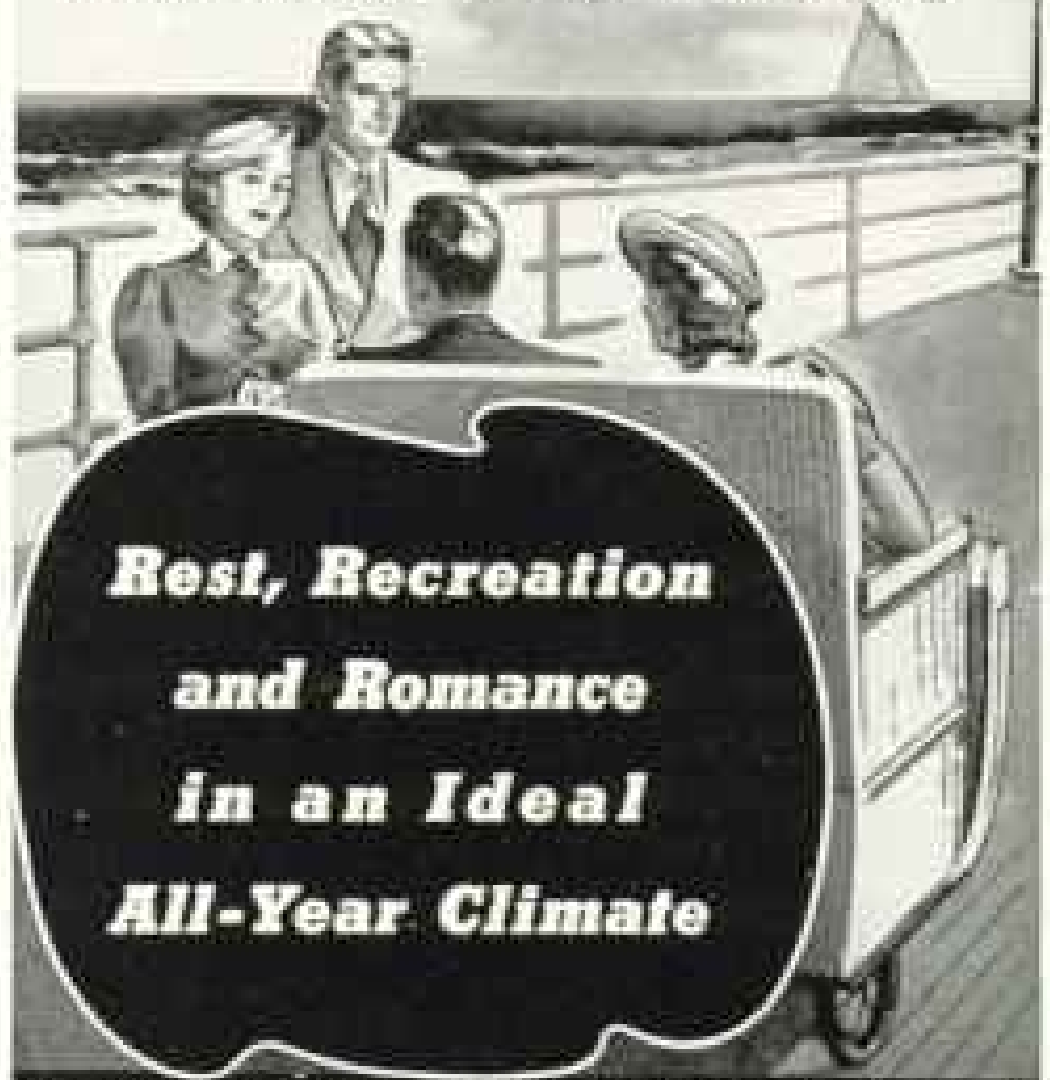
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If you are a seasoned movie-maker, you will realize that this remarkable new 16 mm. magazine-loading camera frees you from annoying "gadget setting" . . . enables you to concentrate on the picture—not on the camera! If you are a beginner—here is the camera that gives you professional-quality movies right from the start. For it *automatically* does many of the things that beginners often forget.

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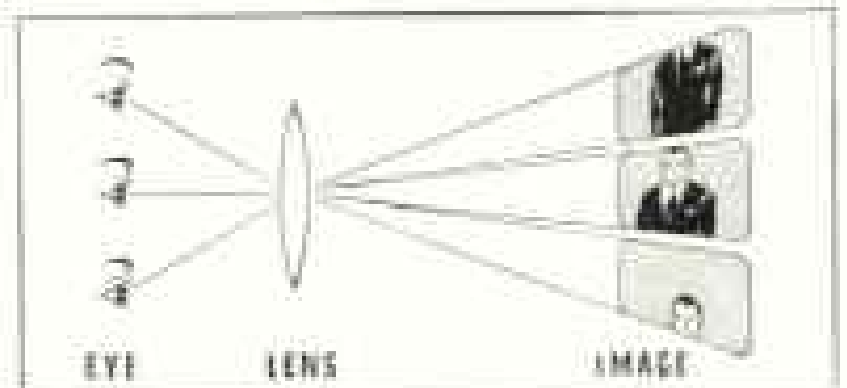
**SEE IT AT YOUR DEALER'S NOW**

Learn how simple and easy it is to make professional-quality movies with this new Filmo. Take it with you on your trip—and you'll bring back better motion pictures. See it at better camera shops and department stores now. Bell & Howell Company, Chicago, New York, Hollywood, London. *Established 1907.*



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  - Zanzibar
  - Mombasa
  - Seychelles Islands
  - Bombay
  - Ceylon
  - Sumatra
  - Penang
  - Singapore
  - Bangkok
  - Angkor
  - Tourane
  - Hue
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  - Bali
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### HINTS ON HOSIERY COLOR

The more color in your skin, the less in your hosiery.

If you're short, don't wear hosiery that contrasts sharply with dress or shoes.

Greenish tint, with its dull surface, has slimming effect on legs.

When you are tanned, match stockings to your skin tone.

Don't wear black hosiery unless your legs and costume are perfect.

Never buy a shade because it looks well on someone else—check it on your own skin.

The better stockings fit, the clearer the shade (and the effect of sheerness) appears to be.

# What hosiery shades should I buy?

*Hosiery shades vary each season, but certain rules always apply in getting smart, becoming hosiery colors*

**Make a list of the basic colors** in your wardrobe. Then select a few basic shades each of which will go with a whole range of colors.

**Now check these shades** for their becomingness to you. It is better to choose a tone that flatters your ankle than a high-style color—better to harmonize it with skin tones than arbitrarily match a costume color.

**Some skins are pink in general tone**, others yellow, white or tan. Every hosiery shade is affected by the skin tone of the wearer. Always try the shade over hand or arm to see how it will look on you.

**Next consider your leg contours.** Lighter shades make legs look larger, darker shades slenderize. "Grayed-down" neutral shades are universally flattering. They blend into the background, make ankles appear slimmer.

**Practically all stocking shades are variations of beige or taupe.** Some have a red cast, some a yellow and others a gray. Decide whether the red, yellow or gray effect is most becoming to your costumes and skin tones.

**Choosing only a few shades is sound economy.** But don't buy the same shades in every weight. A tone that is perfect in 2-thread hosiery may be too dark in 4-thread. For your heavier stockings choose slightly lighter versions of the basic shades.

**1 Realsilk's Shop-at-Home Service** brings you an actual summary of the season's smartest costume colors (with samples of fabrics and shoe leathers), showing which hosiery shades are correct with each color range.

**2 Realsilk's Wardrobe System** of hosiery buying helps you plan your season's supply soundly and economically—fewer shades, correct weights, adequate number, right colors. Saves time, mistakes—adds style.



To get Realsilk Hosiery, phone your local Realsilk office and ask that a representative call on you at home or office. REAL SILK HOSIERY MILLS, Inc., Indianapolis, Indiana.

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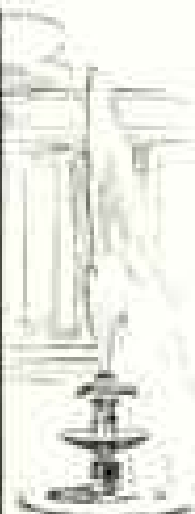


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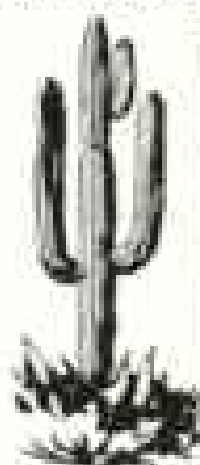


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# "I POURED A DEATH POTION FOR MY SICK BABY!"



## LONG ISLAND MOTHER LIVES A NIGHTMARE IN DARKENED HOME

1 "Our year old son was seriously ill with whooping cough, my

husband was down with the grippe... and to add to my problems I blew the electric fuses as I was going to bed," writes Mrs. Camille Dearkin of 222-09 135th Avenue, Springfield Gardens, L. I.



2 "I didn't know how to fix the lights and decided not to disturb my husband. He could tell me what to do in the morning. But I failed to think what might happen in the dark hours to come...that, roused from sleep by my baby's terrible choking cough, I would rush into the dark for his medicine.



3 "I fumbled in the dark medicine chest for the cough syrup and a teaspoon, that ghastly cough frightened me so. It seemed he must be choking to death! My hand shook so in the dark I kept spilling the medicine and I realized I must have light to measure a proper dose...so, in spite of my panic, I took time to get my husband's flashlight.



4 "In the rays of that light, I saw in my hand, not my child's cough mixture, but a bottle of deadly poisonous disinfectant!

"Is it any wonder that I now write to let you know that my husband and I have fresh DATED 'Eveready' batteries to thank for our baby's life.

(Signed)

*Camille Dearkin*



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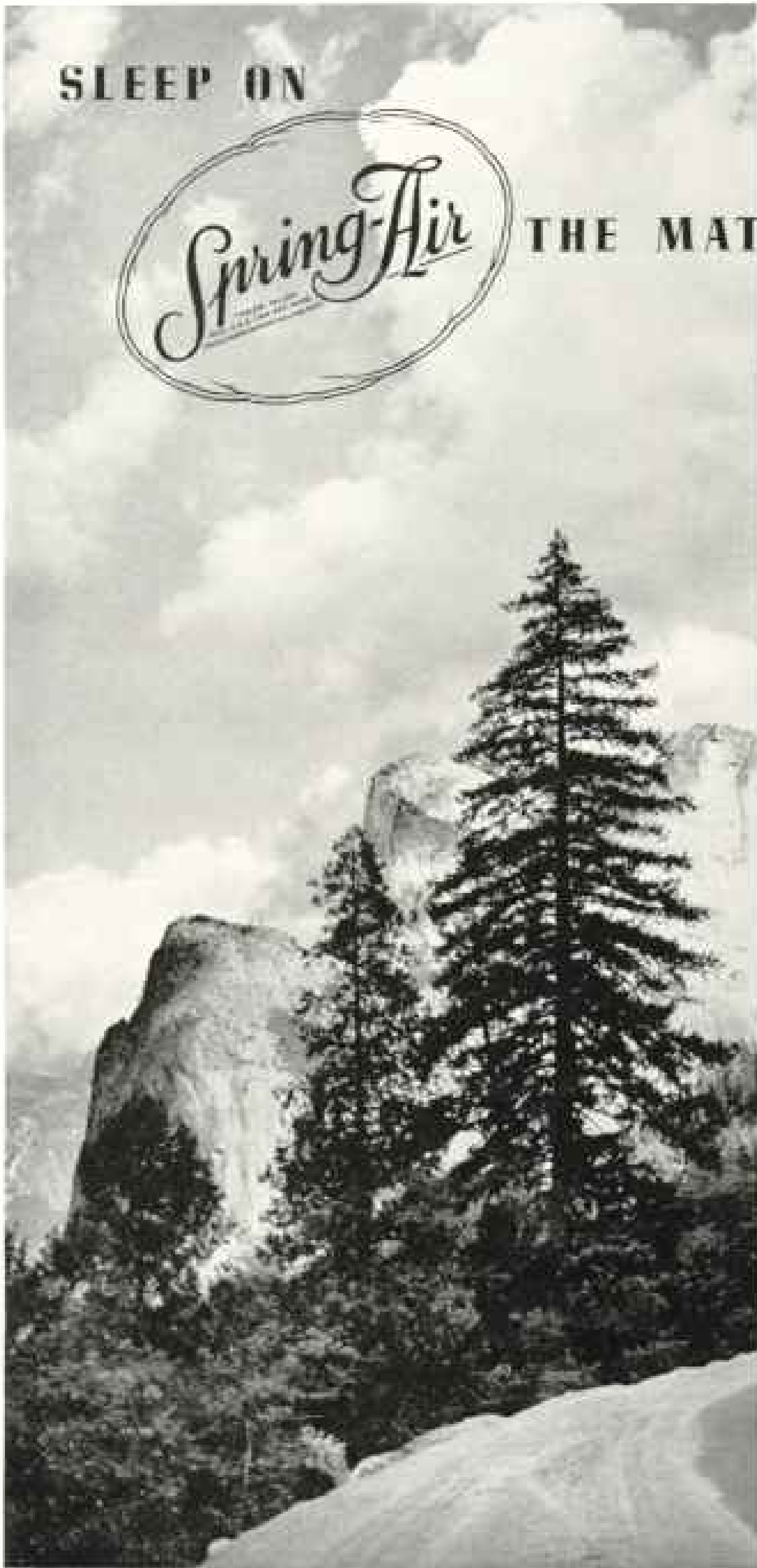


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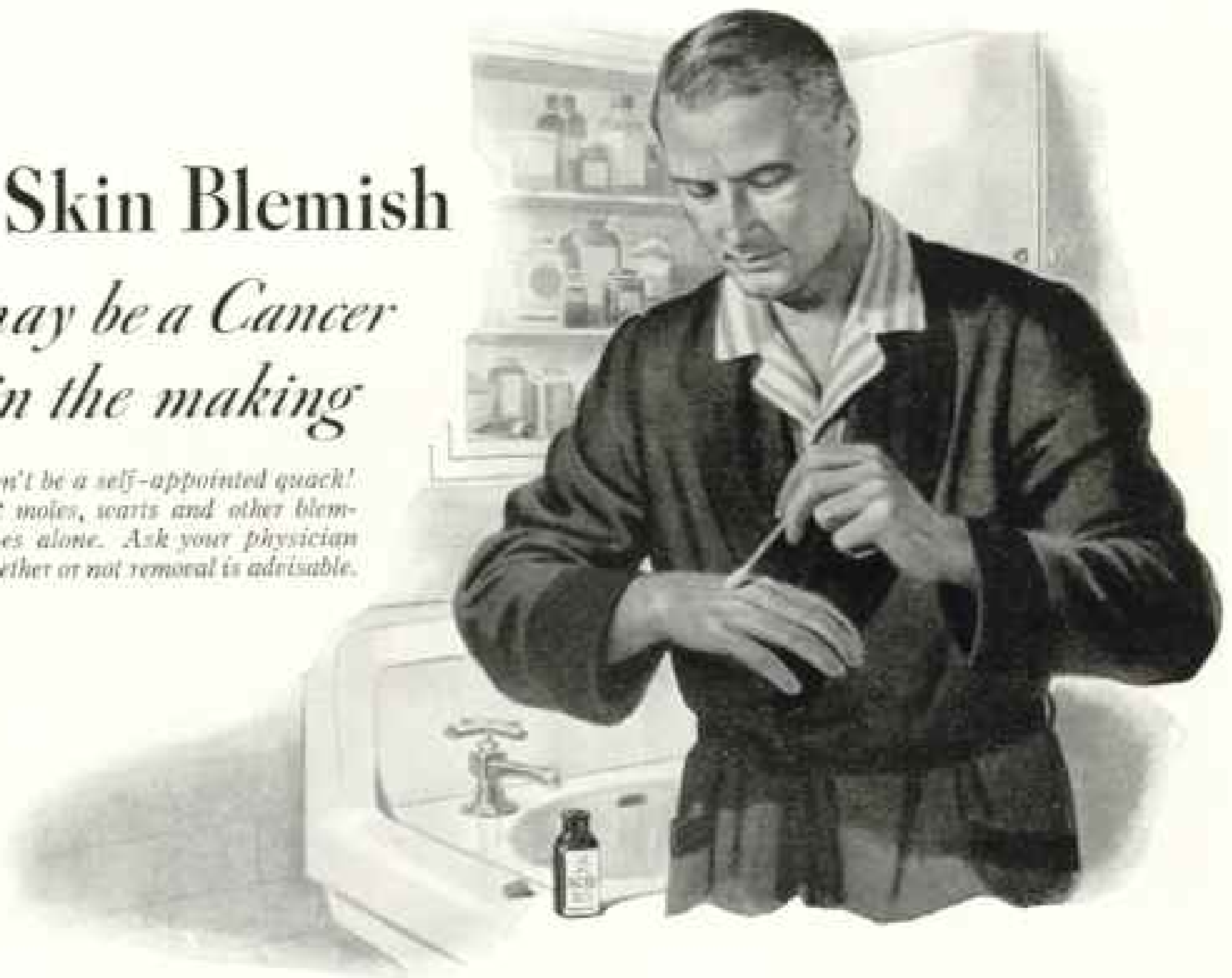
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# A Skin Blemish

*may be a Cancer  
in the making*

*Don't be a self-appointed quack!  
Let moles, warts and other blemishes  
alone. Ask your physician  
whether or not removal is advisable.*



**M**OLES and other skin blemishes usually are just what they appear to be — entirely harmless disfigurements. But as the years go by they sometimes develop into skin cancers, chiefly because the danger is not recognized and they are not treated in their early curable form.

As long as a mole, wart, brown or crusty patch, scar or other skin growth does not change from year to year, you need not give it serious thought. But be on the lookout for such signs as darkening in color, increase in size, scalliness, or a tendency to bleed.

An open wound which refuses to heal is rarely cancerous in the beginning. However, if untreated, it may develop into a stubborn form of skin cancer which is exceedingly difficult to conquer. Prolonged exposure to strong sunlight may lead to skin cancer. Excessive smoking is held responsible for many lip cancers.

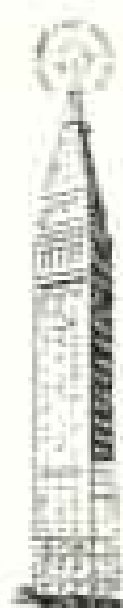
Beware of quick remedies such as salves, oint-

ments and other "cures" for any abnormal skin condition which may be cancer. Only surgery, X-rays, or radium in the hands of a competent surgeon or physician can, as a rule, cure cancer. Self-treatment is dangerous. Innocent moles and warts, which many men attempt to remove with caustics or amateur surgery, may reappear as malignant growths.

Let your doctor decide whether or not early surgical removal is necessary, especially if the growth is located where it is constantly exposed to irritation.

Skin cancers are the easiest of all to detect and cure, yet they kill more than 3000 persons every year in the United States. If you have the slightest suspicion that a mole or other skin condition may be developing in any unusual way, see your doctor at once. Most skin cancers, given prompt and skillful treatment, can be cured without deformity.

Send for the Metropolitan free booklet "Cancer."  
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## MORAL IN MUD

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Then comes the mud. The beaver covers the entire lodge with a thick coat of it. Instinct tells him that this is his real protection, that when winter comes the mud will turn as hard as cement and keep out his bitterest enemy, the wolf.

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• • •

Moral: Insure in The Travelers. All forms of insurance. The Travelers Insurance Company, The Travelers Indemnity Company, The Travelers Fire Insurance Company, Hartford, Connecticut.



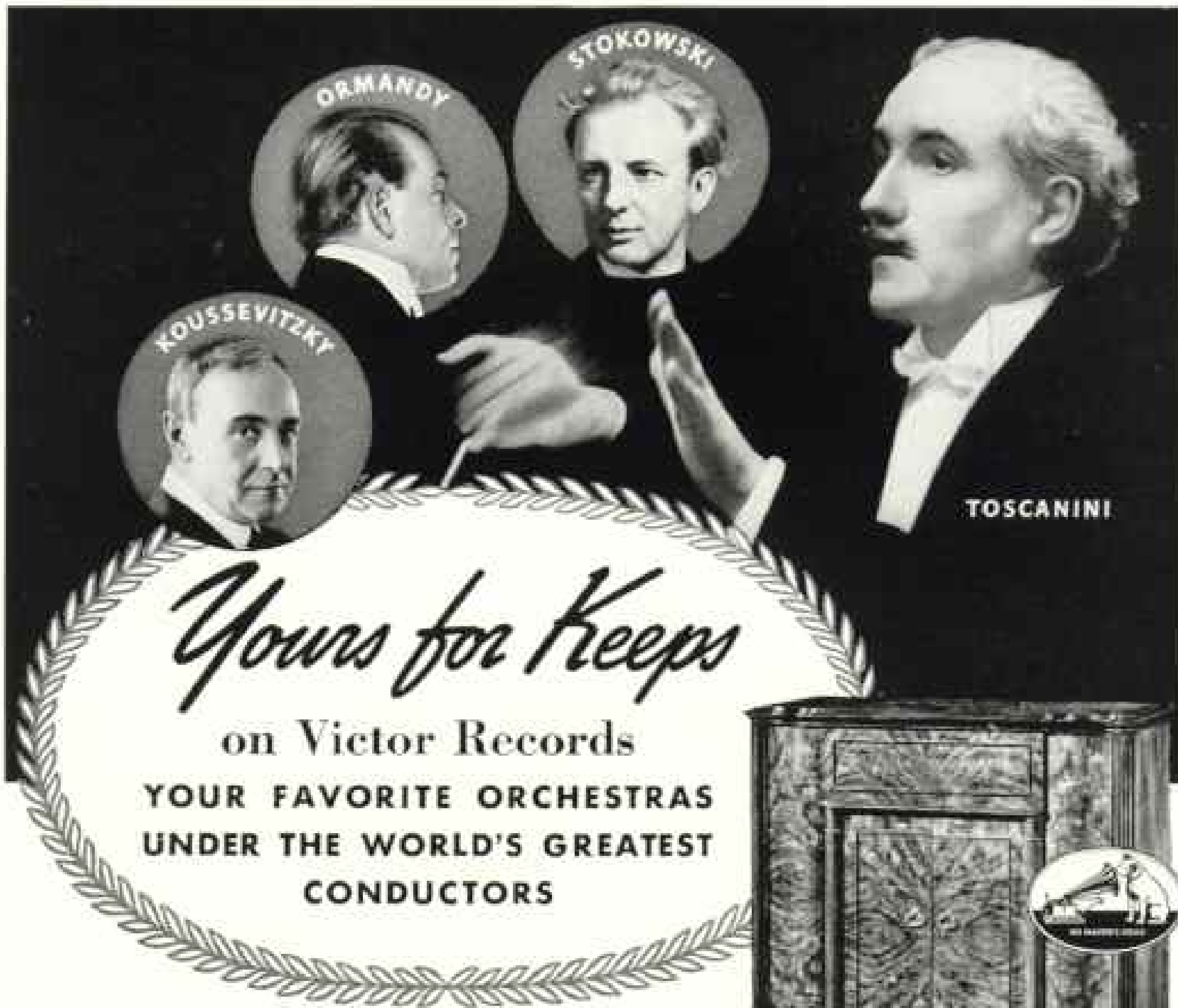


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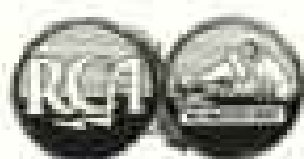
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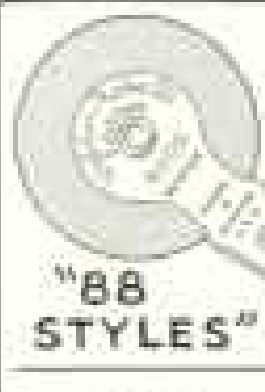
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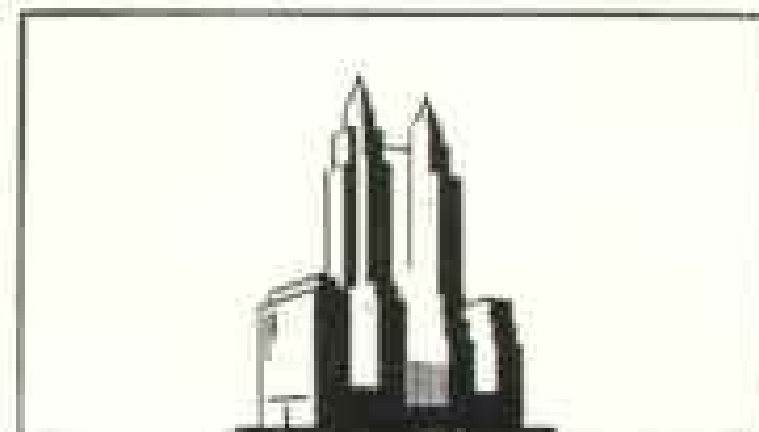
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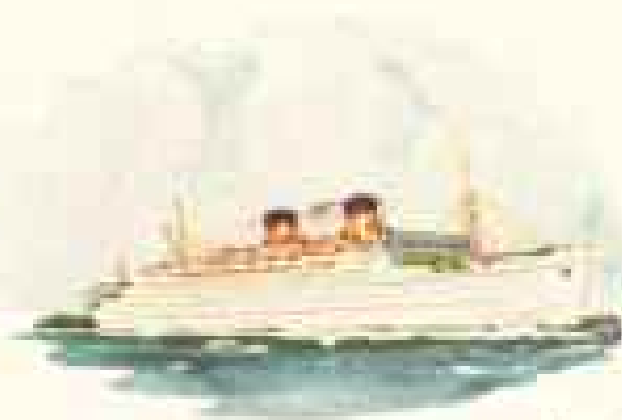


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