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Fishing in the Whirlpool of Charybdis

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Fishing in the Whirlpool of Charybdis

A Scientist Harvests Weird Creatures Tossed Up from the Depths by Churning Waters in the Storied Strait of Messina

BY PAUL A. ZAHL

With Illustrations from Photographs by the Author

ELSEWHERE that day the Mediterranean was blue and quiet, almost calm. But there was one distinct and isolated patch of sea about seven hundred yards off shore curiously alive with whitecaps. Our little Sicilian fishing boat was heading straight for it, and, closer every moment, I could see the whitecaps breaking into solid foam.

Ordinarily I would have considered it the sheerest folly to venture into the whirlpool area of the Strait of Messina. But wise and staunch old Giuseppe Arena had told me not to worry; he knew the currents, the whirls, the dangerous spots, the safe havens; he'd been fishing the strait for nearly 50 years, and he was still very much alive.

Whirlpools Peril Fishing Craft

Giuseppe gladly accepted the assignment to take me to the edge of the whirlpool area, but I could not help noting the sincere solemnity with which he crossed himself before stepping into the boat.

Here, for a few hours each day at predictable times—especially during the moon's new and full phases—swift tidal currents, deflected by irregular shores or opposing waters, create large patches of live water with vortexes strong enough to swamp anything smaller than a seagoing powerboat.

Since the days of the ancient Greek poet-geographers, the Strait of Messina has been both the fear of mariners and the subject of heroic song and legend. Throughout the centuries it has taken uncounted toll of human life. Scylla (monster or siren, depending on the legend consulted) lived in a cavern of the very cliff I could see only a few miles ahead, jutting boldly from the Italian mainland where the town of Scilla rises. And the monster Charybdis, of famed regurgitative powers, lay waiting in the very turbulenc. toward which we were heading.

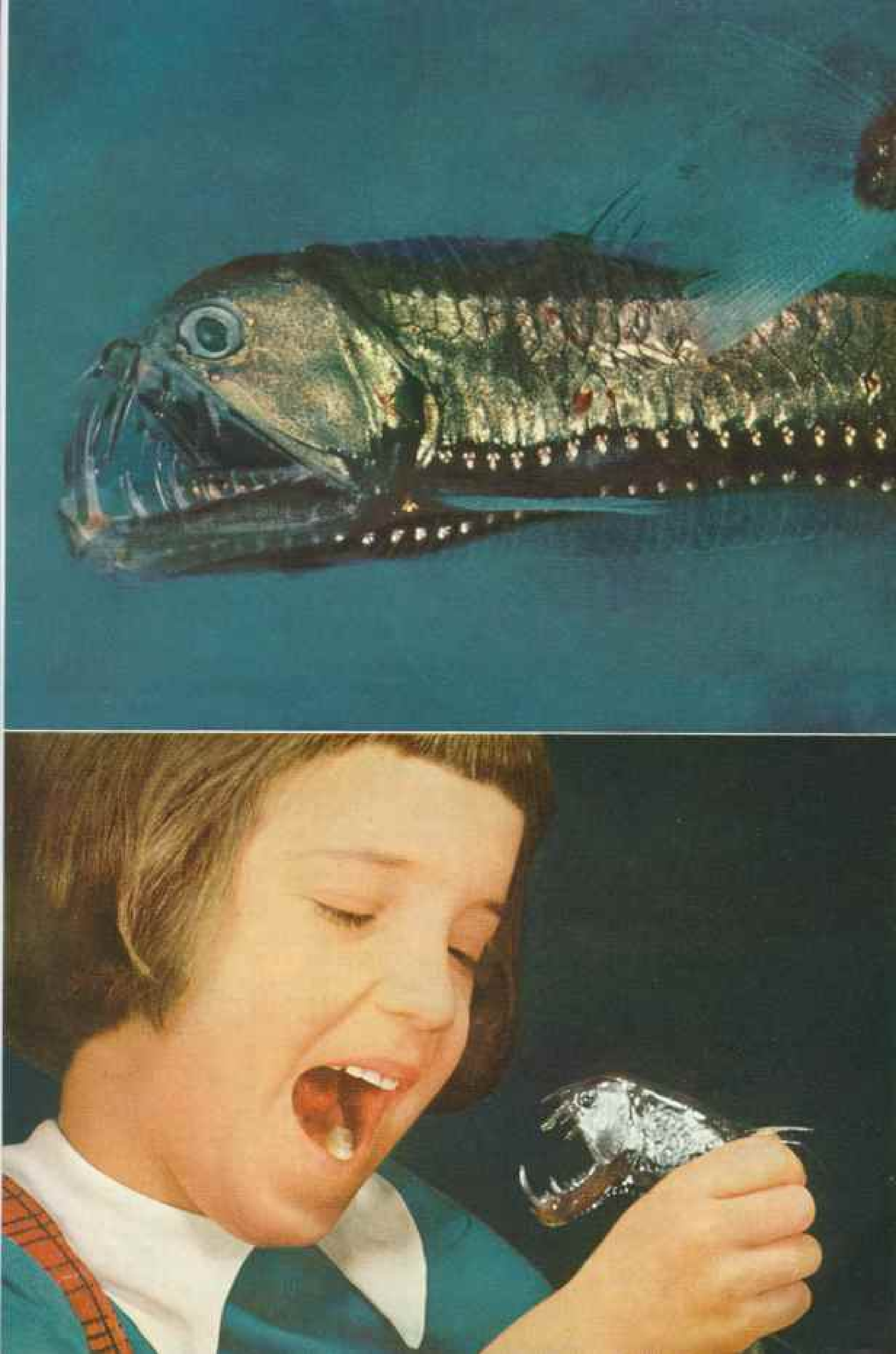
Indeed, at that moment the sea around our little boat seemed to have about it an element of personalized malice. Huge hands of water were slapping thunder against the sides of the boat, and streaming fingers of wetness reached up over the gunwales.

We continued toward the area of whirlpools, nearer and nearer. Giuseppe's oars dug deep into the water, often water that with a careen of the boat wasn't there. We were no farther than 30 feet from the area of maximum fury, and I could begin to see the depression of a suction funnel and hear the ominous gurgle of whirling water.

The Author

Dr. Paul A. Zahl, a distinguished American biologist and physiologist, excels in color photography of "miniature monsters." His previous articles in the NATIONAL GEOGRAPHIC MAGAZINE have included vivid portrayals of back-yard insects and marine life of the Bahamas. He has also brought to NATIONAL GEOGRAPHIC readers remarkable camera studies and first-hand observations of the flamingo, scarlet ibis, roseate spoonbill, and a number of exotic cage birds.

In 1939 and 1940 Dr. Zahl led several expeditions to South America. He is an associate director of the Haskins Laboratories, New York City.



A Deep-sea Predator Glows with Lights Like an Ocean Liner

Myriad strange creatures inhabiting sunless ocean depths generate brilliant patterns of cold light like that of fireflies.

To study these deep-sea goblins, the author spent several months this year at the Strait of Messina, between Sicily and the Italian mainland, where a rich variety of marine life is periodically swept up by whirling currents and strong winds. This issue presents his unique series of color photographs of deep-sea fauna.

The saber-toothed viperfish (*Chauliodus sloani*, left), tenant of the depths a half mile and more down, flashes jewellike light organs and snaps viciously with stiletto teeth. Among the tiny creatures of the deep, this 14-incher seems formidably large.

Three hatchetfish flee the slashing jaws of pursuing viperfish in this reconstruction of a daily undersea tragedy.

"Whose mouth is bigger?" asks Eda Kristin Zahl (left), the author's 5-year-old daughter, who holds a dead viperfish.

Kodachromes by Paul A. Zahl

The boat was rocking as I stood up for a last and better look at the vortex. I lost my balance and toppled backward—not quite overboard. My camera, held wrapped in a heavy sweater for protection against the spray, was forgotten. I caught Giuseppe's look again. But only when I began to feel the boat unassistedly heading in a circular direction on the whirlpool's outer brim did I hastily motion Giuseppe to reverse our course. I had no wish that day for a more intimate grapple with Charybdis.

My wife and small daughter were waiting for me on the shore. My wife's face was strained; she knew the basis for the legend of Charybdis and had been watching as our boat tossed within a gulp of the monster's mouth.

But 5-year-old Eda, who had been busy beachcombing, was obliviously radiant. She screamed joyfully as I jumped out of the boat, and, running to me, held forth the contents of her hands for me to examine. I bent down to look at her treasures—about a dozen small fish, each no longer than one of her fingers. Their bellies had tiny white or blue spots that shone brilliantly in the sun; they had the huge eyes and the fierce-looking mouths often characteristic of fish from the depths—which, indeed, they were.

These had been thrown up on the beach by the same swift currents that had created the whirls off shore. They were fresh; the gills of some were still moving.

Seas Pour Two Ways Through Strait

A glance at a map of the Mediterranean shows the northeast tip of the tricornered island of Sicily almost touching the mainland of Italy (page 585). Here, near the Sicilian city of Messina, the two land masses are separated by a strait about two miles across at its narrowest. Southward from these narrows the Strait of Messina opens into the Ionian Sea; northward, into the Tyrrhenian Sea.

These two seas are deep; in places the Ionian descends three miles, and the Tyrrhenian drops beyond the two-mile mark. But the narrow connecting channel between Sicily and the toe of the Italian boot is relatively shallow, as are the immediately adjoining waters. Depths of scarcely 300 feet are found in the channel.

When the tidal forces of moon and sun tug at the Ionian Sea, slightly raising its level, its waters flow northward for a few hours through the strait into the temporarily lower Tyrrhenian Sea. As the moon passes on over the Tyrrhenian Sea, the water ebbs in the reverse direction; at certain times and places the north and south currents sideswipe (page 590).

For ages these two connected seas have been tipping up and down, flowing back and forth through the Strait of Messina. Twice a month, when moon and sun are aligned so that the gravitational force of one is added to that of the other, a maximum tide occurs, and the currents in the strait attain such speed and power as to create areas of violent surface turbulence and dangerous whirlpools.

Deep-sea Creatures Stranded on Beaches

Not only do the surface waters react thus. Because of the topography of the sea floor in this region, waters farther down also feel the solar-lunar tug, and they too begin to move. When these deepwater currents strike the barrier shallows at Messina, they are violently deflected upward, forcibly dragging with them a host of organisms from below.

Hence, for these few hours twice a month the surface waters in the Strait of Messina abound with living or half-living creatures whose habitat is normally down where all is black and still. Here at the surface these involuntary visitors from that vast, mysterious world soon expire and are either cast ashore by wind and surf or are gobbled up by sea birds that knowingly hover over the strait, or by other surface predators. None from the deep survive.

After a strong onshore wind I have seen beaches along the Strait of Messina littered with thousands of tiny dead or dying creatures whose strange appearance would make even artist Dali wince. I have seen multitudes of sea gulls and puffins waiting aloft for the uprising currents to deliver doomed fishes, squid, and shrimp to the surface (page 584).

Past published accounts of deep-sea expeditions have, for good reason, been illustrated only with paintings or with black-and-white photographs of preserved or dying specimens from great depths. When I mentioned to the editors of the National Geographic Magazine my desire to seek deep-sea fishes in the Messina whirlpools, and to have my cameras and lights set up at a shoreside laboratory in order to photograph my catches immediately after they were taken from the sea, before they could die or deteriorate, they agreed that if it could be done we would have a

Reduction by Paul A. Zahl (enlarged 8 times)

Saber-toothed Viperfish from Mediterranean Depths Bares the Fangs of a Primeval Tiger

Luminous patches gleam inside jaws. Teeth bend under pressure, but easily pierce soft bodies of deep-sea victims.

584

Fish-hunting Gulls Wheel and Soar Above the Turbulent Strait of Messina

Marine life forced to the surface by churning currents attracts these sea birds. Wild water like this might swamp a small boat, but offers no threat to the ferry from which the picture was taken.

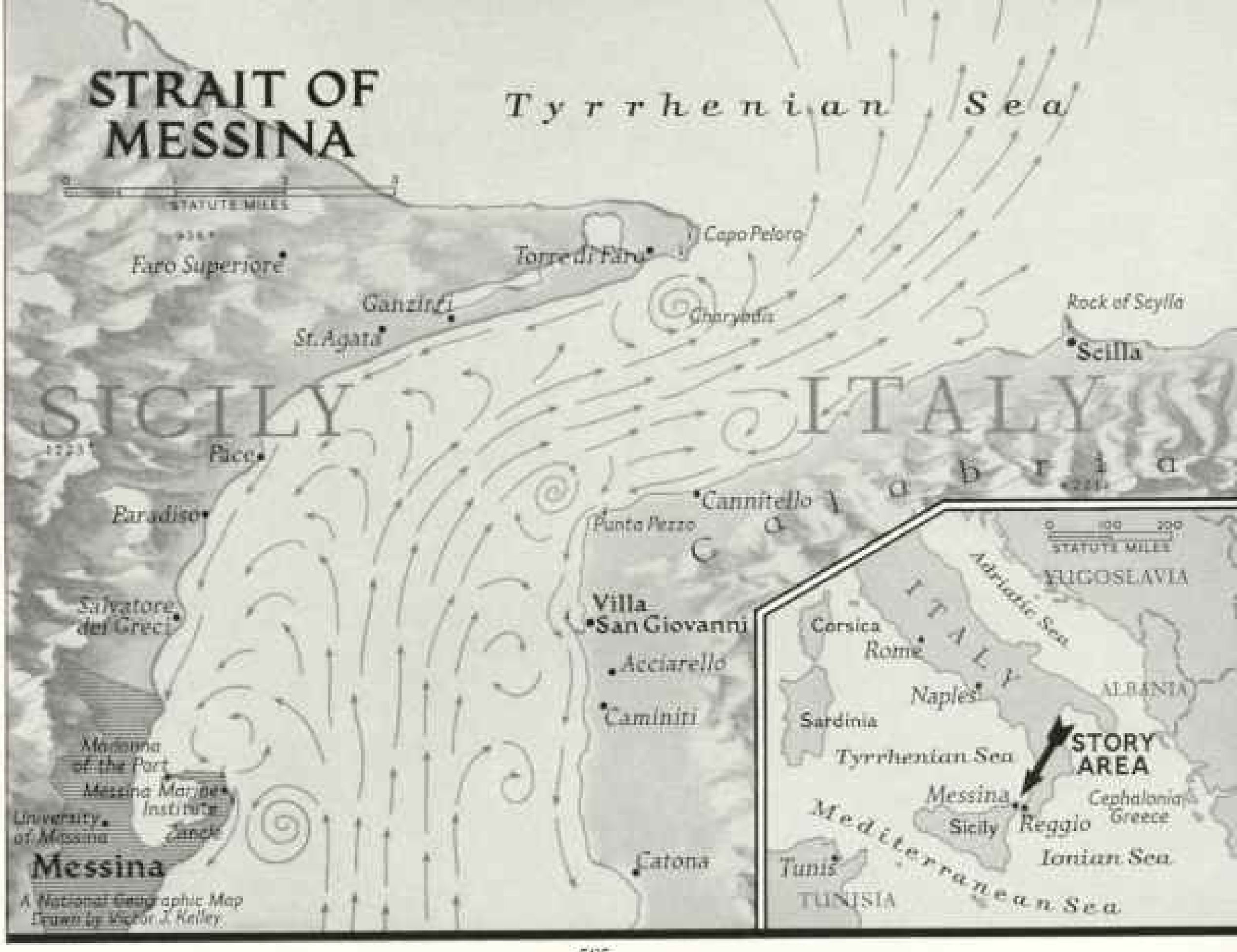
most unusual set of "firsts." If not, well, you can't shoot a man for trying. The National Geographic Society elected to sponsor the project.

Deep-sea Fishes Wear Lights

I wished also to make a comparative life study of the luminescent organs known to characterize the majority of deep-sea fishes. On the bellies and sides of pickled museum specimens I had seen light organs that had once illuminated the blackness of the depths, lights that had long since been extinguished. Lights aglow on living deep-sea fishes, on the other hand, are something that not many people have seen. I was stirred to think that without a bathysphere, but with the help of the Messina currents, I might be able to see such luminous fishes up close.

Much preparation was necessary. New photographic techniques had to be improvised on faith, for at home they could not be definitively tested. Only there on the spot at Messina would I be able to ascertain whether my improvisations were sound. Such blind but hopeful preparation took about three months in New York.

I had been graciously invited by representatives of the Italian Government to make my headquarters at the Istituto Talassografico di Messina (Messina Marine Institute), which stands at the edge of the strait within a stone's throw of one of the largest whirlpool areas. The director of the Institute, Professor Antonio Spartà, had written that his Institute had suffered much from bombing during the war. But reconstruction was well under way, and I would be welcomed



Ancient Mariners Feared These Whirling Waters, the Home of Scylla and Charybdis

Powerful and swiftly reversing tidal currents race through the narrow channel. Countercurrents develop in the lee of headlands. Whirlpools form wherever current and countercurrent meet, or where they encounter irregular depths. Ionian water is colder, saltier, and denser than Tyrrhenian. Where the two water masses clash, upwelling and subsidence occur. All these factors combine to produce Messina's dread turbulence.

The whirlpools stay in relatively constant positions. Homer's Charybdis, however, no longer swirls a "bowshot" away from the rock of Scylla; it now eddies 1,100 yards off Capo Peloro Lighthouse. The shift may have been caused by violent earthquakes.

This map is based on a simplification of the strait's complex currents by oceanographer W. E. Maloney of the U. S. Navy Hydrographic Office. Currents run about six hours as shown, then reverse.

In addition to the good offices and confidence of the National Geographic Society, letters in my behalf were written by the Italian Ambassador in Washington, His Excellency Dr. Alberto Tarchiani. Dr. Michael Lerner, the noted angler, generously aided in clearing the various obstacles inherent in any foreign survey of this sort.

My wife and I and our small daughter arrived in the city of Messina on January 1, 1953. This was to be our home for the next two or three months—this Messina which, with thousands of its inhabitants, had been destroyed by an earthquake in 1908; which during the recent war had been largely leveled by Allied bombs; which had built itself up again and was showing a new face in the form of shiny store fronts, modern buses, an increasing number of automobiles, and a neon-lighted Via Garibaldi.

On our arrival in midwinter, when the mountains rising behind Messina and on the other side of the strait were snow capped, and when Sicily was anything but sunny, this city of 221,000 smiled the sad-gay smile of the brave who have known suffering.

Sicily in the winter of 1953 was much colder than we had expected. My lightweight suits and tropical shirts remained packed during our entire visit. In the shelter of our hotel quarters, as well as in the laboratory, I was rarely without jacket, sweater, muffler, and gloves. Just try to focus a camera with gloved hands!

We had scheduled our visit at this time of the year primarily because January through March, according to all reports, is the most favorable period for finding deep-sea fishes in the strait. Why winter should be better than

(Text continued on page 591)

Author and Daughter, Beachcombing on Sicily's Shore, Watch Whirlpools Rack the Strait of Messina. Italy's Toe Lies Beyond

Each morning Dr. Zahl, with collecting jar and camera, sought rare deep-sea specimens washed up on the beach. Here he views the mainland town of Villa San Giovanni and the Messina-mainland ferry (on horizon). Hidden beyond the distant headland juts the rock of Scylla, dread monster of legend (page 568).

Deep-sea Squid Stare with Enormous Eyes

Squid of many kinds abound in all seas. Some, 50-foot giants, battle sperm whales and give rise to sea-monster legends.

→Others, such as *Rossia macrosoma*, can perch on the end of a pencil.

Like its octopus cousin, the squid mastered the arts of jet propulsion and smoke screening long before man dreamed of such things. Water squirting through a funnel propels the animal, and clouds of ink confuse enemy pursuers, possibly paralyzing their sight and smell.

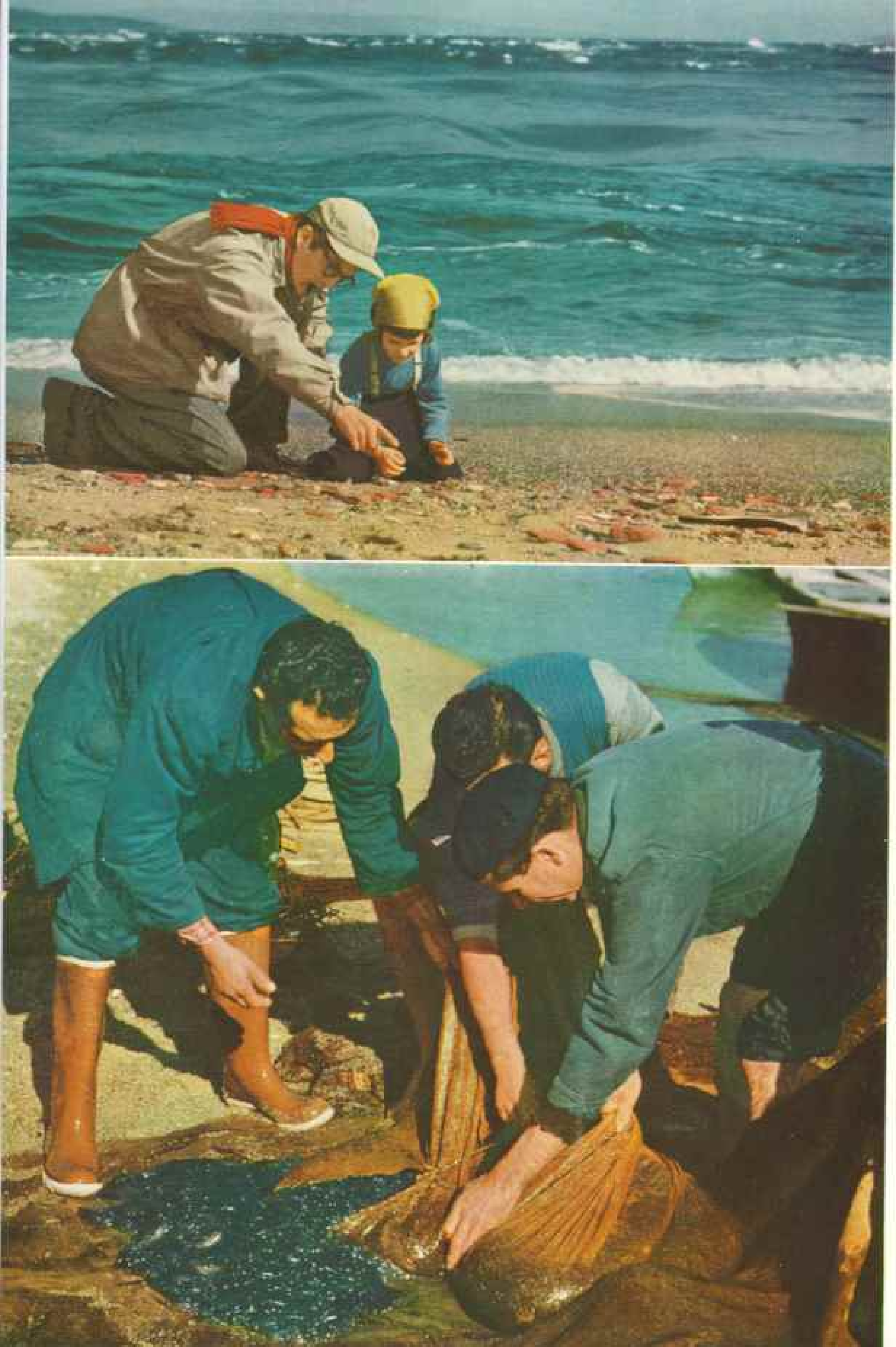
←*Heteroteuthis dispar*, a deep-sea variety scarcely bigger than a man's thumbnail, protects itself by shooting clouds of luminous fluid. Numerous other deep-sea squid illumine the depths with living candles like those of the viperfish (page 580).

Chromatophores, or color cells, form reddish freckles on these three. They can expand or contract with lightning rapidity to change the creature's color.

Kodachromes by Paul A. Zahl

^ An Abandoned Castle Overlooks the Tyrrhenian Sea from Scylla's Legendary Rock; Scilla Village (Right) Produces Wine and Silk

⚜ Just a decade ago Messina stood in ruins, almost as completely shattered by bombs as it had been by the disastrous earthquake of 1908. Only the Madonna of the Port (left), arm upraised in blessing at the harbor entrance, remained unharmed. Here a church balcony towers high above commercial establishments and apartments of the rebuilt city and the strait across which British General Montgomery's Eighth Army jumped for the invasion of the Italian mainland. A curving spit, the Zancle (sickle) encloses the harbor, where an Italian liner takes leave for Australia. The laboratory of the Messina Marine Institute, where the author worked, lies just left of the lighthouse (center). Snow on the distant Calabrian mountains testifies to winter's severity.



any other time of the year has not been established, although it is thought that many deep-sea species tend to migrate vertically during these months and so are more likely to be caught in the upflowing currents. This vertical migration may be associated with the spawning pattern.

The inclemency of the weather turned out to be a disguised blessing. Some observers believe that many surfaced deep-sea fishes die not because of the decreased pressure but because of the increased temperature. The surface waters of the strait, usually quite temperate, were at 50° to 52° Fahrenheit during the winter of 1953, not much different from the known temperature of the Mediterranean deeps. Thus, fishes brought up from the depths were not subject to the extreme thermal shifts of those caught, say, in a deep-sea net haul off Bermuda. The cold water of the Strait of Messina in January and February helped keep many of my catches alive for hours.

If, on arrival at Messina, I thought that these fishes were going to be handed to me on a platter, I was to learn better. Within a day or so I had my equipment set up and ready; my tanks were full of cold circulating strait water; my notebooks were open and the cap was off my fountain pen.

Giuseppe, my right-hand man, saw my eagerness. He shook his fine Sicilian head and kept repeating: "Quarto di luna . . . quarto di luna." My knowledge of Italian then was shaky, but I soon gathered that he meant it was now quarter moon and there would be no deepwater specimens until the moon had gone into its full phase. Giuseppe confirmed my interpretation by making a circle with his fingers, and explaining with great promise: "Luna piena—molto materiale." Full moon—much material.

But there was another requirement for "molto materiale." Next day Giuseppe explained it to me, with the translation help of young Francesco Li Greci, an English-speaking Italian student of zoology at the University of Messina, who had dropped in for a visit. Giuseppe pointed southward and kept repeating the word "sirocco." By this he meant that, although deep-sea currents during the full moon would bring hundreds of specimens near or to the surface of the strait, a strong south wind, or sirocco, was needed to concentrate them so they could be found.

This concentration would take place mainly in waters along a shore line jutting into the strait from Messina northeastward, arcing to a land's end where Capo Peloro Lighthouse stands. Along this barrier the sirocco would pile up, first in offshore waters, then on the beach, anything floating through the strait. Without this south wind, the thinly dispersed deep-sea organisms would be swept through the strait and into the Tyrrhenian Sea, the while being set upon by hungry gulls. So I covered my aquaria and put the cap back on my fountain pen. The full moon was not due for four days.

Visit to a Monster's Lair

While waiting I took my family on a ferry ride across the strait to the mainland of Italy. We disembarked at Villa San Giovanni and walked a few miles up the vineyard-terraced coast until we came to the picturesque village of Scilla, clinging to the side of a high bluff. A great bare rock mass, part of the village cliff, rose sheer more than 100 feet out of the sea. This was the rock of Scylla, of Homeric fame, where dwelt the fearful monster (page 588).

We sat by the road to eat our lunch and contemplate the spectacle. I pulled a notebook from my pocket and read aloud an entry which I had made a month earlier from the Encyclopaedia Britannica:

"In Homer Scylla is a dreadful sea-monster . . . with six heads, twelve feet, and a voice like the yelp of a puppy."

I saw little Eda's eyes beginning to pop as I continued:

"In later authors and in art she is a mermaid, with dogs' heads springing from her loins. She dwelt in a cave in a high rock, out of which she stuck her heads, fishing for

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Strange Life Cast Up by Wind and Tide Litters Beach and Fishermen's Nets

Homer, in the *Odyssey*, tells how Ulysses was threatened by alternate perils: Scylla, a snaky six-headed monster dwelling in a cliffside cave; and Charybdis, an undersea monster living near by, which thrice daily sucked the sea into a frightful whirlpool.

Navigators in the Strait of Messina no longer credit the legend, but they still avoid Scylla's castle-crowned promontory and the turbulent eddies caused by conflicting tidal currents from the Ionian and Tyrrhenian Seas (page 586).

These currents bring to the surface countless deep-sea creatures which the sirocco, a wind blowing from the south, drives shoreward.

The author (above) shows his daughter a particularly interesting specimen. Current in the immediate foreground races to the left, creating whitecapped whirlpools where it shears against countercurrents.

Sicilian fishermen (below) sort fish from nets cluttered with jellyfish and plankton.

 Kodachromes by Paul A. Zahl

This Shrimp Wears Flowering Polka Dots Like a Clown

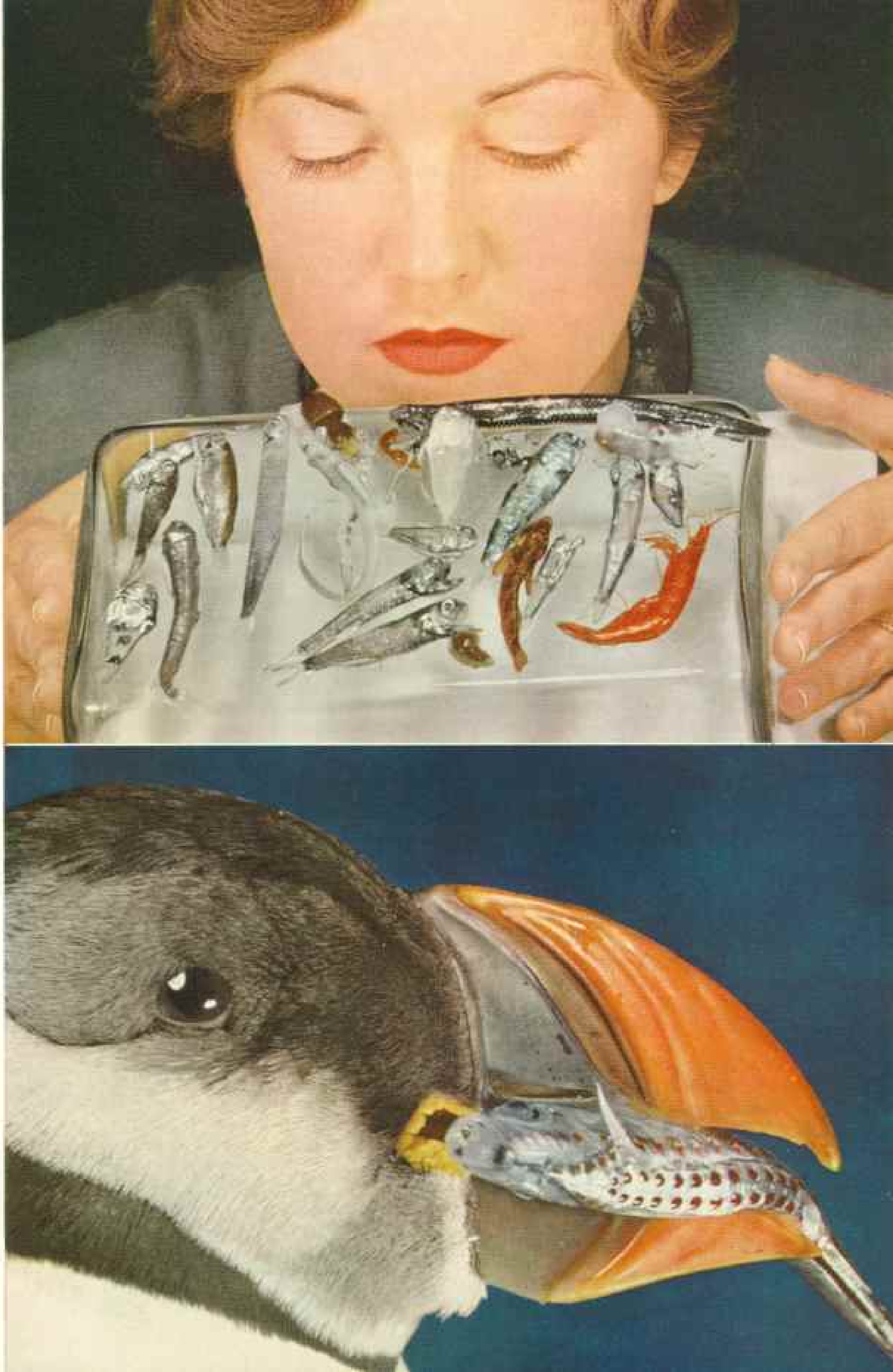
Many of the sea's children—especially those of the depths—wear somber browns and blacks. Not so the shrimps and prawns. They flaunt a riot of hues; flaming red, scarlet, purple (page 616). But in the twilight region of the sea, where red becomes black, these rich colors are lost.

This shrimp (*Sergestes*, above, enlarged four times, and left, enlarged eight times) waves black eyes on stalks above a body spattered with asterlike chromatophores, or pigment cells. These remarkably large cells extend or withdraw the pigment in their rays as the animal changes color.

→This puffin, one of the sea birds that feed greedily on the riches of Messina Strait, ran afoul of a fisherman's net. During brief captivity it eagerly seized this proffered fish.

Above: The author's wife inspects deep-sea specimens taken in a night's catch.

Kodachromes by Paul A. Zahl



marine creatures and snatching the seamen out of passing ships. Within a bowshot was another rock under which dwelt Charybdis, who thrice a day sucked in and thrice spouted out the sea water. . . ."

But little Eda takes fairy tales with some skepticism. Her eyes were on the rock and the near-by village. "Why do all those people live in that town, if the monster is so terrible?" she asked.

"Let's go find out," I replied, closing my notebook. We got up and headed for the rock of Scylla.

Half an hour later we were on the summit, having followed an easy path up the side. All we found there were an abandoned castle, a few government weather instruments, and a magnificent view of the Tyrrhenian Sea.

This could have been a day of anticlimax for the child, but it proved not to be so, for a little while later down on the beach we found as authentic a monster as anyone could ask for—many monsters, in fact.

Miniature Monsters of Scylla

We were strolling on the gray sand, and Eda was busy looking for shells. Suddenly I saw her stoop and pick up a tiny silvery object. She examined it closely, then called to me in matter-of-fact tones, "Daddy, here's that monster. Look at its horrible mouth and eyes, and the fire on its stomach."

By this time I had reached her, and I soon recognized that what she had found was an *Argyropelecus* (page 596). Although it is sometimes caught near the surface, *Argyropelecus* migrates vertically and ranges down to considerable depths.

There had been an onshore wind all morning. Any fish brought up from the deep by pre-full-moon currents—fish that normally with a sirocco would have landed on the beaches of Sicily across the strait—were that day being washed ashore here on the beach of Scilla.

The creature in Eda's hand was only an inch and a half long and quite dead. What produced its monstrous aspect were the gaping cavernous mouth and the closely set, black-appearing globular eyes that extended up out of the head. Part of the skull was transparent, clearly revealing the brain. On the underside of the thin body were lines and packets of light organs, reflecting bright red.

The creature's diminutive size made no difference; here was a monster which to the child was far more convincing than any legend. We continued walking along the beach, and, although we found no other deep-sea species that day, we picked up at least a dozen uniformly weird specimens of *Argyropelecus*.

Today, months later, if you ask Eda what monster lives at Scylla, she will, without batting an eye, reply, "Argyropelecus."

Full Moon Spins Whirlpools

When full moon came I patrolled up and down the beach near the Institute almost the whole of the first day. At 8 in the morning the sea was calm and the air cold. Fishermen in small two-, four-, or six-man rowboats not far off shore were casting nets for market fish.

About 10 o'clock I noticed the water near shore beginning slowly to move parallel to the beach in the direction of Messina harbor, about half a mile westward. This seemed to be a signal for the fishing boats to head for port; they now began to move Messina-ward, riding close to shore on the current, which was gradually growing more rapid.

By 11 the sea was clear of small craft. The current was now a rampaging river.

By 11:30 an area of curiously jumping whitecaps began to develop about 200 yards off the Institute beach. On its near side the sea was still sweeping in the direction of the city harbor; on the far side it moved in the opposite direction. Where these two opposing currents sheared against each other a foamy turbulence was developing, which I could make out as a long series of whirlpools, some only a foot or two in diameter, some 10 or 12 feet across (page 586).

Elsewhere in the strait—off Ganzirri, off Punta Pezzo, off Scilla, but too far away for me to see without binoculars—similar areas of turbulence were also arising, I was told.

I was so impressed by this spectacle of

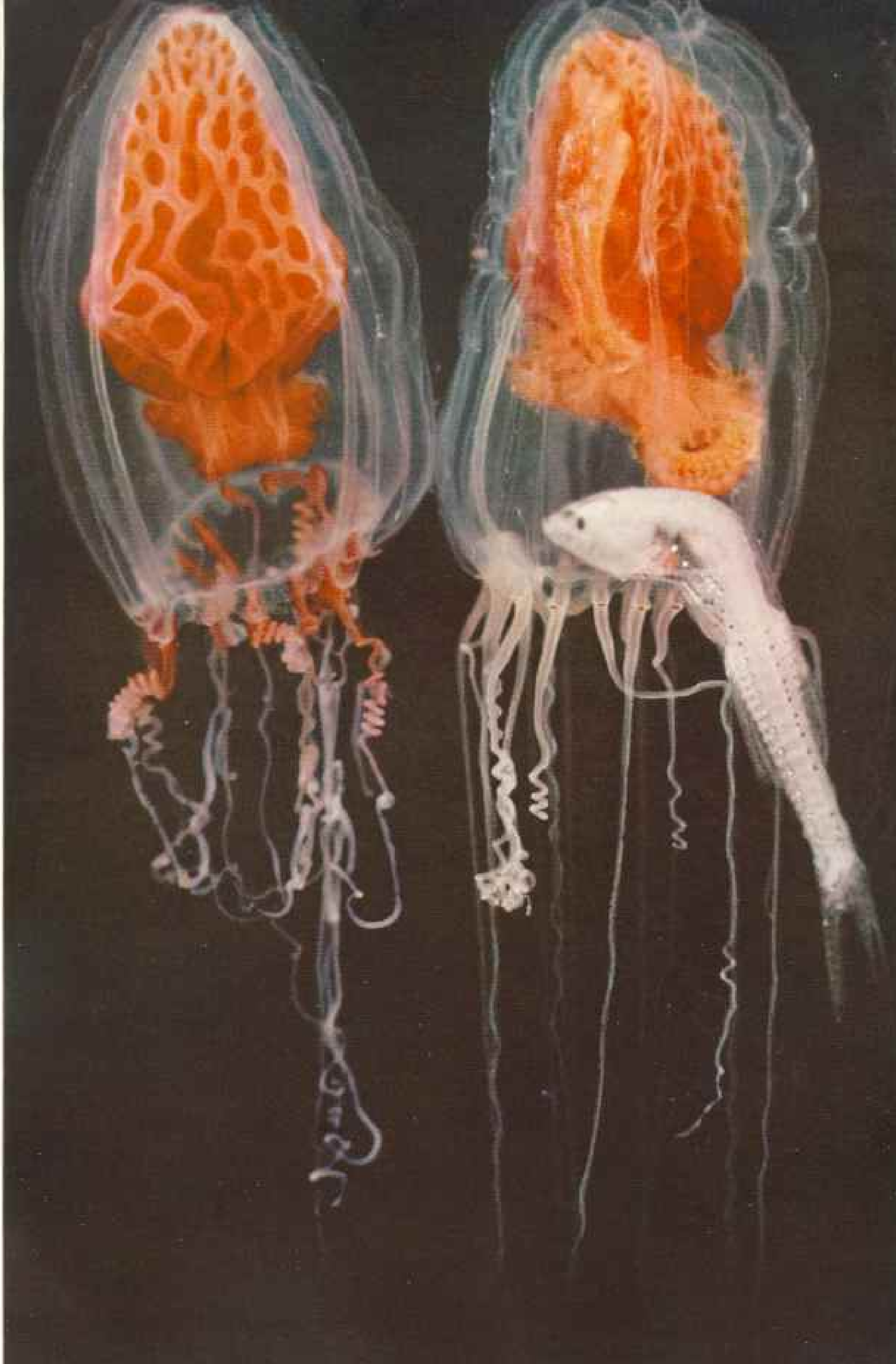
(Text continued on page 603)

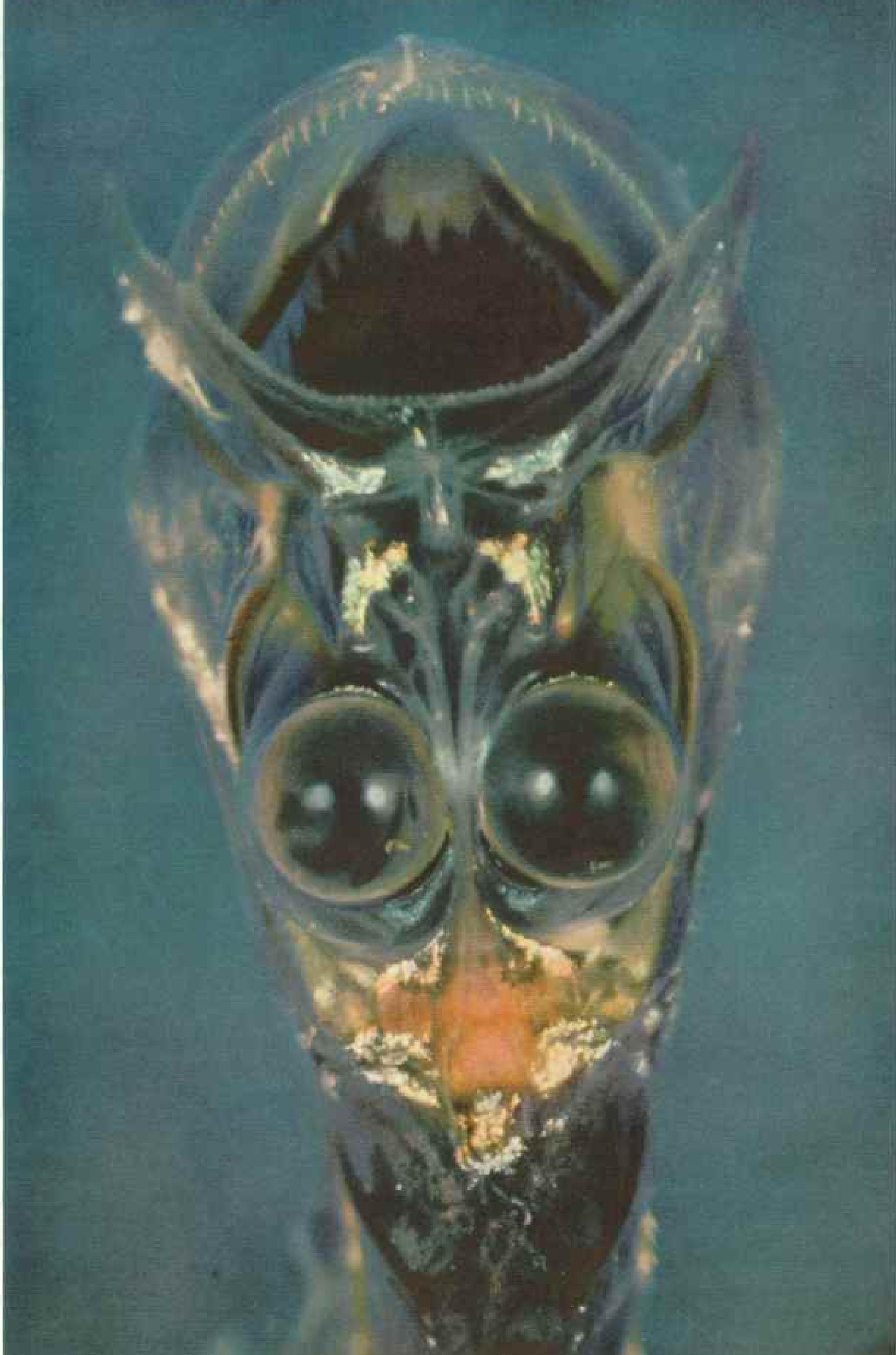
Deadly Tentacles of a Delicate Medusa Ensnare a Hapless Fish

These seagoing jellyfish are no bigger than almonds. As they drift, lethal threads coil and drop like elevators, waiting to throw hundreds of stinging hairs into any prey coming within reach. Once paralyzed, victims are slowly pulled into the animal's body.

Voracious medusa at right has ingested a marine worm, whose body may be discerned. Rows of light organs on the captured fish help identify it as a *Cyclothone* from the depths (page 611).

 Kodachrome by Paul A. Zahl (Enlarged 1 times)





Silver Hatchetfish Watches His World Through Astrodome Eyes

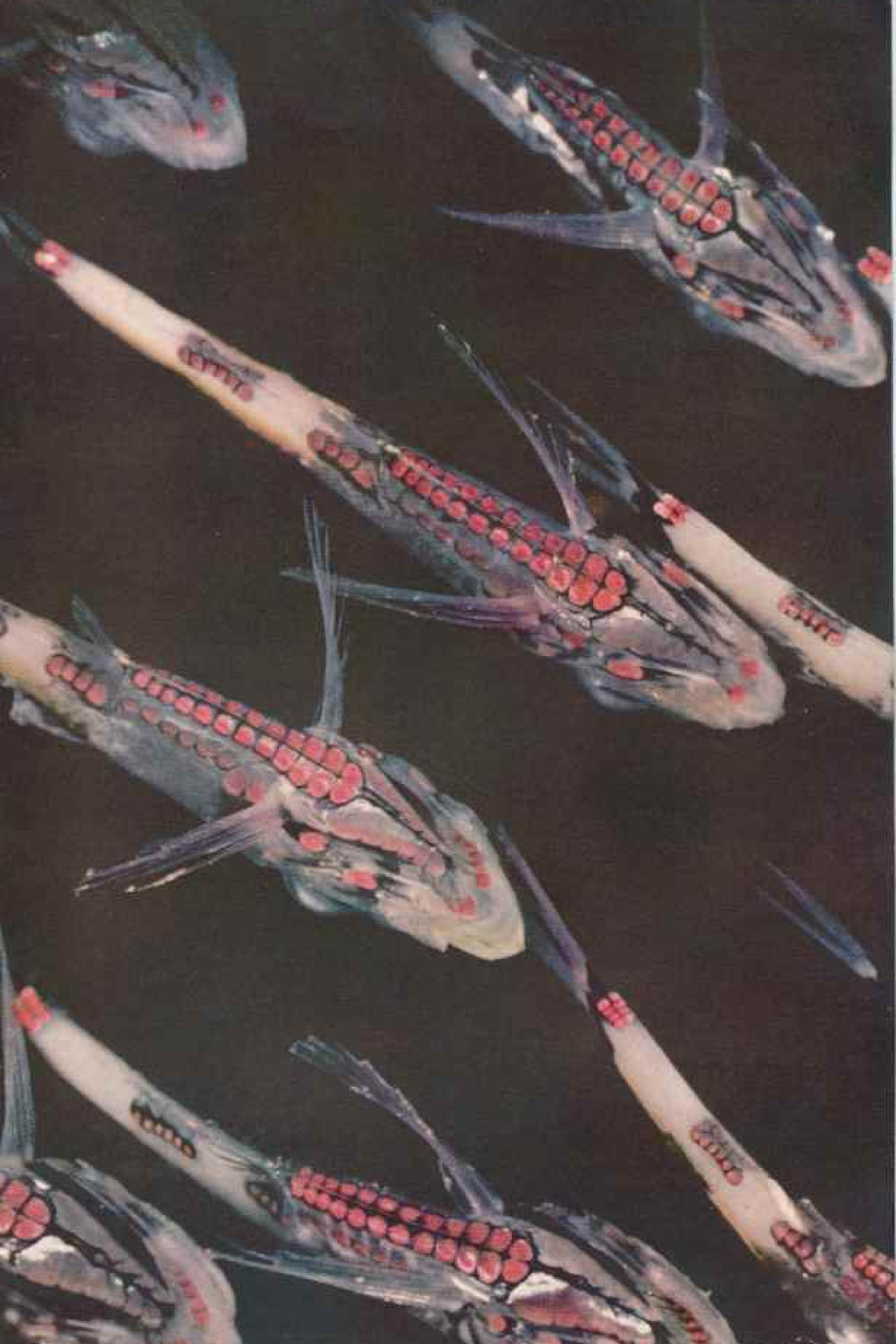
Nocturnal animals such as owls and tarsiers often have abnormally large eyes, the better to catch the night's faint light. Many fish and crustaceans living near the lowest limits of the sun's penetration show the same peculiarity.

One such is *Argyropelecus*, the tiny hatchetfish (opposite and right). His bulging eyes, set close in front of a transparent brain case and above a cavernous maw, hold lenses suggesting a telescope. The eyes, like those in many other deep-sea creatures kept by the author in his seaside aquarium, became cloudy long before the animal died.

Viewed from below (page 598), the slab-sided hatchetfish shows only a narrow blade studded with brilliant lights. Oddly enough the lights point down, doing little good for upward scanning eyes. Silvery pigment turns the fish's sides into a blaze of tinsel.

Above: Mrs. Zahl contrasts a fully grown *Argyropelecus* with an enlarged drawing made for scientific illustration by Signor Filiberto Mazza of Messina's Marine Institute.

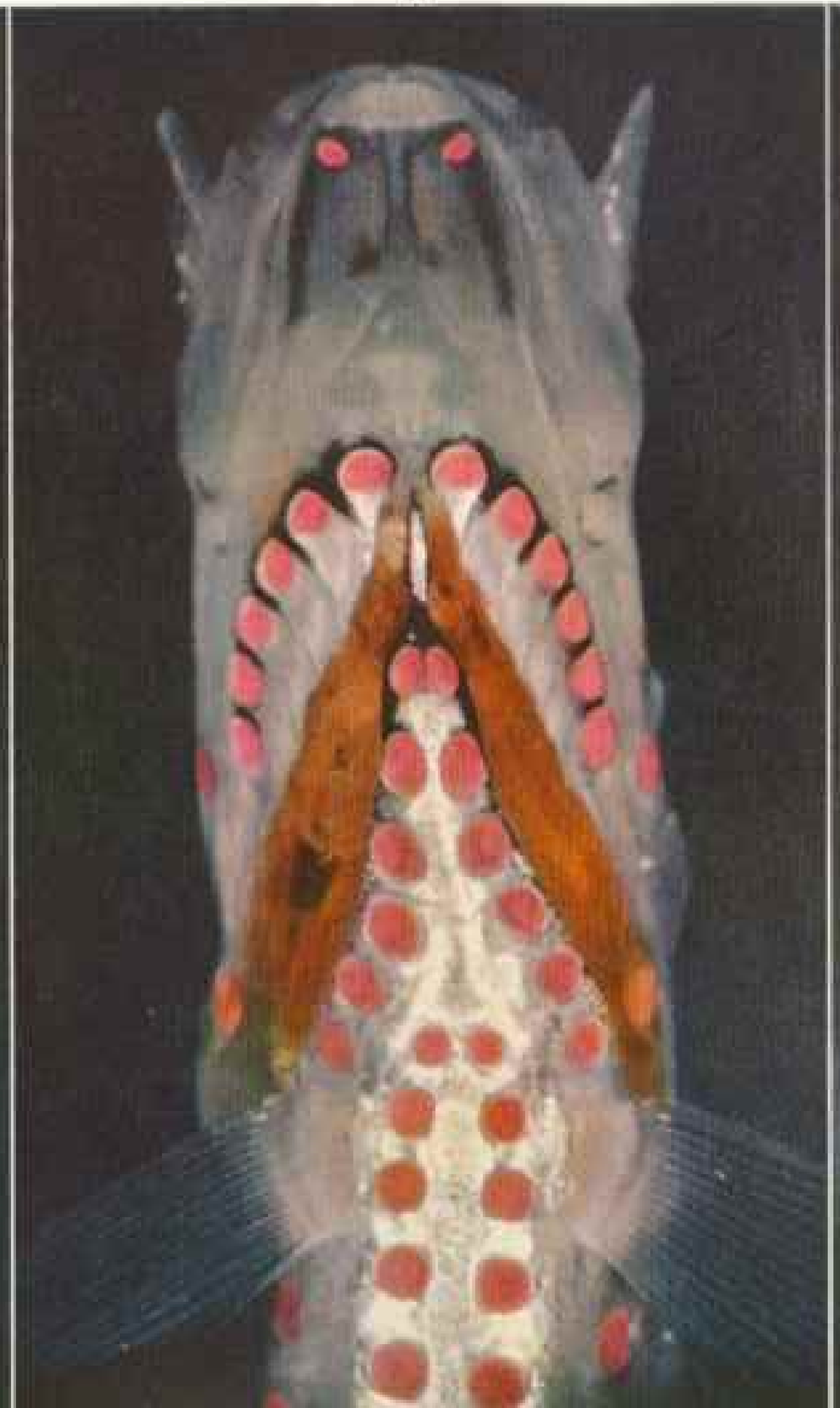
Kodachromes by Paul A. Zahl
(Enlarged 18 and 5 times)

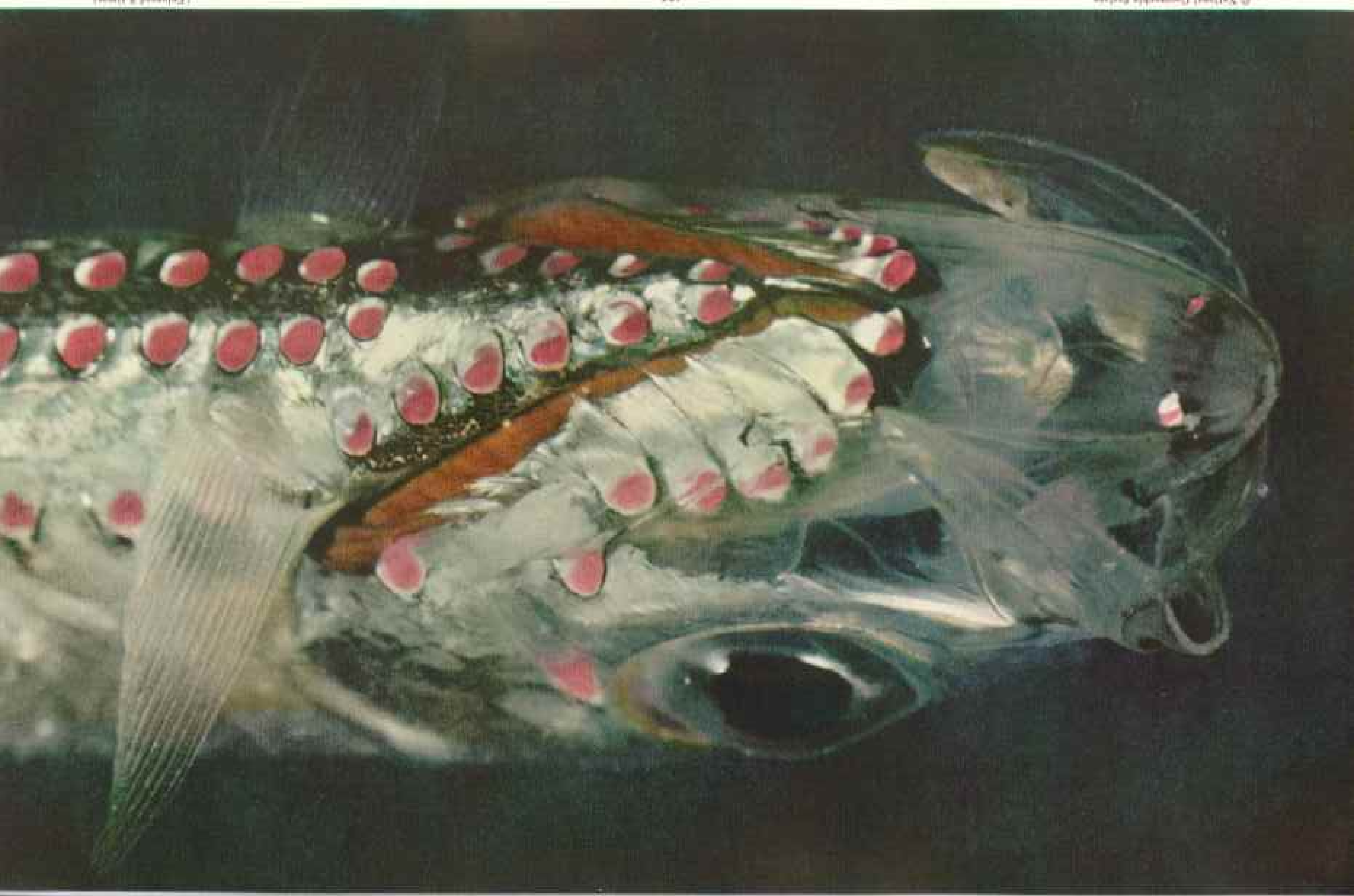


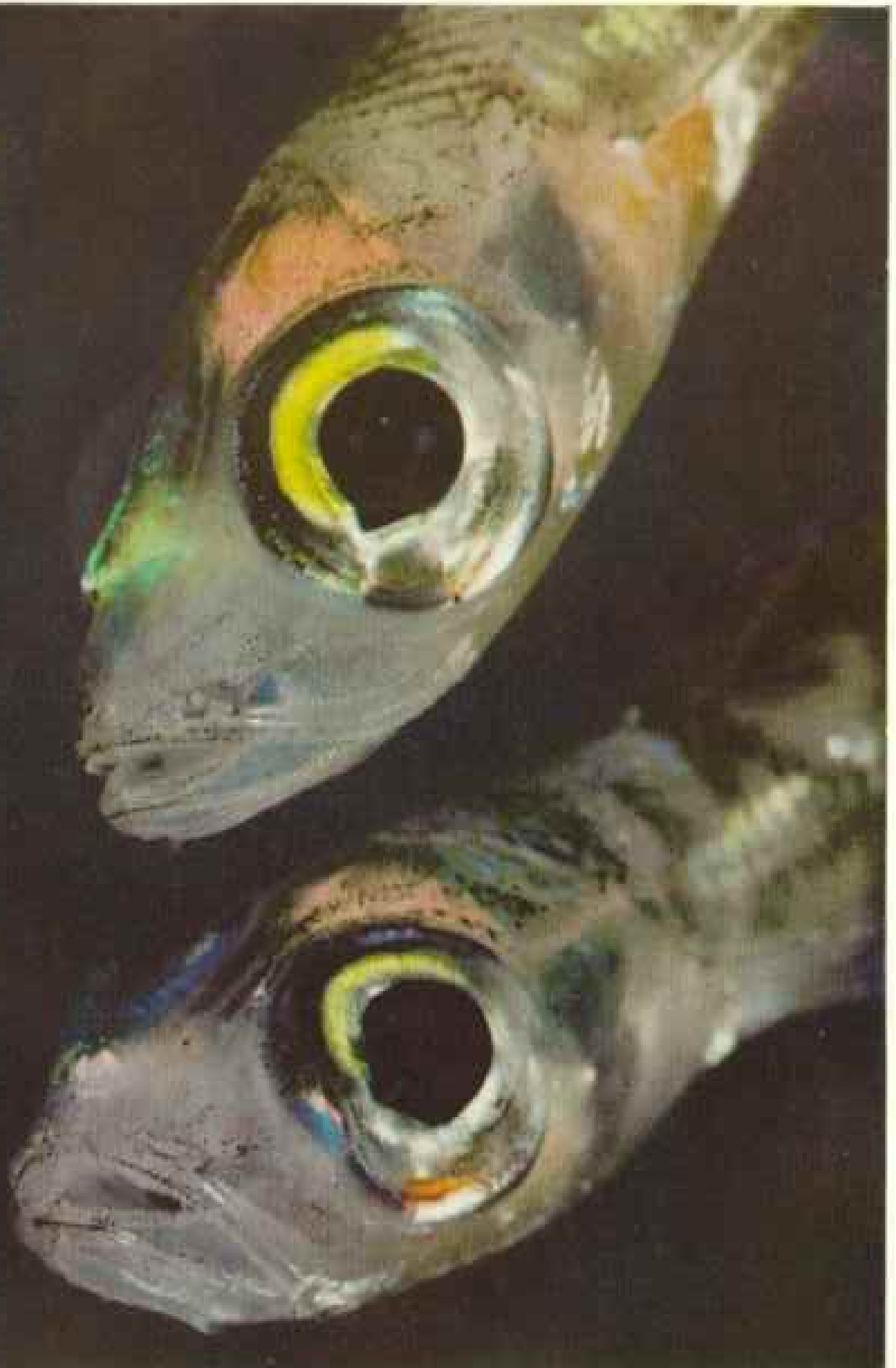
Deep-sea Fishes, Living in Eternal Night, Carry Flashing Torches Which May Lure Prey, Repel Enemies, or Signal Friends

Luminescent organs, or photophores, glow in such characteristic hieroglyphics on most deep-sea species that scientists use them for identification. They may appear on any part of the body, in fanciful colors and patterns. Those of the hatchetfish (right and opposite page) resemble kernels of corn.

Kodachromes by Paul A. Zahl (enlarged 5, 5, and 18 times)







Blisters on a Snaky Head Mark an Effect of Reduced Pressure

Pressure increases sharply as the ocean descends. At four miles down, for example, water crushes with a weight 640 times that of the atmosphere, or four and a half tons to the square inch.

Deep-sea life endures such external weight by maintaining equal pressure inside body tissues. Fish with closed air bladders must stay within restricted depths lest expansion of the bladder bring sudden buoyancy and force them to "fall" upward and die.

Miraculously, many other fishes migrate rapidly from one depth to another—sometimes daily—without injury. What marvelous hydrostatic equipment makes this possible no one knows. Mortality among specimens hauled up from the icy-cold abyss may result more from change in temperature than pressure.

Man, by comparison, can stand little more pressure under water than 65 pounds to the square inch.

Paralepis (enlarged eight times), one fish taken by the author, carries blisters possibly caused by expanding gases as the fish was forced upward to zones of lower pressure.

◂ *Chlorophthalmus* (enlarged eight times) possesses brilliant iridescent eyes, but no luminescence like that of *Mauroticus* (opposite page).

Kodachromes by Paul A. Zahl

the whirlpools close at hand that I hardly noticed there was no wind. That was bad, said Giuseppe, who was watching on the beach with me. Without a sirocco we would have a hard time getting any large number of specimens.

By 12:30 the turbulence began to abate. Giuseppe, who by this time had brought nets, collecting jars, and buckets from the Institute, was instructing the workmen to help shove his boat off the dry beach and into the water. He seemed to be in a hurry. "The gulls," he said to me in Italian, "will get all the scopelids [a large family of deep-sea fish, highly edible] before I've had a chance."

I had been watching hundreds of sea gulls and puffins hovering over the whirlpools. Diving and rising, diving and rising, they looked like a swarm of mad bees.

Soon the men had the boat afloat and Giuseppe was off. I didn't go along the first day, for I wanted to ready my equipment in the laboratory in case he brought back specimens. But for a few minutes I watched. Giuseppe rowed into the area which half an hour earlier had been alive with whirlpools. There he gave the boat free rein and hung over the bow holding ready a fine-mesh dip net. Repeatedly I saw him dip and transfer something into the jars. After a time I saw him drop a circular-mouthed troll net overboard and then begin to row again.

I left him so engaged and returned to my laboratory. About midafternoon there was a knock at the door and Giuseppe entered. "The birds didn't get all the fish," he announced with obvious pride as he placed two collecting jars on my work bench.

If I didn't gasp, I certainly should have, for in one of the jars was a magnificent individual of a species I was familiar with only from textbooks—*Chauliodus sloani* (page 580). In the other jar were at least 50 much smaller fish, many floating near the surface, dead or dying; others still swimming about.

But my eye was mainly on that *Chauliodus*. He was a snaky creature with a head like that of a saber-toothed tiger, easily justifying his common name: the saber-toothed viperfish. About 10 inches long, he seemed at that moment to be enjoying very good health, which is certainly remarkable considering that he was now probably a half mile or so from home, vertically speaking.

Glass Rod Annoys Viperfish

Quickly I transferred him to a large tank of running sea water. There on his belly and sides I saw lines of bright blue-white light organs glowing or reflecting like so many stars. I gently prodded the creature with a glass rod, and his mouth opened to incredible dimensions, just as shown on page 583, revealing not only the most astounding teeth I had ever seen in fish or mammal but also a previously hidden set of purple-blue light organs lining the base of the mouth.

Then suddenly, with the speed and viciousness of an infuriated cobra, his mouth snapped shut in the direction of the annoying glass rod. Now the lower teeth extended beyond the upper lip, and the upper teeth below the lower lip. Some days later, with another specimen, I put on this glass-rod demonstration for my wife and little Eda. As a result I had to wait weeks before I could persuade the latter to pick up a harmless dying viperfish and pose for a picture.

So voracious is this creature that sometimes a netted specimen was found in the process of swallowing another fish nearly half its size; nor as *Chauliodus* died would he release or disgorge his victim. The jungle ethic of eat or be eaten was never more realistically illustrated. The largest viperfish we caught measured 14 inches in length and weighed about half a pound. The longest any specimen lived in my tanks was eight hours.

But ferocity bears no relation to size in this world of marine furies. In Giuseppe's other jar were adults of a genus known as *Cyclothone*, about an inch long, almost transparent, incredibly delicate, and as innocent looking as guppies—until they opened their mouths. In these Lilliputian monsters the ratio of mouth to body size exceeded that of any other deep-sea fish I encountered (page 611).

As in *Chauliodus*, when the great maw was agape a whole battery of tiny glowing light organs was revealed; when the mouth closed, these disappeared under the gill shield.

Fluorescent Crustaceans Rival Walt Disney Creations

These crablike miniatures, which could hide behind a grain of wheat, carry red eyes on stalks and shine with unearthly purple. During night fishing in Messina's waters, the boat's light attracted legions of them, their paths forming webs of lightning streaks.

Countless billions of animals like these keep larger deep-sea species from starvation.

 Illustrations by Paul A. Zahl (Enlarged 22 times)

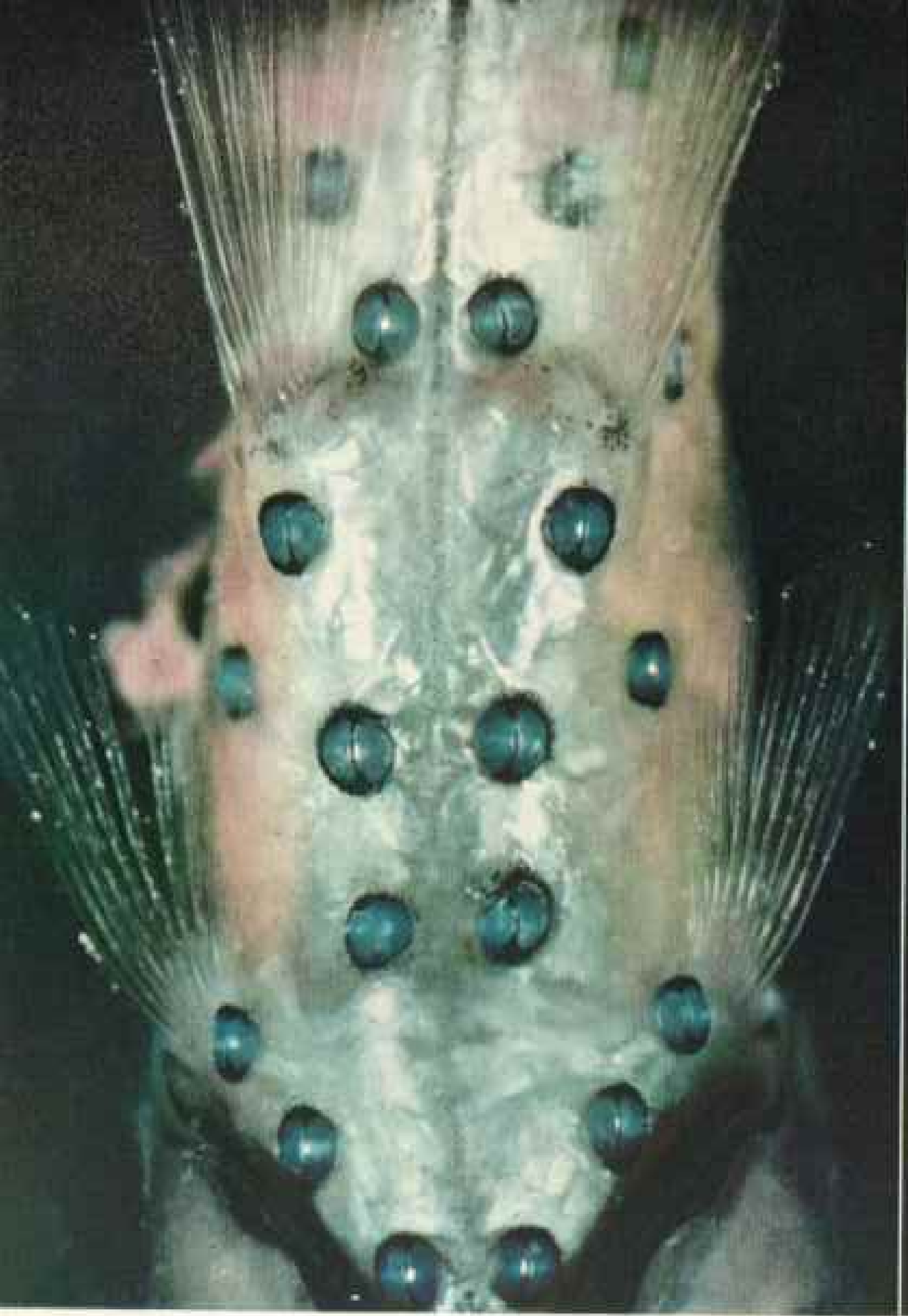
Mrs. Zahl Sketches Deep-sea Specimens in a Messina Laboratory

Easy collecting of the rich and diverse life inhabiting Messina Strait calls for a combination of circumstances: the right tidal pull of moon and sun to create the whirling currents; steady blowing of the south wind to concentrate the upflung marine life; cold weather to refrigerate the specimens; and fast work to beat the birds.

Fortunately the author enjoyed all these favorable circumstances and gathered unusually large quantities of fine living specimens. In his laboratory tanks he studied and photographed them, then preserved and classified them for future use.

Here Mrs. Zahl serves as technical assistant to the expedition. Choice specimens fill laboratory jars around her as she sketches a young shark (page 607). Before her are dissecting tools and a hypodermic needle for injecting preservative.

Ψ Brilliant patches of light tissue mark the face of *Myctophum* (enlarged 15 times), a member of the lanternfish group. Large blue photophores in characteristic pattern stud the belly of this "headlight" fish.



The rarest species were found only during the maximum currents of the full or new moon. In our subsequent days of collecting, however, dead or dying *Argyropelecus* could be seen on the beach, or live ones could be netted from the boat regardless of moon phase. The abundance of this genus was possibly related to the fact that its habitat is not as deep as that of some of the other forms, or because at that time of year its vertical migration upward is greater than that of most other deep-sea fishes.

There were many of these hatchetfish in Giuseppe's other jar that first day. Their eyes, as I had seen at Scilla, were relatively enormous crystalline globes backed by black retinal tissue; situated close together on the head, they pointed in an upward direction like telescopes.

This strange visual adaptation presumably enables the fish to school vertically or to feed from below either on food matter that is drifting downward, or on other organisms. A fierce predator, it has a capacity indicated by the dimensions of its open mouth (page 596).

Fish with Fluorescent Lights

Perhaps the most striking feature of *Argyropelecus*, though, is its light organs. In neatly lined packets, like kernels of corn, they are distributed mainly on the fish's thin belly surface. Like searchlights, they are equipped with brilliant reflectors aimed downward. In daylight these batteries of searchlights appear red, as we saw at Scilla, with a shimmering, fluorescent, fiery quality. Under one of my tungsten camera lights they turned bright purple. The color registering on Kodachrome tends to resemble that seen in daylight, although the fluorescent other-world quality was only partially captured by the film (pages 598 and 599).

Furthermore, what the film sees is probably not primarily light produced in the tissues, but rather that being reflected from the outside. Of the hundreds of deep-sea fishes equipped with light organs that we caught in subsequent days and examined in total darkness, only a few—and these inconsistently—glowed with true self-generated light. This was no doubt due to the fact that the specimens, although still alive, were far from their natural environment, far from the physical, chemical, and biological conditions prevailing in the deep.

Self-generated light was most often seen during night fishing, which we undertook later in our stay at Messina. In the process of removing tiny specimens at night from the dip nets, I would sometimes accidentally squeeze one. Under these conditions, little stars on some species would for a few seconds glow to brightness, then fade.

Pencil Activates Light Organs

No amount of stimulation with adenosine triphosphate (a chemical known to activate the luminescent material of fireflies) would induce light production in the laboratory, even when injected under the skin. Sometimes, however, the simple expedient of touching a swimming fish with the end of a pencil or glass rod would cause a sudden flare-up of the light organs.

How is this light produced? The light organs of some fishes are full of luminescent bacteria that seem to produce the primary glow, the fish merely supplying the housing, the sustenance, and the reflector. In other fishes the illumination is produced not by bacteria but by the interaction of enzymes developed by special tissue cells comprising the light organs. But the details of either process in fish are obscure.

That the light organs of these creatures glow with great intensity in the depths is unquestioned. What their actual purpose is in the normal life of a fish, and indeed how they function, are questions that biologists have probed and speculated upon for years. Are they lures, are they blinders, are they signposts for species or sex recognition, are they lanterns for actual illumination—or all in one?

Whatever the answers to these difficult questions, lights of red, pink, white, purple, and blue, displayed by a thousand species of fishes, squid, shrimp, and other deep-sea dwellers, must make the underwater world one of Tiffany splendor.

While the coldness of Messina's 1953 winter favored our work, the infrequency of the sirocco during January was a decided handicap. Without such a wind sweeping across the Mediterranean northward from Africa—sweeping, especially, the surface waters of the Ionian Sea into the narrow funnel of the Strait of Messina—maximum concentration of deepwater fishes could not occur. Furthermore, in the absence of strong wind, fish-eating sea birds had complete freedom to get at each tidal harvest before we could.

Kodachromes by Paul A. Zahl

A Popeyed Creature of the Deep Bites Off More than He Can Chew

The blue ghost of sunlight vanishes at about 1,900 feet; even below 200 feet life-giving rays quickly become too pale for ocean plants to grow. Thus deep-sea animals must feed on their fellows or on the gentle rain of food particles sinking constantly to the bottom. Here a predator tries to swallow a shrimplike invertebrate with a cluster of rose-red eggs.

Another Monster of the Deep? This Baby Shark Is Seven Inches Long

Not all the animal life washed ashore at Messina comes from the depths. This baby shark of the genus *Scyllium* is a bottom feeder that lives in comparatively shallow waters. It will mature to a length of several feet. Its scales, similar in structure to teeth, feel like thousands of tiny inverted thumbtacks, recalling the days when sharkskin was used as sandpaper.

Heaving Against Nets, Sicilian Fishermen Gather the Strait's Scaly Harvest

A boat has spread the 150-foot net in a circle; men holding the ends now haul in the catch. Rare specimens go to the author; fishermen's families eat the rest. The beachcomber is Dr. Zahl's daughter.

But we did our best, patrolling the strait every day, whenever the currents abated enough to permit, and combing the shore for stranded fishes.

Competition from the Birds

We were often successfully rivaled by flights of swooping sea birds, preceding us along the surf line by perhaps 30 feet, gobbling up every scopelid in sight. With such a band of marauders at work on a beach, only the *Argyropelecus* and a few other species, which, because of their spines, the birds didn't choose to eat, would remain for us.

In spite of this considerable competition, we managed to obtain some unusual specimens, though not in the abundance that Giuseppe promised if only a sirocco would synchronize with a full or new moon.

Finally, in February, we gave up waiting for the sirocco and took to night fishing, hoping in this way to defeat the birds.

One night stands out in my memory. It was about 9 o'clock when we embarked from the beach at the fishing village of Ganzirri, Giuseppe's home town, a few miles north of Messina. These Sicilian fishing villages have no wharves or piers; the villagers' boats, when not in use, are hauled up high on the sand.

That night the air was cold and the sky overcast. Giuseppe had on heavy underwear, plus three sweaters over his shirt, and I was similarly clad.

On the strait's far shore, on the mainland of Italy, twinkled the lights of Reggio and Villa San Giovanni. All else was gloom and darkness.

Our boat lay on the beach where Giuseppe was preparing the gas lamp. Suddenly the mantle burst into bright incandescence, sputtered for a minute or two, then settled down to a quiet, steady hiss. We were ready. Several men appeared out of the shadows to help shove the boat down the sandy slope, and we were off.

Ours was one of the huge lanterns used mainly in spring and summer for tuna and swordfishing, the basis of the commercial fishing industry in Sicily. The light, with a shade the size of a ten-gallon hat, hung from a metal hook at the bow of our boat (page 612). The illumination produced was equiv-

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Giuseppe Arena, the Author's Assistant, Displays His Catch

Signor Arena, a specimen preparator in the Messina Marine Institute, gave invaluable assistance in the search for deep-sea specimens. Here he shows the day's results to Mrs. Zahl and friends.

alent to at least a thousand watts. It would not necessarily attract deep-sea fishes, but would serve mainly to illuminate them for us in the otherwise pitch-black waters.

Now we were in the strait, Giuseppe rowing steadily toward a place which he considered most promising. The lamp was almost blinding, and its swaying and bobbing might have been distressing to anyone susceptible to seasickness. Actually, light-fishing was no new experience for me; I had done it often in the waters of the Gulf Stream off Bimini.* But the marine fauna revealed by the light here in the Strait of Messina proved no less captivating a sight than had its Caribbean counterpart.

Fireball of the Ocean Depths

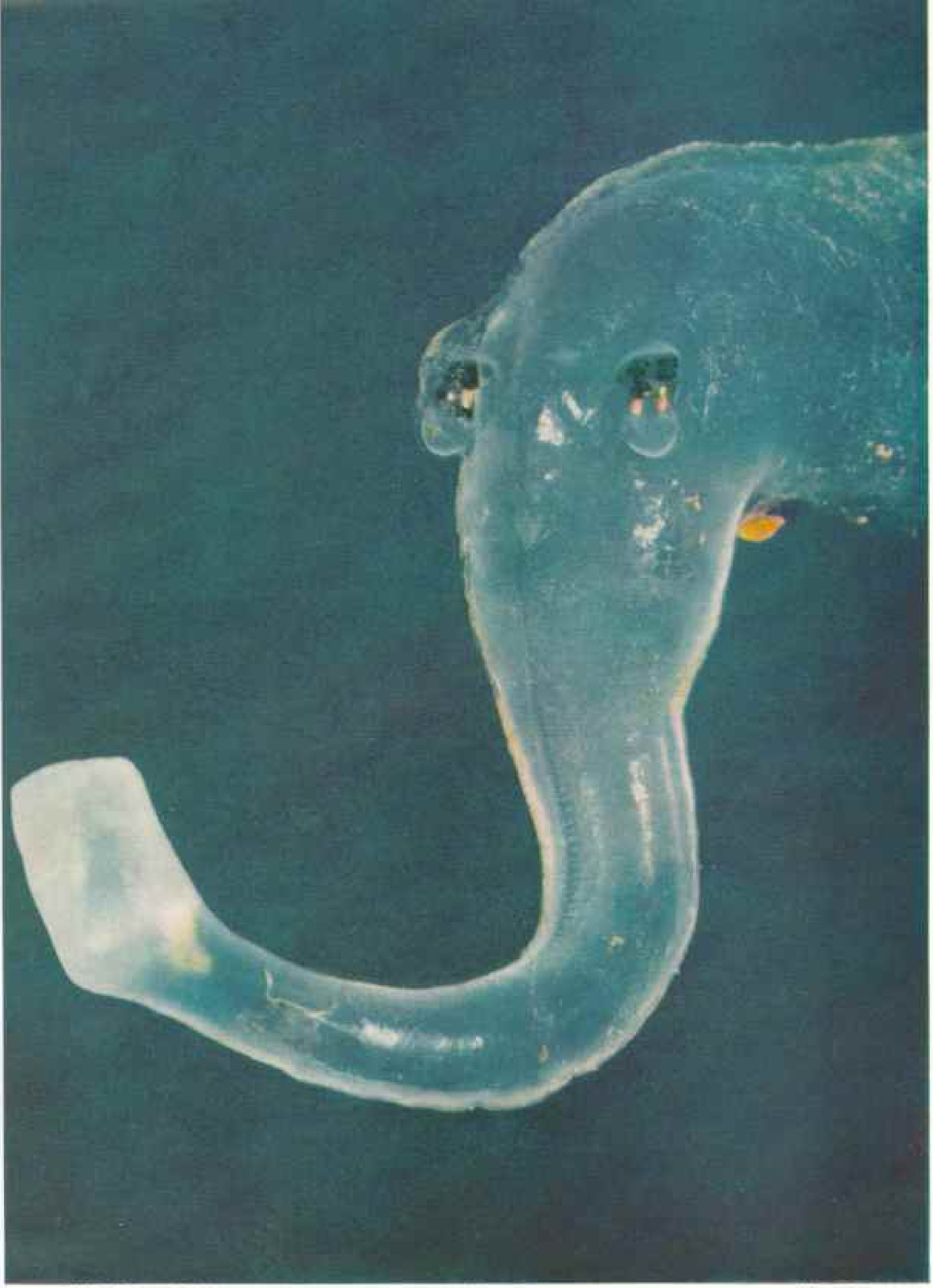
Long, luminous jewel chains of the tunicate *Salpa* now draped the sea under our light. I thought the soft glow of these pelagic creatures to be about the most beautiful sight in the world.

Then a *Pyrosoma* hove into view—a fireball, if I ever saw one. Also free floating, *Pyrosoma* is a colony of joined but independent tunicate organisms, shaped like an open-ended cucumber. Each small gelatinous individual has its own light plant, and the illumination created by the sum of many such little generators is something of nearly astronomical splendor—one big fiery sun in a watery firmament.

Then there were fragile comb jellies—the oval sea walnuts and the Venus's-girdles, the latter transparent and dimly glowing belts of living material, flat, thin, and sometimes two feet long. There were also the jellyfish medusae, just beginning to make their spring-time appearance in the strait (page 595). With tentacles trailing and bells pulsating, they and the comb jellies completed a picture under our light of a wondrous ocean world. None of these was primarily attracted by the lamp, but merely drifted by.

Eerie voices floated across the water. I looked up and saw several other boats the size of ours outlined against the darkness by the light of their own lamps. While one man

* See "Man-of-War Fleet Attacks Bimini," by Paul A. Zahl, NATIONAL GEOGRAPHIC MAGAZINE, February, 1951.



(Enlarged 4 times)

Elephant-headed Mollusk with Teardrop Eyes Resembles a Child's Stuffed Toy

Transparent *Pterotrachea coronata* here takes on color from a blue background, as do the creatures on the opposite page. A predatory thumb-sized animal that swims upside down, it swallows food through its trunk (page 615).

Kodachromes by Paul A. Zahl (enlarged 12 and 8 times)

Pygmy Roundmouth Opens Jaws Like a Troop-landing Barge

One of the most abundant of deep-sea fishes, the inch-long *Cyclothone* resembles a transparent worm. Its mouth can snap open nearly 180° to engulf a fish or crustacean dinner. Black dots shine like stars when viewed from underside.

Eel Larvae, Wafers of Living Lucite, Can Hide No Secrets from the World

Fresh-water eels spawn southeast of Bermuda near the Sargasso Sea. Larvae like these, so transparent that usually only the eyes can be seen, travel three years to European rivers. Spinal cord, digestive tract, and rib-like muscle segments show as in an X-ray.

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Net Poised, Giuseppe Fishes by Gaslight

Swooping sea birds (page 584) gobbled almost every fish in sight during daylight hours; the author and his assistant were forced to do much of their netting at night. Powerful gas-mantle lanterns like this are widely used in Sicilian waters by tuna- and swordfishermen (page 608).

rowed, another was active over the side with a waterglass and hand net. "Abyssal fishermen, too?" I asked, with humor half intended.

"No," Giuseppe seriously replied, "it wouldn't pay. They are fishing for squid and octopus; for abyssals they wait for a sirocco."

That was how I learned that many Ganzirri fishermen and their wives, especially during winter when food fish are not plentiful in the strait, walk the beaches after each sirocco tide, picking up the larger scopelids for the family table. Giuseppe informed me that fish from the depths, light organs and all, are as tasty as anything the sea can produce. I never had the opportunity to confirm this personally, but I would certainly have been willing to do so.

My gaze returned to the water under our own light. We had been drifting, and the fauna had changed. Gone were the fleets of fiery jelly creatures. Now myriad crablike Lilliputians, no larger than grains of wheat, were whirling in the light.

Their colors—tints of red, purple, orange—were magnificent (page 602). They would zip from darkness into light, then into darkness again, like insects under a porch light in summer.

Eel larvae were there, too—so transparent that only their eyes could be seen (page 611). From my Caribbean experience I knew that these creatures were definitely attracted to the light, as were the squid we saw now and then. Indeed, if I hadn't long since been initiated into the fantasies of light-fishing, I'm sure I would for the time have forgotten all about the deep-sea fishes we were seeking.

Finally we began to see what we were after, and the other glamor creatures of the sea paled to unimportance. But when Giuseppe pointed out the first of them to me, I was disappointed. There it was, just under the surface, a narrow little silvery-black fish, no longer than the first joint of my thumb. It wasn't swimming actively, just seeming to rest there, as well it should after its journey from the depths of the Ionian Sea.

Myctophum Looks Like a Minnow

Quickly Giuseppe had it in his net and extracted it from the meshes for me to see. I took the impotently wiggling thing in the palm of my hand. In general structure the fish did not differ radically from any one of a thousand surface minnows I had seen in my life. Perhaps the mouth was a little more angular, the eyes a bit larger and a little more silvery, but unless I had been told that

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Like a Circus Performer, *Pterotrachea* Swims Upside Down Through a Wedding Ring

An almost invisible foot, or flapper, drives this strange mollusk through the water. Viscera and vital organs are compacted in the white patch (left); head and elephantlike trunk hang down at right (page 610).

this was a true adult member of the genus *Myctophum*, I should certainly have thought it to be a common minnow—that is, until I turned the fish over and examined its belly.

Suddenly I had the Milky Way in my hand, and the planets, and a dozen suns. Some 40 shining light organs were implanted there on a background of shimmering silvery scales. They glowed an intense white, partly with self-generated light, partly with light reflected from the lamp. I was a little excited, although this was by no means my first experience with luminescent organs, and I quickly dropped the creature into one of the glass jars of sea water.

We found many more myctophids that night, as well as *Argyropelecus*, *Chauliodus*, and *Trachypterus*. None of these did we examine closely; that was a job for next morning in the laboratory. It was into the jar with the catch, and then quickly back to the lamp in the hope that new or rarer species would show up.

Occasionally, while watching and waiting, I would play at focusing my eyes into the waters far below, down where deep-sea fishes call it home, down where pressures are incredible and the blackness is broken only by glowing galaxies of living things.

I wondered how far down into this world the sunlight of next day would penetrate. I recalled that when William Beebe descended in his bathysphere near Bermuda some years ago, he reported that at about 1,900 feet he could still perceive faintly the blue remnants of daylight, but that at 2,000 feet all turned into absolute blackness.*

Actually, experiments with photographic plates lowered into the sea show that there is still enough daylight at 3,000 feet to affect the emulsion. The intensity at this depth, however, as Beebe noted, is so slight as to be imperceptible to the human eye.

The depth to which daylight penetrates the sea depends on such factors as the angle of the sun to the surface, and the amount of light-absorbing plankton and other suspended material in the water. Thus, in northern seas, where plankton is relatively thick,† the blackness of the abyss begins at a much higher level than in tropical seas where waters are clearer.

Owls of the Deep-sea Twilight

Also of interest is the fact that daylight penetrating the sea is absorbed differentially; that is, the red waves of the spectrum disappear first, then the greens and yellows, and lastly the blues and violets. Hence, in the twilight zone just above the abyss, the world is one of blue-violet. Many of the creatures that inhabit this zone have big eyes, efficient light gatherers comparable, perhaps, to the eyes of such terrestrial twilight dwellers as owls and tarsiers.

* See, in the National Geographic Magazine, "Half Mile Down," December, 1934; "Depths of the Sea," January, 1932; and "Round Trip to Davy Jones's Locker," June, 1931, all by William Beebe.

† See "Strange Babies of the Sea," by Hilary B. Moore, National Geographic Magazine, July, 1952.

Going, Going, Gone! Sea Anemone Gulps a Silverside

Frequently seen in tidal pools on rocky shores are the flowerlike animals known as sea anemones. Belying their sinister nature, they present the innocent face of a garden bloom.

In spite of appearances, the sea anemone is neither vegetable nor vegetarian. It is a trap, lying quietly in wait for small animal life which it can seize and devour much after the manner of the medusa on page 395.

Dozens of waving arms ring the mouth. Each arm holds innumerable tiny hypodermics ready to inject paralyzing poison into any creature drifting near. Once a victim is at hand, the multiple arms close in and engulf it as surely as would a boa constrictor. With the gullet's tiny downward beating flagella, or whips, the anemone sweeps food into its stout and muscular body, which is chiefly an accordion-pleated gut of considerable capacity.

Anemones have been observed to occupy the same spot for 30 years or more. If they wish, they can glide along at a snail's pace. But so tenaciously do they cling that efforts to pry them loose often tear the animal. Pieces of the body left behind may grow into new anemones.

This rosy carnivore measures only an inch and a half across. Belonging to a species common on Mediterranean rocks, it shows extraordinary vigor. When offered this tiny silverside, it reacted swiftly, grasping and paralyzing the fish.

These unusual pictures were taken across an hour's span. Some 24 hours later the author saw the anemone disgorge a lump of bones and scales.

Here the fish's head shows clearly through the anemone's stretched body wall (lower).

Kodachromes by Paul A. Zahl
(Enlarged 2 times)

Actually, even in the blackest abyss of the ocean, far below the twilight zone, there are few fish without eyes—the reason being that eyes are useful there in order to see the luminous organs of creatures to be eaten or avoided. Aquatic inhabitants of caves on land, on the other hand, tend during evolution to lose their eyes, for there is little bioluminescence in cave waters.

Pressure in ocean depths is, of course, enormous. Yet most deep-sea creatures seem quite indifferent to it, equipped as they are, in the main, with adaptive mechanisms that automatically equalize intratissue pressures with those of the surroundings. Consider the problem in hydrostatics which confronts those species that regularly, sometimes daily, undergo great vertical migrations.

Deep-sea Fishes Get "Bends"

Among the many fishes freshly up from the depths which I examined during my Messina activities, only one species showed signs of the "bends"; only a few species (those having swim bladders) showed evisceration, indicating an inability to accommodate to the diminished pressure of the surface.

Since there is no daylight in the depths, there are no photosynthetic organisms, such as algae or diatoms. Hence, all creatures there are predators, or scavengers living on carrion that continuously rains down from the upper sea layers. The fact that most inhabitants of great depths are relatively small may be related to the overwhelming competition for a limited food supply.

I recall a morning after one of our night-fishing ventures. In the laboratory my wife was going over the evening's catch, separating the dead from the living, identifying, sketching, and generally fulfilling her duties as junior ichthyologist to the expedition, when she let out a yelp. I came over and saw that her eyes were fixed on a tiny fish about an inch long. At first the creature looked like just another myctophid. Then I saw the cause of the yelp.

It was a species of *Myctophum* all right, and the belly was sprinkled with the usual light organs, blue in this case. But on the fish's snout, lying close between the eyes, were two relatively enormous spots of phosphorescence that looked like the headlights of an automobile. They glowed a brilliantly intense white. Furthermore, under the eyes there were also patches of highly luminescing tissue. "Myctophum headlightus," my wife hastily Latinized, exhibiting her newly acquired knowledge of fish taxonomy.

Signor Filiberto Mazza of the Institute's staff, who came into the laboratory a little later, supplied the correct identification—*Myctophum rafinesquei* (page 605). He seemed a little amused at our unsophisticated delight over the "headlight" structures. He stepped out of the room, returning in a few minutes with a museum jar in hand.

"Here in this even rarer *Myctophum metapoclampum* you will see some real headlights."

There, pickled in formalin, were several specimens about three inches long whose entire foreheads were solid masses of light-producing tissue. The tissue, naturally, did not glow as in the case of our living specimen, but it showed the lengths to which Nature sometimes goes.

Signor Mazza, incidentally, is a science artist of note. For years he has devoted himself to recording the extraordinary marine life of Messina's fabled strait. Sitting in his laboratory with one eye pressed to the tube of a microscope, he has transferred in enlarged detail every scale, every fin ray from fresh specimens to huge, precise drawings which line the walls of the Messina Marine Institute (page 597).

Exotic Sea Life by the Pailful

It was not until mid-February that we had our first promising sirocco. It began late one Saturday afternoon. The moon was right, and Giuseppe said that if the wind continued we'd find more specimens in one day than in the whole previous six weeks.

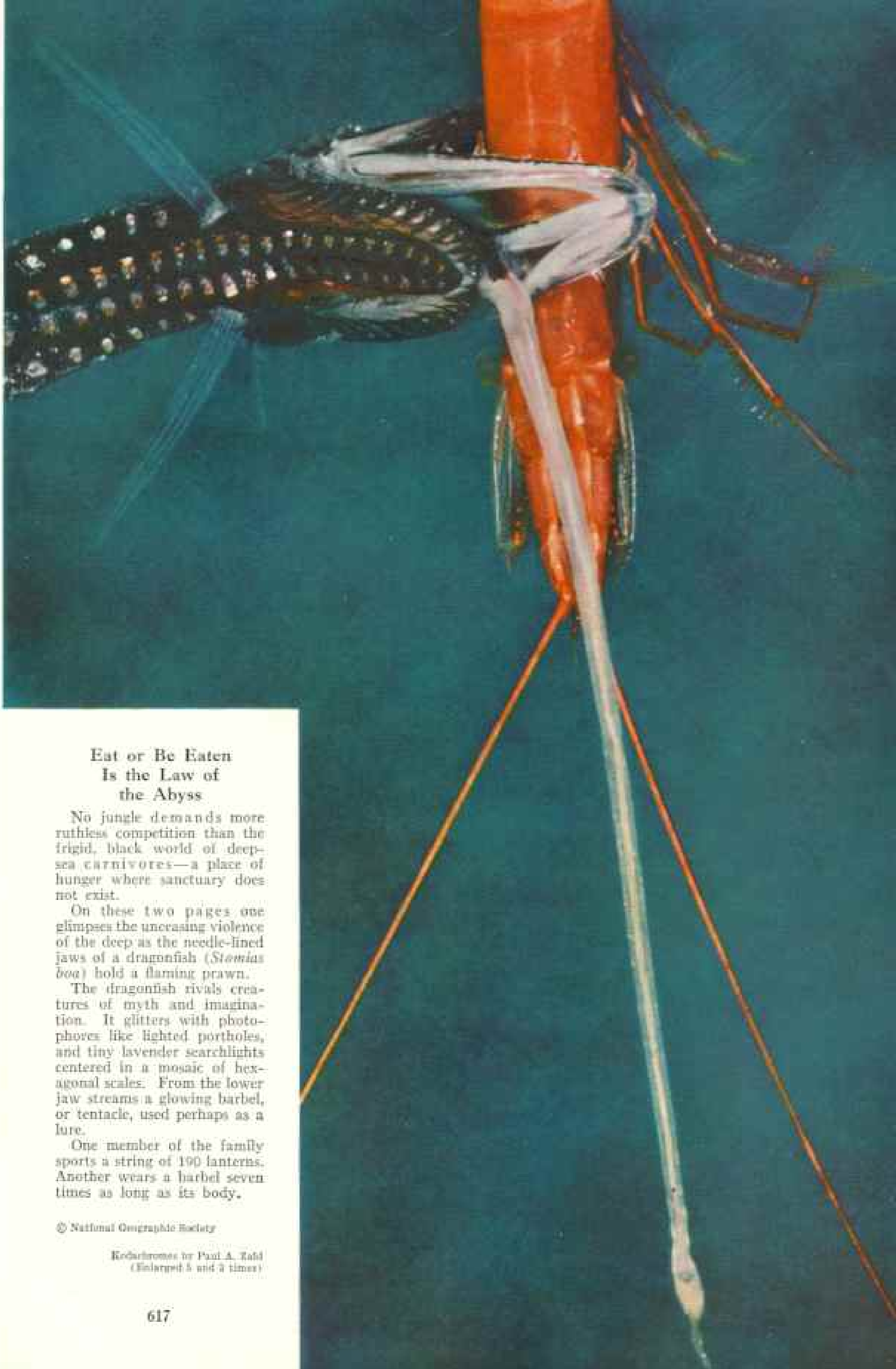
Sometime during the night the wind made a complete switch, and when I awakened Sunday morning I found it blowing smartly from the north. Nevertheless, I kept my appointment at the laboratory with Giuseppe, whom I found waiting there, disappointed and apologetic.

On my work bench he placed two big buckets full of squid, starfish, and a number of medusae I had never seen before, plus jars containing a dozen exotic deep-sea species, several unfamiliar to me.

"If the sirocco had only lasted a few hours longer," he kept saying, "then . . . molto materiale . . . molto, molto."

But I did not feel Giuseppe's disappointment; from my standpoint we had hit the jackpot.

The haul brought in that day contained a galaxy of ocean wonders. The awesome



Eat or Be Eaten Is the Law of the Abyss

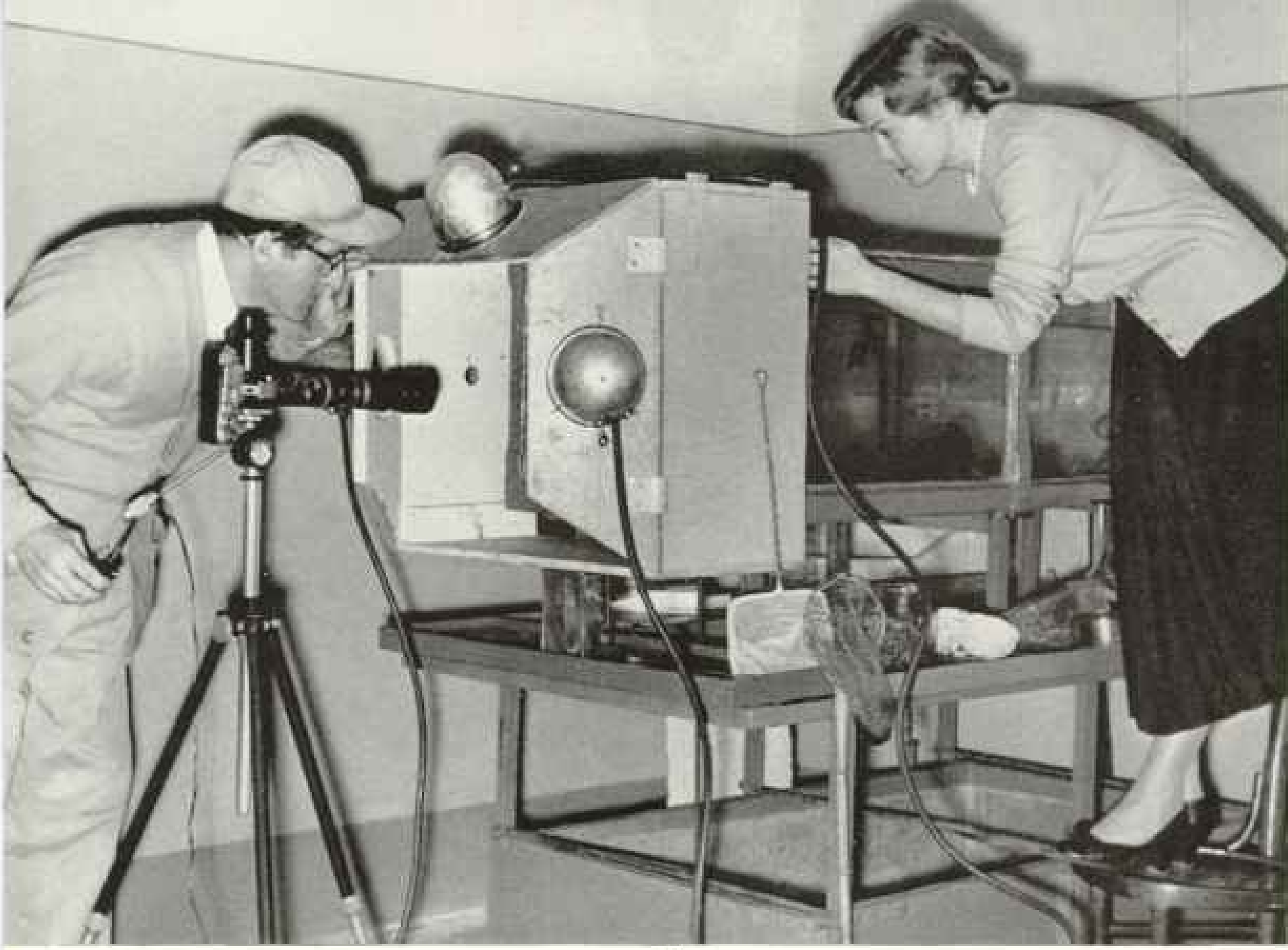
No jungle demands more ruthless competition than the frigid, black world of deep-sea carnivores—a place of hunger where sanctuary does not exist.

On these two pages one glimpses the unceasing violence of the deep as the needle-lined jaws of a dragonfish (*Stomias boa*) hold a flaming prawn.

The dragonfish rivals creatures of myth and imagination. It glitters with photophores like lighted portholes, and tiny lavender searchlights centered in a mosaic of hexagonal scales. From the lower jaw streams a glowing barbel, or tentacle, used perhaps as a lure.

One member of the family sports a string of 190 lanterns. Another wears a barbel seven times as long as its body.

Kodachromes by Paul A. Zahl
(Enlarged 5 and 3 times)



Author and Wife Photograph Deep-sea Specimens in Messina's Marine Institute

Tanks of sea water kept many of Dr. Zahl's subjects alive for hours while he made his photographs. The hinged box concentrates light from high-speed lamps while a telephoto lens focuses into the tank.

teeth of *Chauliodus* (page 583), *Gonostoma*, and *Stomias* (page 616), the mysterious light organs of the myctophids, the weirdly colored eyes of *Chlorophthalmus* (page 601), all inspired wonder at the specialization found in the sea. *Trachypterus*, too, from the ocean's middepths, fell into that category—but, alas, not on my film.

The specimens of *Trachypterus* I had seen earlier were small, not more than two inches long, and were dead or, at best, gasping their last. This one was a 15-incher, very much alive and sensationally photogenic.

Like a Steam-rollered Eel

In my aquarium the silvery creature looked like a blunt-faced eel that had lost an argument with a steam roller. Running along its knife-edge back was a delicate membrane, actually the dorsal fin, that constantly and gracefully undulated. When the fish was disturbed or in motion this poem of a membrane rippled with a grace beyond the power of words to describe.

One of the so-called ribbonfishes, my miniature sea serpent had a droll, down-the-nose expression; its pectoral fins were long and tipped with rose, and its tuft of a tail gave it a jaunty appearance.

I readied camera and lights, confidently expecting storm-damaged power lines to be repaired in time; without electricity I could make no pictures. For once, luck was not with me; for six hours I watched my specimen weaken in the tank. By the time life returned to the wires, death had come to my ribbonfish. Never again did we find one of such size and beauty.

Late one afternoon I went out to the laboratory beach for a stroll. A north wind had completed what a south wind had started. Literally thousands of dead *Argyropelecus* lay at the surf line, together with hundreds of pink comb jellies. They alone were left; the other more edible species had already been devoured by the birds.

I had long since completed my work with *Argyropelecus*, and comb jellies are common the world over. So I brought back no specimens to the laboratory. But I could not help reflecting on how profligate is Nature with some of her most remarkable creations.

Cruising Japan's Inland Sea

Voyaging Americans Brave Whirlpools and Tide Rips to Explore the Secluded Beauty of an Island World

By Willard Price

With Illustrations from Photographs by the Author

"I THINK—small boat—Inland Sea—very danger."

Captain Hikeda's English was not perfect, but his meaning was clear. He did not approve of our plan to sail a small boat from end to end of Japan's land-girt waters. Master of a vessel of 3,000 tons sailing the Inland Sea, he knew its labyrinth of islands, reefs, shoals, hidden rocks, savage tide rips, and whirlpools.

What had we let ourselves in for? When we first conceived the idea of a small-boat expedition the length of the Inland Sea, we knew its reputation as one of the most beautiful waterways in the world, but not that it was also considered by sailors to be dangerous in places for smaller craft.

On previous visits to Japan my wife Mary and I had seen the Inland Sea from the decks of large steamers. These brief glimpses were tantalizing. We wanted to loiter around its ravishingly beautiful islands, probe its bays, land on its warm beaches, walk through its villages tucked in snug coves between blue sea and pine-clad mountains, and learn what sort of folk live in this secluded island world.

Voyagers Run a Gantlet of Noes

The way to do it was in a small boat, much as we had sailed the Nile, the Amazon, and China's Grand Canal.* But difficulties now arose that we had not encountered in previous ventures.

One was the hazard of raging tides that twice a day rush in and out of the Inland Sea, funneling furiously through narrow passages between islands, rocks, and reefs. The tides are no higher than elsewhere, but the many obstacles in their path make this a chaotic sea.

Another was the fact that the sort of thing we proposed was "not done." We were told upon arriving in Osaka, jumping-off place for the Inland Sea trip, that we would have trouble finding a small-boat owner who would rent his craft for such a fool's journey.

Inland Sea fishing boats rarely venture more than five miles from home port. Why should they? Fishing is as good near home as far away.

The Inland Sea is 250 miles long from Osaka at the eastern end to Moji at the western. It is sprinkled with islands estimated from 700 to 3,000, depending upon whether the term "islands" is extended to cover islets and the fantastic rocks that jut up sometimes a hundred feet from the blue surface. No other sea on earth, not even the Aegean, is so rich in islands. The circuitous route we had planned in and out among the islands would cover not merely 250 miles but something over 1,000. To boatmen used to fishing within sight of home port, such a proposition was absurd (map, page 622).

Japanese Craft Ignore Mines

The third difficulty, quite unanticipated, nearly wrecked our project. The Occupation was then in effect, and all Americans and other foreigners under its control were forbidden to travel the Inland Sea.

Mines sowed in the sea by Allied airmen during the war had not all been swept up. Occasionally one exploded and a boat went sky high; hence the ban. It did not apply to the Japanese. Their craft could, and did, swarm at will over the sea. Most of them were wooden-hulled and of such shallow draft that they slid over any mines there.

Officials puzzled over our case, anxious not to obstruct our project. Finally they came up with a solution. Although we were in Japan on military permit, we did not belong to Occupation personnel. Therefore the Occupation authorities could not properly limit our movements. We were free to sail the sea and get blown up if we wished, provided we did it on our own responsibility.

So now we turned back to the problem of finding a boat. A new-found friend, Kunitsuna Sasaki, passenger traffic manager of the Kansai Steamship Company, came to our aid.

He journeyed with us by Kansai steamer from Osaka to the fishing village of Sumoto on the island of Awaji, and there we found a craft suited to our purpose. The owner agreed to rent it and entered into a verbal contract on the spot. We returned to Osaka, drew up a written contract, and sent it to Sumoto for the boatman's signature.

But he had had time to think things over. The Cassandras of Sumoto had filled his ears with stories of wrecks in the far parts of the

* See, in the National Geographic Magazine: "By Felucca Down the Nile," April, 1940; and "Grand Canal Panorama," April, 1937, both by Willard Price.

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Draped with Drying Nets, Japanese Fishing Boats Anchor in Kannonji Harbor

For their 6-week voyage on the Inland Sea, author Willard Price and his wife chartered the 45-foot 7-ton vessel at center. For crew they had a young skipper and his two uncles. The Prices named the craft *Konpira* for the Japanese sea god supposed to protect sailors (pages 622, 647).

Inland Sea. His boat might be smashed on the reefs, or pulled down by the *kappa*, water goblins that haunt the whirlpools. Instead of signing the contract, he suggested that we *buy* the boat; then any disaster would be on our shoulders, not his.

Hardly prepared to acquire a Japanese fishing junk, we looked elsewhere. Mr. Sasaki had another idea. He sent two newspaper friends to see us at our Japanese hotel. One of them made photographs, the other took our story. He ran it in an Osaka paper under the title, "I Want to See the Real Japan," with the subtitle, "I Wish to Borrow a Boat to Sail the Inland Sea." Boatowners were invited to write.

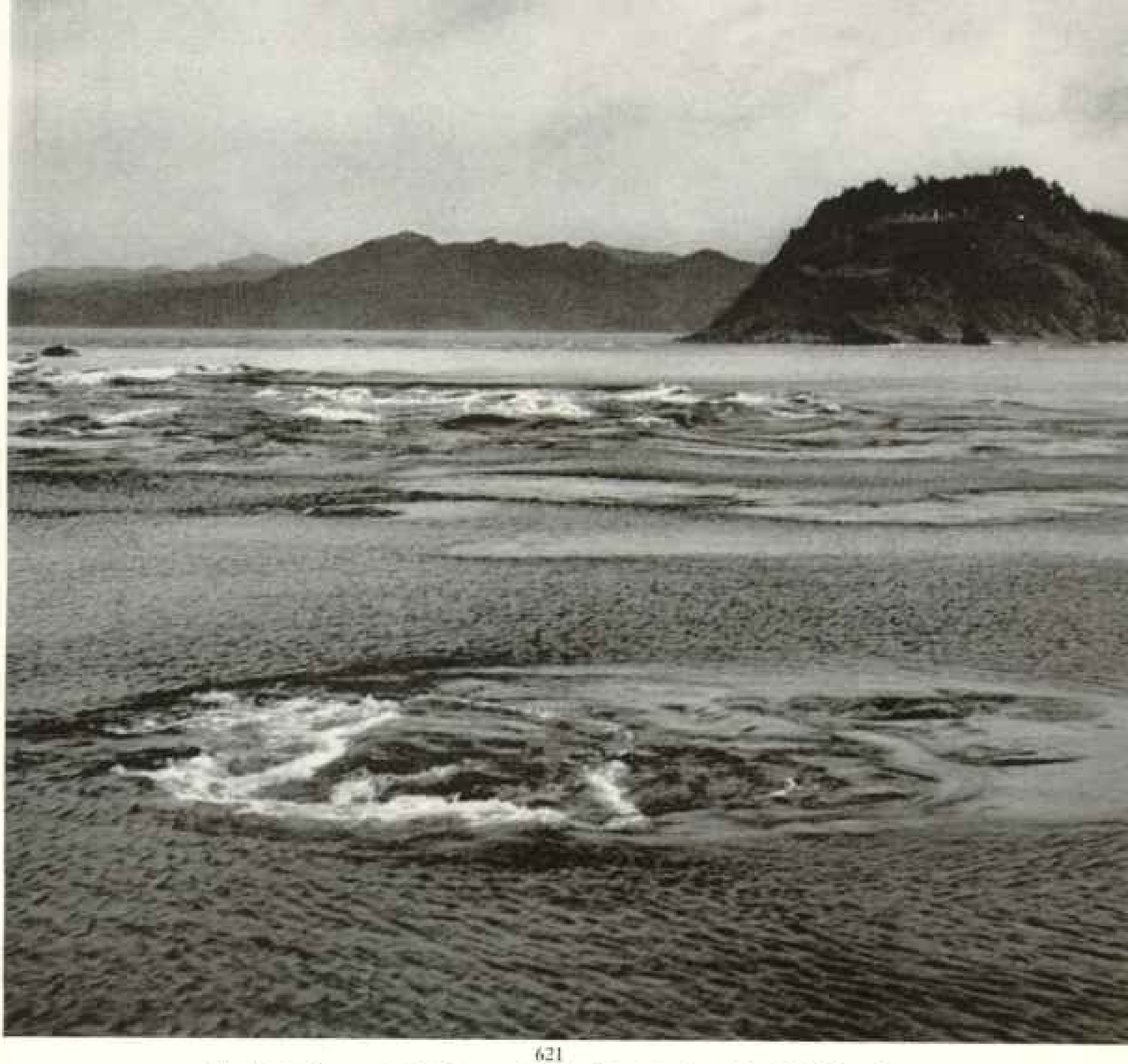
This brought a handful of offers. But when they were traced back to their sources and the boatmen learned how far we wished to go, the offers were withdrawn.

All except one. The letter came from Kannonji, an Inland Sea port which has played a part in Japanese history as a pirates' nest. It was founded well over a thousand years ago by Indonesian buccaneers who then terrorized the Inland Sea, looting ships and taking their crews captive. Their descendants are no longer pirates, but they furnish some of the Inland Sea's most venturesome sailors. Kannonji's ships are all of a pattern—low, swift, piratical-looking, not much changed since buccaneer days.

Wide-Margin-of-Safety Willing to Gamble

We journeyed to Kannonji and met the young man who had written the letter. His name, freely translated, means "Wide-Margin-of-Safety." That was reassuring. How could anything go wrong under a captain with a name so auspicious?

He took us to the water front, off which some



621

Clashing Currents in Naruto Strait Stir Up Seething Whirlpools

Seasoned sailors of the Inland Sea steer clear of the mile-wide passage. The superstitious believe that devils lurk below to pull them down. Here the incoming tide crashes relentlessly into the ebb of its predecessor. The waters rage and spin in a tangle capable of engulfing a large craft (pages 626 and 627).

of the Kannonji fleet lay at anchor. Draped with brown nets drying, the vessels looked like enormous bats. He pointed out one lying about a hundred yards from shore. That was his. It could be ours for six weeks if we wished. Yes, he would take us anywhere. He had not been to other parts of the Inland Sea, but he was not afraid. His two uncles would go along as crew. He regretted that neither he nor his uncles could speak English. That was a handicap, though not too serious; we had a modest knowledge of Japanese gained through five years' residence in Japan before the war.

The boat took our fancy at once. Riding the waves, head in the wind, it looked as if it could hardly wait to be off in quest of adventure. It was larger than our Nile craft, but that was as it should be, for we were to sail a sea, not a river. The captain's letter had told us that it was a 7-ton boat, 45 feet long, with 10-foot beam. It carried two sails and a 12-horsepower auxiliary engine. It looked more like a schooner than any other Western vessel, but it was of the junk type with a moderately high poop, overhanging stem, shallow draft, and lugsails.

Could I go aboard? A high sea was rolling into the roadstead, urged on by a smart wind. The captain grinned doubtfully, but went for a dinghy.

When I saw it, I was tempted to change my mind. It was a cockleshell not more than eight feet long. It rolled and tossed and skipped. Wide-Margin-of-Safety, standing in the stern manipulating the sweep, brought the boat within jumping distance of the stone steps of the mole.

I leaped into the shell and crouched. The captain waggled the sweep, and the dinghy swayed from side to side, taking in water over

both gunwales. Coming at last alongside the fishing boat, we did not scramble onto it but allowed a wave to throw us aboard.

Two towering masts divided the craft roughly into thirds. Aft of the mainmast were the engine and some cubbyholes for the crew. Beyond the foremast were the big rusty anchors and coils of line. Between masts was a good expanse of deck that we would have to ourselves. The captain explained that an awning would be erected to keep off the sun. There was a covered tub of fresh water, and we could cook on a charcoal brazier.

"But where do we sleep?"

A Fish Bin for a Stateroom

Cheerfully the captain removed a hatch, and I looked down through the hole. What I saw was a compartment ordinarily used as a fish bin. It did not smell fishy—it had been scrubbed perfectly clean—but it was very shallow, not two feet deep. I looked at the captain unbelievingly.

He promptly tried to convince me that a human being could actually squeeze himself into this shallow space. He slipped through the hole, stretched his legs under the deck in one direction and his head and shoulders in the other and lay still, leaving me to contemplate his stomach, the only part of him still visible. With the hatch on, as it would be in stormy weather, the place would be as dark as a pocket, and airless.

Wide-Margin emerged grinning, expecting my approval. I nodded. After all, what quarters could one expect on a fishing junk? If the weather was not too cold or wet, we could sleep on deck.

"When the sea is rough, does it wash over the deck?" I asked.

The captain laughed and nodded vigorously.

We took off in the dinghy for the mole, where my wife had been joined by several hundred citizens of Kannonji. The sea was more choppy than ever. Halfway to shore, Wide-Margin-of-Safety lost control of the treacherous little craft, which promptly turned turtle.

The overturned boat, tossed by the waves, struck me a blow that nearly knocked me senseless. I hit something else—the rudder of an anchored junk. Grabbing it, I pulled myself aboard and was taken ashore in another dinghy.

Our captain was all apologies. He assumed that our deal was off. A kindly fishwife insisted that we come to her house, remove our wet things, and don summer kimonos. She washed the salt out of our clothes and ironed them, refusing to take a penny for her pains. I was touched by her kindness, the more so when I learned that her son had been killed while fighting our troops in New Guinea.

In an upper room that looked out on the fishing fleet we sat on the matted floor and sipped hot tea. The captain was crestfallen. I assured him that all was not lost and told him our English proverb, "A bad beginning makes a good ending." Thereupon we drafted a contract for a 6-week voyage.

His charges were reasonable enough. For the boat and three men we would pay 2,500 yen a day ($7), with an additional charge for fuel. The men would buy their own food, and we would buy ours.

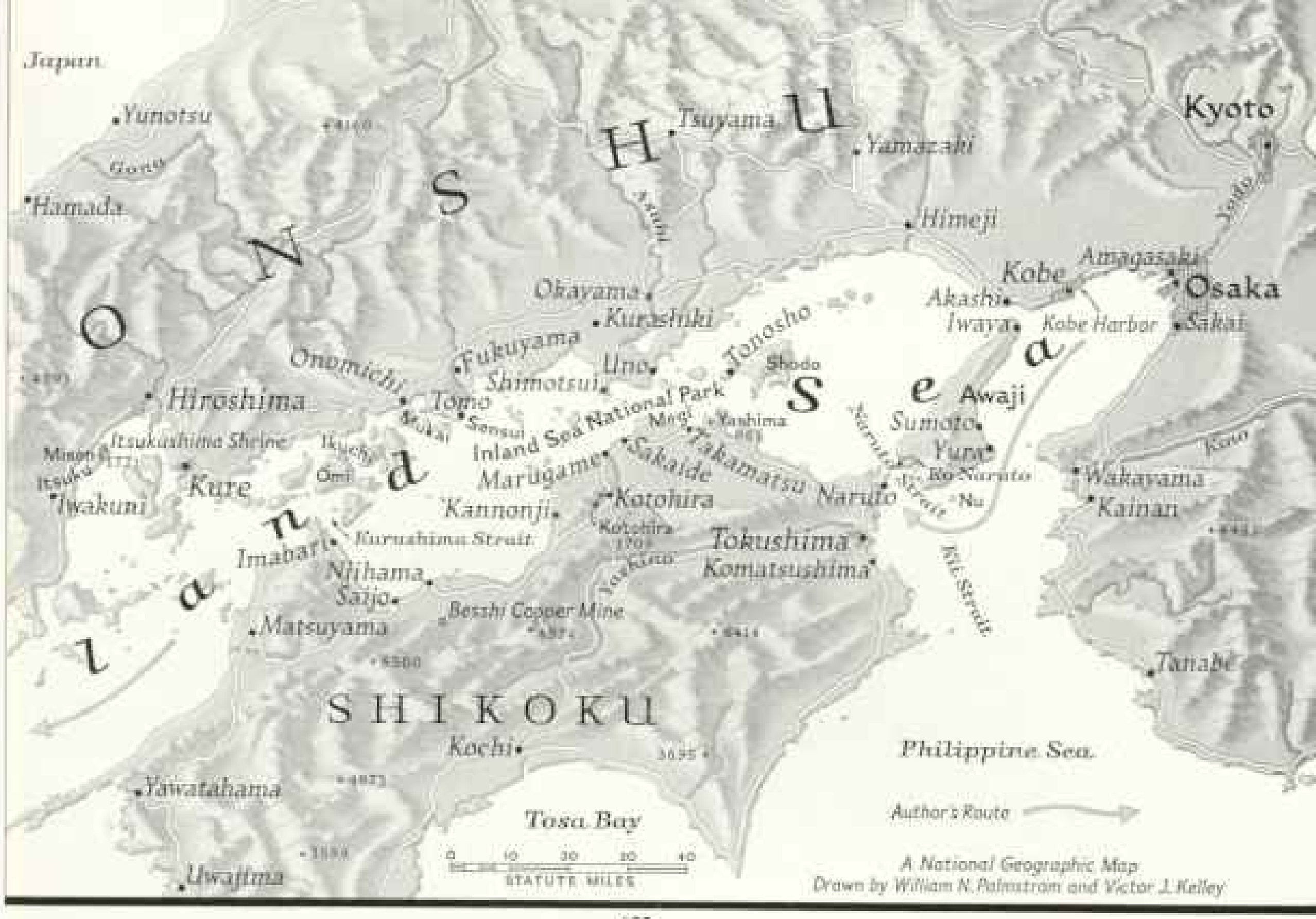
For us this was eminently satisfactory, and for the crew as well, since they would earn more for six weeks of pleasurable cruising than for a year of toilsome fishing.

We returned to Osaka in high spirits. It would take a few days for the men to construct the awning, build a convenience overhanging the stern, and put a floor in the fish-bin stateroom. Then they would bring the boat to Osaka, and our voyage would begin from there.

Sea God Carried for Luck

In the meantime we bought necessary equipment—heavy comfortables for sleeping on deck, pots and pans, a few dishes, a little cutlery, and a Shinto shrine!

Fishermen facing the unpredictable are usually superstitious. The captain had, half in jest, remarked that my dunking in the sea on the first day was a bad omen. The shrine seemed to be the answer. We placed it on deck and dedicated it to Kompira, the Japanese sea god who is supposed to protect sailors.



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250 Miles Long, Japan's Inland Sea Is 4 to 40 Miles Wide

The author and his wife voyaged some 1,000 circuitous miles from Osaka to Shimonoseki. Threading hundreds of islands and fighting furious currents, they varied the cruise with stops in friendly villages.

His sanctuary at Kotohira overlooking the Inland Sea attracts thousands of pilgrims, especially seafarers (page 647). We went one step further: we honored Kompira by naming our boat after him.

On a lovely September morning the little craft arrived at Osaka, took on her passengers, was duly photographed by newsmen—some of whom had come all the way from Tokyo for the event—and sailed away to the west with flags flying. We placed the shrine at the foot of the foremast (page 627). It delighted the crew, who made offerings of fish and rice before it throughout the voyage.

Now we met for the first time the uncles of Wide-Margin-of-Safety. One was "Good-Fortune-in-Autumn." Would his name prove as inauspicious as the captain's? The other was "Literature-Pursuing-Sixth-Son." It was true that he was a sixth son, but as for literature, he pursued it at a respectful distance. Both men wore towels around their heads, brigand fashion. With their brown faces twisted out of shape by a lifetime of squinting out to sea, and their mouths studded with teeth like those of a killer whale, they looked as if they could rob a galleon or slit a throat with equal ease. We were to learn that they were as gentle as lambs.

The wind was fair, and we sped toward Kobe without benefit of engine. The two big lugsails towered above us, the larger reaching to a height of 30 feet. In the best junk tradition, bamboo slats or battens kept them stretched to the wind, and other bamboo strips held them to the masts.

Much of the Inland Sea is remote and mysterious, but this part is like Main Street. It vies with Tokyo as the industrial and commercial heart of Japan.

Cities stretch continuously along the shore from Osaka, second largest metropolis in the nation, with 2,000,000 people, to the great port of Kobe, 20 miles away, with 810,000. We knew that beyond the hills only 28 miles away was million-big Kyoto, third largest of Japanese cities and for a thousand years the capital (page 646).

What a triumvirate are these cities—Osaka building industrial machines, Kyoto fashioning art objects, and Kobe helping to ship these products to all parts of the world. Osaka and Kobe were flattened by war: Kyoto was spared because of its temples and art. Now it would be hard to find in any of them the scars of conflict, except perhaps in the minds of men.

The chimneys of large shipbuilding yards belched a smoky welcome as we entered Kobe harbor and tied up at the American Pier. We were surprised and pleased to find waiting for us a group of officials who drove us around town, took us to the beautiful Mansion Kobe

624 National Geographic Photographer J. Baylor Roberts

To Make Salt from the Inland Sea, Japanese Use Sand as a Blotter

A layer of loose sand soaks up sea water seeping into this salt-making field near Sakaide, on Shikoku. In the bins workmen wash the sand with more sea water, producing a strong brine which they pipe to boilers.

(formerly a luxurious private home, now a hotel) for tea, and to the Hotel Seigaso for an elaborate *sukiyaki* dinner.

From such luxury we returned to the boat and went to bed in the fish bin. Exploring the place with a flashlight, I killed a spider and one of those bugs that frequent wet, dark places. However, we counted ourselves fortunate to find no rats or mice.

When my head was on the pillow, my nose was just six inches from the deck above. If I happened to get under a beam, there was only three inches of leeway. We tried to disregard a feeling of claustrophobia and went to sleep. I dreamed I was crawling through places that became smaller and smaller, until I was finally trapped. I came to with a start and raised my head, only to hit the hard deck.

"If you're leaving, you'd better use the hatch," Mary advised sleepily.

"It's hot as Tophet here," I complained.

The captain had said it would be too cold on deck; the Japanese habitually sleep between smotheringly thick quilts in a tightly closed room. Accustomed as most Westerners are to open windows, we found the sea breeze on deck more to our liking.

Navigation by Asking the Way

We sailed at sunrise. Kobe's food stores were not yet open, so we would buy something for breakfast at our first landing, the fishing village of Iwaya on Awaji. We had brought along some canned goods for emergencies, but we intended to live off the country for the most part.

But where was Iwaya? A heavy blanket of fog covered the sea. No land was visible except the hills of Kobe behind us.

The captain and Good-Fortune were having an argument, pointing in quite different directions. Presently a fishing boat hove in

National Geographic Photographer J. Baylor Roberts

In Wide, Wet Steps, Rice-growing Terraces Curve with the Hillside's Contour

For the Japanese, rice means the staff of life. Early summer is planting time. Harvesting begins in September in the north, October in the south. These farmers near Kobe transplant seedlings.

sight, and we altered our course to come alongside. The captain asked the way, and the fisherman pointed.

We proceeded, but, having failed to bring the pointing finger along with us, we were soon lost again. The captain began to look for another fishing boat.

Our boat carried no chart or compass. I had assumed that these hardy seafarers would know their way by a sort of sixth sense. But, after all, they were fishermen, not voyagers. I had to admire the nerve of a captain who would embark so nonchalantly on a hazardous voyage, but I doubted more than ever the suitability of his name, Wide-Margin-of-Safety.

Fortunately, Captain Harada of Kansai Steamship Company had persuaded me to take along a score of detailed charts, each covering a small area of the Sea. I dipped into the hold and brought up a mighty roll of them. Each was some three feet by four feet, and altogether there were enough to carpet most of the deck. I found the chart for this immediate area and called the captain. He tried to understand it, but gave up and looked for another fishing boat.

I rooted out of a suitcase a pocket compass I had thrown in at the last minute, never dreaming that we would actually need it. With charts and compass I took over as navigator. The navigation was far from perfect; destinations seldom appeared where they should have been, and islands often bobbed up without the approval of compass or chart. But at least we did not have to zigzag from boat to boat asking the way.

Thus we innocents abroad blundered our way through the Inland Sea, while Kompira chuckled in his shrine at the foot of the foremast but benevolently diverted our stem whenever we might have struck something.

The morning mist burned away before we reached Iwaya village. The sea was dotted with small boats in which the tentacles of octopuses waved, for this is a famous octopus fishing ground (page 634).

The method of catching these 8-armed frights is curious. An earthenware pot is let down at the end of a cord, the other end being made fast to a small buoy. The octopus loves nothing so much as a dark hole and crawls into the pot. If the pot is drawn up gently, the tenant does not realize what is happening until it is too late.

Along the beach of Iwaya, octopuses stretched out by bamboo sticks to dry in the sun looked like kites. We passed them by, asking for food, and were referred back to the octopuses, the only breakfast the village could offer us.

Octopus Eyes No Food for the Queasy

We boiled sun-dried octopus over our charcoal brazier on the deck. The tentacles were not bad, once you forgot their similarity to snakes. The suction cups were as crunchy as nuts, but the body was as tough as rubber.

The eyes are supposed to be a great delicacy. They look much like human eyes, and after you swallow them you have the guilty feeling that they are continuing to look at you from the inside.

We sailed a glassy blue sea along the mountainous shore of Awaji to the sizable town of Sumoto. Here welcoming officials took us to see their most notable citizen, an eye-ear-nose-and-throat physician who in his spare time pursues one of Japan's most famous arts. Dr. Tatsuzo Matsutani is a father of Japanese puppetry. From bamboo and brocade, plaster and paper, he contrives puppets two-thirds life size. Made mobile by multiple controls, they do almost everything but talk (page 640). The remarkable Bunraku theater puppet shows in Osaka and other great cities have their inspiration in this island port.

So many things move in a complicated Matsutani puppet that one operator is not enough; it takes three or four. They are in full view on the stage, but their black clothing, covering face and body, is supposed to make them invisible. From the point of view of the Japanese spectator, they just aren't there.

Dr. Matsutani insisted that we stay to dinner, lodged us for the night in a room in his hospital, and sent us on our way with a good breakfast, all because "We are grateful for what Americans have done for us. Makasa was a *kamisama* to the Japanese."

"Makasa" is as close as the Japanese tongue can come to MacArthur, and "kamisama" means Mr. God, or Honorable Deity. Although General MacArthur had given way to General Ridgway, he seemed more firmly enshrined in the hearts of Japanese than he was when actually in Japan. When MacArthur left, a town official said, "We have lost our basement." He evidently meant foundation.

We stopped at the atoll-like harbor of Yura and also at primitive Nu Island where, in accordance with old custom, a crier was passing through the streets of the fishing village ringing a bell to announce a death. Then we sailed to the city of Tokushima on Shikoku. There three newspaper reporters, one of them a young woman, met us.

Newspaperwomen are rare in Japan, and the kimono this one wore made her seem still more out of place. She looked on shyly as the men conducted their interview and, when urged to come forward, retreated so abruptly that she stumbled over an anchor and sat down hard on the deck. Now she was all blushing confusion and would have run away in utter disgrace. Mary gently detained her until she controlled her fit of tears, then gave her an exclusive story "from the woman's angle."

And so to bed on the deck, but not to sleep. A phonograph in a seamen's bar split the welkin with a badly scratched American record of "Silent Night, Holy Night." Whistles blew and stevedores shouted as steamers docked or put to sea. Back and forth along the mole above our ship paraded the policeman delegated to guard us. Not content with patrol duty, he came aboard periodically to wake us up and tell us what good care he was taking of us.

Whirlpools Threaten at Naruto

At Naruto Strait we had the first taste of the perils of the Inland Sea. Through this bottleneck the tide rushes from the Philippine Sea into the Inland Sea like a mountain torrent. It meets the ebb of the previous tide, and the conflicting waters make giant whirlpools that sometimes suck down large boats (page 621).

We were advised to circle Naruto Strait by the Ko Naruto (Child Naruto or Little Naruto), a safer passage. But what a pity it would be to miss one of the most dramatic phenomena of the Inland Sea!

At least we could have a look at it from the steamer which takes Japanese tourists to view the spectacle. But when we went aboard, her captain explained at length why he could not go near the whirlpools that day: the sea was too rough, the waves too big.

The ship did roll violently, and a Japan Travel Bureau man who went with us spent the trip on the salon floor. But when we reached the strait the waves miraculously disappeared, the captain changed both his mind

(Text continued on page 635)

Kompira Ventures into Naruto Strait's Treacherous Waters

Mr. and Mrs. Willard Price had difficulty getting a small boat to tour the Inland Sea; Japanese fishermen feared its raging tides and chaotic channels.

Here the voyagers enter Naruto Strait, where violent currents and whirlpools nearly wrecked their craft. Sinister spirals are beginning to form on either side of the boat, while the tidal bore brings two steep shelves rushing from the distance. As the vessel tosses, the pilot laughs at the anxiety of crew and passengers. Beyond him sit a blue-capped official along for the ride; Captain "Wide-Margin-of-Safety"; and Mrs. Price. A shrine to Kompira, the sea god, stands by the foremast.

➤ Mrs. Price, surrounded by buckets, pots, and ship's gear, cooks over a charcoal brazier. Zinc oxide ointment protects her face from wind and sun.

Kodachromes by Willard Price

Rocky Spines Rearing from the Water Like Ruined Battlements Make a Labyrinth of the Inland Sea

"We saw hundreds of islands, but not one was flat," says the author. These girls survey outcroppings off Shodo Island.

Pilgrims and Pupils Visit Red Maples on a Sacred Island

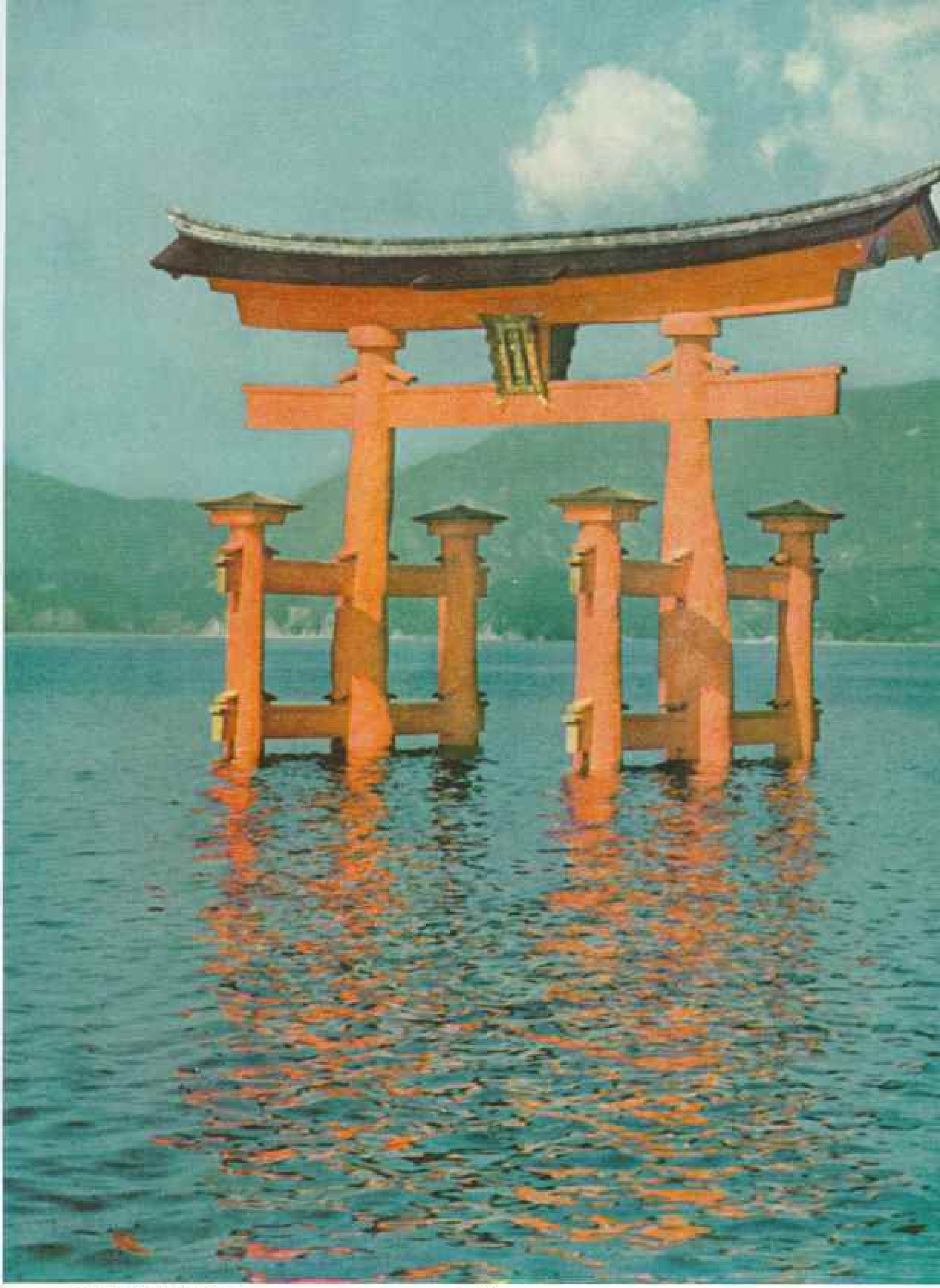
Itsuku Island offers some of Japan's finest scenery. Excellent sea bathing and mild climate attract thousands of visitors, especially when cherry trees bloom in spring and maple leaves turn crimson in fall.

School parties from all parts of Japan go to Itsuku in maple season. Pilgrims arrive in a steady stream because the island is sacred to Shintoism. They bow and clap their hands in the shrine, try to grasp the meaning of centuries-old sacred dances (page 632), visit the pagoda, and climb to the hillside temple. They may feed a holy horse and tie paper prayers to iron lanterns.

Since the island has no wheeled vehicles, visitors climb hundreds of stone steps to the top of Misen, where an eternal flame burns. From this peak they may view atom-bombed Hiroshima.

These students picnic in Maple Valley, where translucent maple leaves shine against a background of conifers.

Kodachromes by Willard Price



Tide Engulfs Itsuku Island's Torii, Symbolic Gateway to a Shinto Shrine

This camphorwood structure, strikingly large and ornate, shows Buddhist influence in design and color. *Kompira* cracked her foremast trying to sail under it.

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Kodachrome by Willard Price

Stone Lantern and Pine Boughs Look Out Toward *Kompira* and Honshu's Mountains

Kompira, flying her special flag beneath Japan's Rising Sun, cruises off the Japanese mainland. Students on an outing row to the shrine. For a fee, attendants will light lanterns lining Itsuku Island's shore.

Fierce Mask and Ancient Gestures Frighten Devils from Itsukushima Shrine

Built on piles, the shrine seems to float on the Inland Sea when tide rises. Here a costumed priest dances on the temple's festival platform. A bronze beast stands guard on the right.

Kodachrome by Willard Price

↑ Gay Streamers Prolong Goodbyes as *Kompira* Leaves Shodo Island

Colored ribbons held by Tonosho villagers proclaim a reluctance to let new-found friends depart. Bamboo poles are used to fend the ship off rocks or to hold up awnings. One of the skipper's uncles stands behind the foremast.

↓ Feet Take a Rest as Mrs. Price Rides a Basketlike *Kago*

In times gone by Japanese gentlefolk often traveled by palanquin. Today such transportation is little used except in remote districts. These porters carry the author's wife atop Yashima, near Takamatsu. Decorated coats denote their calling.

An Octopus Dries in the Sun Like a Misshapen Corset

Octopus is a favorite food of Awaji islanders; they buy it sun-dried and stretched on sticks, or alive from tanks along the wharves. Choice portions are tentacles, boiled and sliced.

This Sumoto housewife examines an 8-armed horror costing about $1.00, more than most Japanese laborers earn in a day.

Passers-by watch a youngster poke a tentative finger at a live octopus; it is nearly helpless out of water. Jars used for catching the creatures stand above the tank.

Lowered at the end of a cord, an earthenware pot appeals to the octopus's love of dark crannies. Crawling in, he is drawn up so gently he does not realize his danger.

The author, sampling octopus, found the tentacles edible, the suction cups crunchy, and the body rubbery. Swallowing the "reproachful" eyes gave him a guilty feeling.

and his course, and we steamed into the channel.

It was an eerie sight. For a time the surface about us remained as smooth as glass. Then in a perfectly quiet spot a peculiar boiling began. The water humped itself up into a dome and started to whirl. Faster and faster it spun, a deep pit forming in the center. Then the updraft of a moment ago was replaced by a strong downdraft.

It was easy to imagine the fate of a small boat caught in the centripetal whirl. Some of the pools were 50 feet across, some much larger. Where the outer edge of the whirlpool encountered still water, waves rose sometimes as high as 30 feet.

Whirlpool Maws Yawn for Ships

When a whirlpool began to form dead ahead, our steamer promptly changed course. The edges of the whirling disks caught our bow, and at such moments the ship would not answer her helm but staggered to one side or the other at the mercy of the merry-go-rounds. We did not go through the strait but only skirted it, then returned to Naruto town.

A debate took place on the dock. Could *Kompira* sail the strait? Captain Wide-Margin-of-Safety, being an adventurous soul, was inclined to accept a wide margin of risk. Old tars on the water front were unanimous in warning him not to challenge the deadly Naruto. It wasn't just a matter of whirlpools, they said; there were devils under the channel. One of the most persistent of Japanese superstitions is the belief in *kappa*, evil mermen or water goblins who delight in drawing humans down to a watery grave.

The prophets of doom won. It was decided that next morning we would sail the safe passage. Much disappointed, we put up at an inn for the night.

A Salvage Master to the Rescue

There we met our good angel. Mr. Takehisa, owner of the hotel, is also a civil engineer engaged in the salvage of sunken ships. Having operated often in the turbulent waters of Naruto Strait, he knows the channel as few men do. Of course we could go through Naruto. He himself would pilot us.

Even with an able guide it was a dizzying experience. The tide tears through the mile-wide passage at from 8 to 10 knots, a speed greater than that of many river rapids. The pilot selected a time when the outcoming tide should have nearly spent itself. However, as we entered the strait, we seemed to be looking up a staircase. Mr. Takehisa told us that the water is often five feet higher at one end of the strait than at the other.

Powered only by the engine, we began to weave among the whirlpools. We were surrounded by holes and water hills. Carefully we avoided the pits, but allowed the hills to crash against the prow and drench us with spray. The surface rose before us in different levels like great steps. Some plateaus of water were higher than our deck.

The boat staggered like a drunken man as the whirling currents caught her, now on one bow, now on the other. Cross currents rushed in from unexpected angles. She heeled so far to port that everything on deck began to slide, and I, taking pictures, had to embrace a mast. Then as suddenly she lurched far over to starboard.

With all this frenzied movement it was odd to hear the pilot say, "We're not moving." Taking a sight across trees on shore, I could see that we were making no progress. The top speed of the engine was six miles an hour. Evidently a 6-mile-an-hour current was holding us stationary.

Uncle Good-Fortune ran up a sail. This was nearly our undoing. A whirl of water swung the ship broadside. With the current pressing one way against the hull, and the wind the opposite way against the sail, our lee rail sank deep under water. A few inches more, and the shallow-draft, keelless ship would certainly have capsized.

Uncle hastily pulled down the sail. We turned and fled ignominiously with the tide.

Narrow Escape from Becoming Salvage

When the tide changed, we tried again and got through. Once when our craft seemed certain to be hauled down by the kappa, I had the distressing thought that our pilot earned his living by salvaging sunken ships. Had he diabolically plotted to sink *Kompira* so he could raise her? If so, I thought, he calculated without our sea god, for we came through safe and drew in to a cove to put the pilot ashore. Then he proved his good intentions by refusing payment for his services.

"Any time you want to do it again," he said cheerfully, "let me know."

"Thank you," I said. "Once is enough."

Leaving behind Awaji, largest island in the Inland Sea and famed in legend as the first of the Japanese group to drop from the spear-point of the ancestral gods when the Japanese archipelago was divinely created, we sailed across stormy open water to another large island, Shodo. Here at the town of Tonosho officials set a valuable precedent. Ignoring our protestations that the deck of *Kompira* made a comfortable bed, they insisted we spend the night at the town's expense in a delightful seashore inn (page 633).

Thereafter our captain, upon arrival at a new port, would fill officials' ears with the

National Geographic Photographer J. Baylor Roberts

Relics of Hiroshima's Atomic Holocaust Interest an American Visitor

A souvenir shop sells photographs of the 1945 catastrophe and objects salvaged from the ruins. This man examines glass and pottery fused by the bomb's heat. Hiroshima has all but recovered from the blast.

story of the wonderful treatment we had been accorded in the last port. The eyes of the officials would grow round, and one could see the determination forming in their minds that they were not going to be outdone. The mayor's car would be requisitioned to take us about, and often the mayor along with it, and we would be lodged at the best inn, entertained at an official dinner lasting as long as three hours, and tucked in for the night.

The captain's motives in instigating these plots were not altogether altruistic. He always managed to get himself invited as well. In some ways the Japanese are undemocratic; yet there is a camaraderie between high and low that would seem strange in America. This young fisherman's best shirt was always soiled, and he was usually coatless and always tieless; yet he was readily included in the dinner parties, expressed himself freely to high officials, and was treated as an equal by them.

One expects to find excellent inns in the large cities, of which there are many along both shores of the Inland Sea. But nearly every town, too, has a well-appointed inn.

We would remove our shoes in the vestibule, put on soft slippers, and be led through shining corridors to an artistic room carpeted with straw mats. The chief feature of the room was always the *tokonoma*, or sacred alcove, occupied by a beautifully designed hanging scroll and a flower arrangement. Sometimes there were chairs, but usually one sat on the floor. This was no hardship, ex-

637 National Geographic Photographer J. Baylor Roberts

An American Freighter Unloads Baled Cotton for Japan's Textile Industry

Soon after the war the United States began shipping cotton to aid Japan's recovery. Today the output of the islands' mills totals a little more than half their prewar production. This ship stops at Kobe.

cept at a three-hour dinner. Meals were served in the room on an ankle-high table. There is no public dining room in a Japanese inn.

At bedtime the maid spreads out soft, thick quilts—eight inches too short for a tall Westerner—and supplies guests with a sack of oats as a pillow.

The Japanese Bath, Luxury Unlimited

The crowning joy of the day is the hot bath in water three feet deep. The tub is sometimes as big as a swimming pool. A Japanese bath is the most nearly perfect bathing device on this planet since the baths of Caracalla of ancient Rome.

The gardens of these inns are often places of great charm and beauty, and nearly every town has its public park, quite unlike anything of the sort in Western lands. The Japanese garden depends much upon irregular outlines, rocks, stone lanterns, arched bridges.

It tries to achieve an effect of cultivated wildness, or careful naturalness. A woodland glade may be so naturally covered with moss that one never dreams that every bit of it was planted by hand. Hillocks look natural, though in many cases they are man-made. There is usually no straight path in a Japanese garden.

Nor are there beds of flowers in the Western sense. In fact, flowers are seldom seen, except where they grow in seeming naturalness in the woods or on the edge of a stream.

One rarely finds a garden in Japan without water. It may be a large lake; it may be a small pool; it may be only a waterfall or brook; but water there should be to satisfy the Japanese love of beauty. About the water there are always rocks, for Japanese garden designers believe in them. Many rocks in the old gardens were donated by feudal lords.

Beyond Shodo we entered the Inland Sea National Park, which is made up of myriad islands of all shapes and sizes, but alike in one particular—they are all up and down. We did not see one flat island in our entire voyage. Some rise to a height of several thousand feet. Everywhere our hosts were determined to take us to the highest peak in the vicinity. We did more climbing in six weeks in Japan than in six years in California.

Japan crowds a population of 83,200,000 into a land the size of Montana, which has 590,000. So even the islands of the Inland Sea have a considerable population, and the island mountainsides are often cultivated to the very top.

We think of rice as Japan's staff of life. So it is on the mainland (page 625), but on the islands sweet potatoes and fish are the staples. Here sweet potato vines will cling to any slope.

Many an island is too abrupt and rugged to do anything with except perhaps crown with a temple. Many are just gaunt, towering rocks. Although several hundred thousand people live on the islands of the Inland Sea, scores of charming islets are uninhabited, enchanted spots with beaches and gnarled aged pines, ideal places to step ashore, broil fish over a campfire, have a picnic, and spend a night.

Sailing the Waters of Dreamland

The blueness of this enchanted world amazed us. The sky was a porcelain blue, the sea was an exquisite blue-green so clear that one could look down into it to great depths, and the boat seemed at times to be floating in air. The islands, especially in the morning, were wrapped in a soft blue haze.

The people of this dream world are not greatly affected by changes taking place on the mainland. Nevertheless, some major reforms have reached them.

The Occupation's land reform has broken up large holdings and enabled tenant serfs to buy land for the first time. However, they choose to ignore the new law which requires that a man's land, upon his death, shall be divided equally among his children. Even on the mainland the average farm is only about two and a half acres; on the islands it is much smaller. To divide it into several still smaller farms would mean that each heir would get only "a cat's forehead," to use the Japanese phrase. So the islanders stick to inheritance by the eldest son. The other sons must leave home and make a new life for themselves.

To the islanders, fishing is of top importance. It is equally important to Japan as a whole. Eighty-five percent of Japan's animal proteins come from fish. Japan leads the world in fisheries production. In 1949, a representative postwar year, Japan produced almost three million metric tons of fish, the United States 2.5 million, the U.S.S.R. 2 million, and the United Kingdom and Norway 1.1 million each.

Age of Sail Has Not Vanished

The motorized fishing boat is common, and yet the age of sail has not vanished on the Inland Sea. Near Tomo we counted 28 sails within view at one time.

But the Inland Sea has many other industries besides fishing. The city of Marugame makes fans. Imabari makes towels.

Niihama mines and refines copper. I was taken by tunnel two miles inside the mountain of the Besshi mine. It is like a skyscraper standing on its head; the floor at the top is called the first, while the newest and lowest level deep in the heart of the mountain is the twentieth. The mine contains many miles of tunnels, and they are being extended at the rate of four miles a year (page 649).

In an island world of fishing villages with humble houses it was astonishing to come upon a sample of architecture that out-Nikkos the great shrine of Nikko in color and splendor. It is the magnificent temple of Kojoji on the island of Ikuchi (page 642). The many sanctuaries are gay, almost giddy, brilliantly decked out in red, blue, white, silver, and gold. The temple, belonging to the Shinshu sect of Buddhism, has been 10 years a-building and is not yet finished. It is so modern that it was recently upset by a strike of its priests.

To see a curious art of Shikoku, we journeyed overland to Kochi. Here is the place for raising *onagadori*, or so-called "long-tailed" fowls. I call it an art rather than an industry because a bird with tail coverts 20 feet long is not of great utilitarian value, nor

(Text continued on page 647)

Fourteen Feet of Feathers Drag the Shikoku Ground →

Japanese officials once wore spectacular feathers from *onagadori* cocks, and warriors adorned their lances with the plumes. A few breeders still raise the birds, keeping them in high, narrow cages or wrapping and coiling the feathers for protection. Tail coverts on this bird fall far short of the record, 24 feet.

 Kodachrome by Willard Price

← Sumoto Puppets Rise Almost as High as Their Creator

Puppetry, once Japan's most popular dramatic art, is found today chiefly at Osaka, where it is one of the special attractions of the city. But part of Japan's living theater today draws heavily upon puppetry in stage settings, costumes, music, even the plays themselves. And the jerky, stylized poses and gestures of its players come directly from the puppet stage.

In Osaka's famed Bunraku theater, each realistic doll measures two-thirds life size. It is handled directly by men standing on the stage. The chief operator, in gay costume, holds the doll at waist height and controls the movements of body, head, and right hand. Two assistants, wearing black hoods and robes so as not to attract attention, operate left hand and feet—or bottom of kimono for female puppets, which have no feet.

Movement of eyes, eyebrows, lips, tongue, and even finger joints creates lifelike illusion.

In few places has puppet manipulation reached such a high level of skill as in Japan. Puppeteers synchronize their movements not only with one another but with the narrator, whose droning voice chants the ballad-drama to music from the samisen, a three-stringed instrument. The narrator alters his voice as he takes each character's part.

Dr. Tatsuzo Matsutani, a Sumoto physician, makes the oversized puppets as his hobby. Here he exhibits four of his bamboo, plaster, and brocade creations. He may take a month to make one doll.

← Curbstone art classes paint scenes in Kyoto, Japan's art center.

Golden Carp Leap → for Bread Morsels

This bridge arches a stream in Takamatsu's Ritsurin Park. A one-time estate, the park blends lakes and pines in 134 acres.

Kodachromes by Willard Price

↑ Buddhist Pilgrims Enter Kojoji Temple on the Island of Ikuchi. Westerners Rarely Visit This Elaborate Shrine

↓ Japan's brightest colors are reserved for children. As women grow older they wear progressively darker and more conservative kimonos. In Kannonji the wife of Captain "Wide-Margin-of-Safety" presses kimono material with a charcoal-heated iron.

Kodachromes by Willard Price

A Seagoing Freighter Takes Shape in a Mukai Island Yard

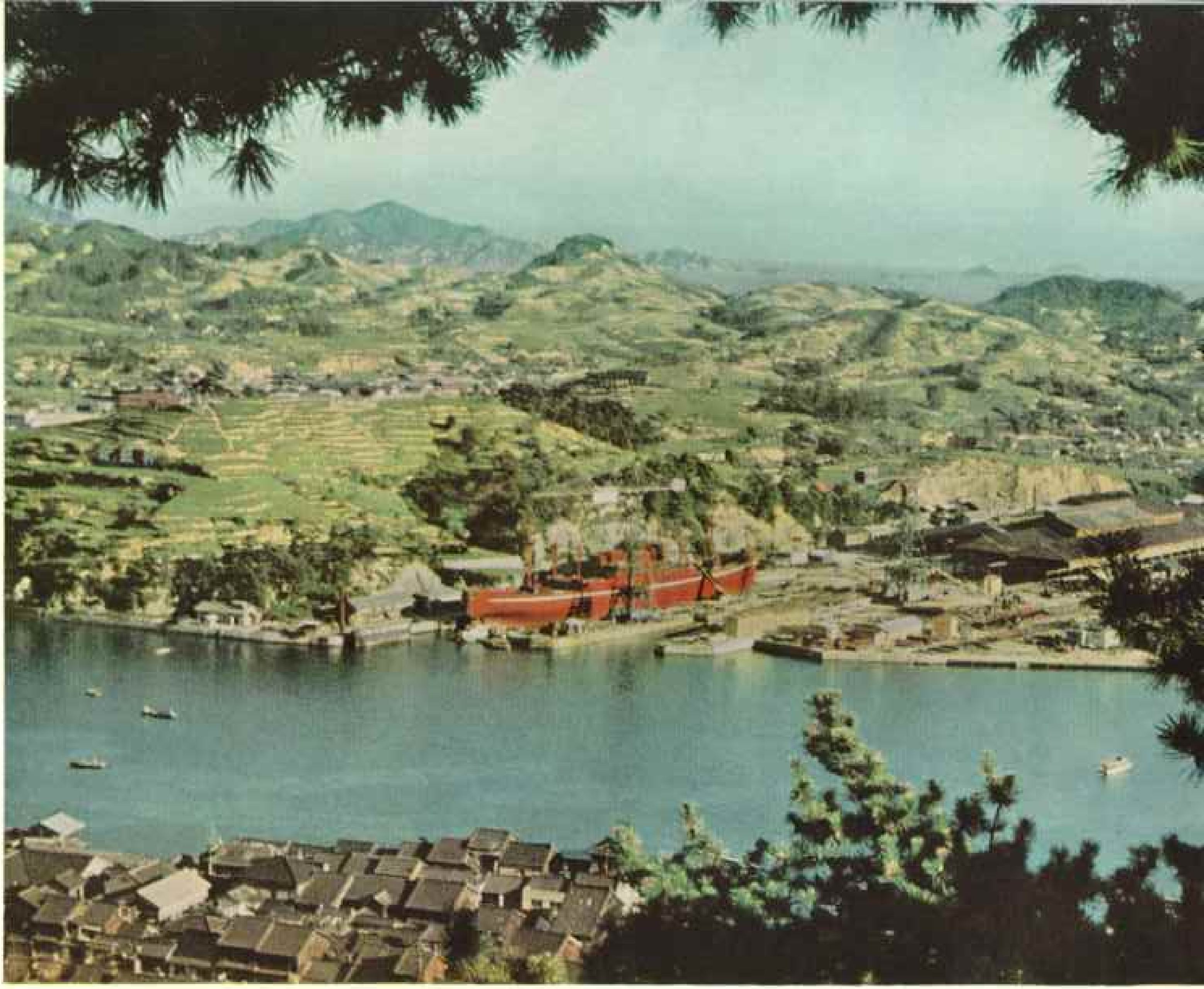
Japan, which once owned the world's third largest merchant fleet, came out of World War II with its merchant marine shattered. Recovering rapidly, she now has more than 50 fast new freighters plying between Japan and the United States. Japanese shipyards in 1952 were producing at a rate approximately equal to the prewar average.

Japan builds ships not only for her own use but for sale to the world.

Here the shipping center of Onomichi looks across a narrow arm of the Inland Sea to a dockyard on Mukai Island. More of the Inland Sea lies in the distance.

Many of Japan's mariners come from prefectures bordering the Sea.

The ship under construction is a freighter. Japan has not begun to rebuild her navy.



Beppu's Stone Devil Presides over a Steaming Hell. Hot Mineral-water Showers Massage Rheumatic Muscles

Beppu municipality fumes and sputters with boiling ponds. Some erupt scalding mud; others provide mineral waters and baths for the ailing. Alligators and crocodiles, bred for their skins, grow rapidly in the warmth of Devil's Mountain Hell (not shown). A cold stream at Shibaseki Spa (right) tempers the hot showers.

Kodachromes by Willard Price

Kodachromes by J. Baylor Roberts

Vacuum Jugs Pour from Osaka Factories

The Prices began their voyage at Osaka, Japan's industrial metropolis and second largest city. There they found much of the war damage repaired; factories by the hundreds turned out consumer goods as well as industrial machinery.

Kyoto's Fine Art Takes More Time

Near-by Kyoto, spared from bombing, fashions exquisite art objects: silks, brocades, and embroideries, porcelains, damascene, lacquer, and cloisonné. Here delicate handwork fills in layers of enamel paste on a copper box at the Inaba Cloisonné Factory.

is it intended to be. The breeders of such birds are artists. I found that the price of a fowl depends upon the length of the feathers, which are valued at about $2 a foot.

In olden times the feathers adorned tops of samurai lances in the processions of the feudal chiefs.

Only the cocks have long tail coverts; the hens are quite ordinary. The average growth of the tail is two and a half feet a year, and the longest tail on record measured 24 feet. The bird is kept in a tall, narrow box, its tail draped over a hanger, though on Honshu Island it is sometimes coiled up and wrapped in cloth. Once in three days it is taken out for a 10-minute walk. Someone must walk behind it, carrying the "train."

Strange Tales of the Inland Sea

Some of the most famous of Japan's legends have to do with the islands and bays of the Inland Sea. There is the story of Momotaro that every Japanese child knows. An elderly couple who longed to have a child one day opened a peach and out stepped a baby boy. They called him Momotaro, Peach Boy. We remembered his story when we landed on Megi Island (Oniga Shima), the Isle of Devils, for when Momotaro grew up to be a mighty warrior he came to this island and conquered all the devils.

We were told of an island called Contrary because legend has it that disobedient children were sent there. Even today mothers warn their children, "Be good, or I'll send you to Contrary Island." During our stay in Japan the newspapers reported that two families had gone to court, each claiming to own Contrary Island because an ancestor had been sent there for being a bad boy. Another island in the Inland Sea goes by the name of All-the-Saints-Got-Drunk (Sensui).

In one of the deepest spots of the Inland Sea we looked down to what legend glamorizes as the sea king's palace. It looks like a palace, although it is nothing but an immense rock with many openings through which swim colored fish. It plays a part in the famous story of Urashima, the Japanese Rip Van Winkle.

Urashima, a fisher boy, was borne on the back of a friendly tortoise down to the palace of the sea king. There he met the king's daughter, married her, and lived with her for three dreamlike years. Then he longed to visit his native village. His princess gave him a jewel case as a remembrance of their love, but told him not to open it.

Returning to his village, he found everything changed. The houses were different, the people were strangers. Perplexed, he thought of his jewel case, the only friendly thing he had. He opened it, and a cloud of purple smoke came out. His black hair turned white, his youthful limbs withered, and he crumbled to dust on the beach—for three years in the sea king's palace were equal to 300 on land!

Competing for honors with the king of the sea bottom was our sea god, Kompira, to whose shrine we climbed by 800 exhausting steps up the mount of Kotohira on Shikoku. Thousands of pilgrims, mostly grateful seamen, come here every year. One of the buildings of the temple is filled with models of ships supposed to have been saved from disaster by the friendly intervention of this god. Also there are numerous ships' shrines, and after our trip was finished Wide-Margin-of-Safety made a special pilgrimage to place our *Kompira* shrine among them.

Day by day and week after week we plied back and forth through fairyland, crossing and recrossing from one mainland shore to the other and circumnavigating the islands. We wished it would never end, except that at times a diet of raw fish, seaweed, bean curd, squid, tea, and rice becomes a little tiresome. After Naruto we touched at many places and passed through the strait of many wrecks, Kurushima. Its whirlpools reminded us dramatically of Edgar Allan Poe's description of the Maelstrom. Now the islands grew immense, a single bay of one of them looking as large as New York Harbor.

At the old naval base of Kure the famous battleship *Haruna*, reported sunk in the South Pacific but finally sent to the bottom in her home port, had been salvaged and was being dismantled for scrap iron.

Hiroshima Risen from Its Bombing

In Hiroshima (page 636) the mayor showed us the Industrial Exhibition Hall that is being preserved in its wrecked state as a memorial of the world's first atom bomb attack; then he took us to the roof of the City Hall to see how remarkably his city has been rebuilt. Even its ancient castle has been restored, although the new one is a temporary wood-and-plaster replica erected as a feature of a sports fair in 1951. From a distance it looks very much like the real thing.

Incidentally, there are many real castles left about the Inland Sea dating from feudal times. Fortunately they came through the war unscathed. Among the most picturesque are those of Osaka, Himeji, Sumoto, Marugame, and Matsuyama. They contrast with their modern settings, in which the only visible reminder of former times is an occasional kimono.

Though in westernized Tokyo the kimono has almost disappeared, it persists in and about the Inland Sea. There the women

National Geographic Photographer J. Baylor Roberts

A Tunnel Beneath Shimonoseki Strait Links Honshu and Kyushu Islands

This 2-mile route, designed for motorists, cyclists, and pedestrians, was begun in 1939; work is not yet completed. It has two levels. The upper will be for motor vehicles; cyclists and pedestrians will take the lower. The project will save a tedious ferry passage. Railroad trains use an older tunnel.

scarcely know that they have been "emancipated," though they are aware of woman suffrage and turn out in numbers at the polls.

But in the home women continue their traditional role and wear the kimono, although they object to its growing expense. The 11-foot *obi*, or sash, that goes round and round and ties in a gorgeous bow behind is often superbly embroidered and may cost more than an American woman's entire outfit. Most stunning and expensive of all is the wedding costume—so expensive, in fact, that most brides rent it, unless they use their mother's or grandmother's.

We sailed on to the island of Itsuku (popularly Miyajima), which the Japanese count as one of the most beautiful spots in Japan. Here the well-known *torii*, Shinto sacred gate, stands in the sea some 500 feet from shore. Every 50 years or so it must be reconditioned; we were lucky enough to arrive just after it had been repainted (page 630).

A priest of the temple told us the torii was so high that *Kompira* could sail under it. Wide-Margin-of-Safety, in a narrow moment, decided to try it.

Kompira Cracks a Mast

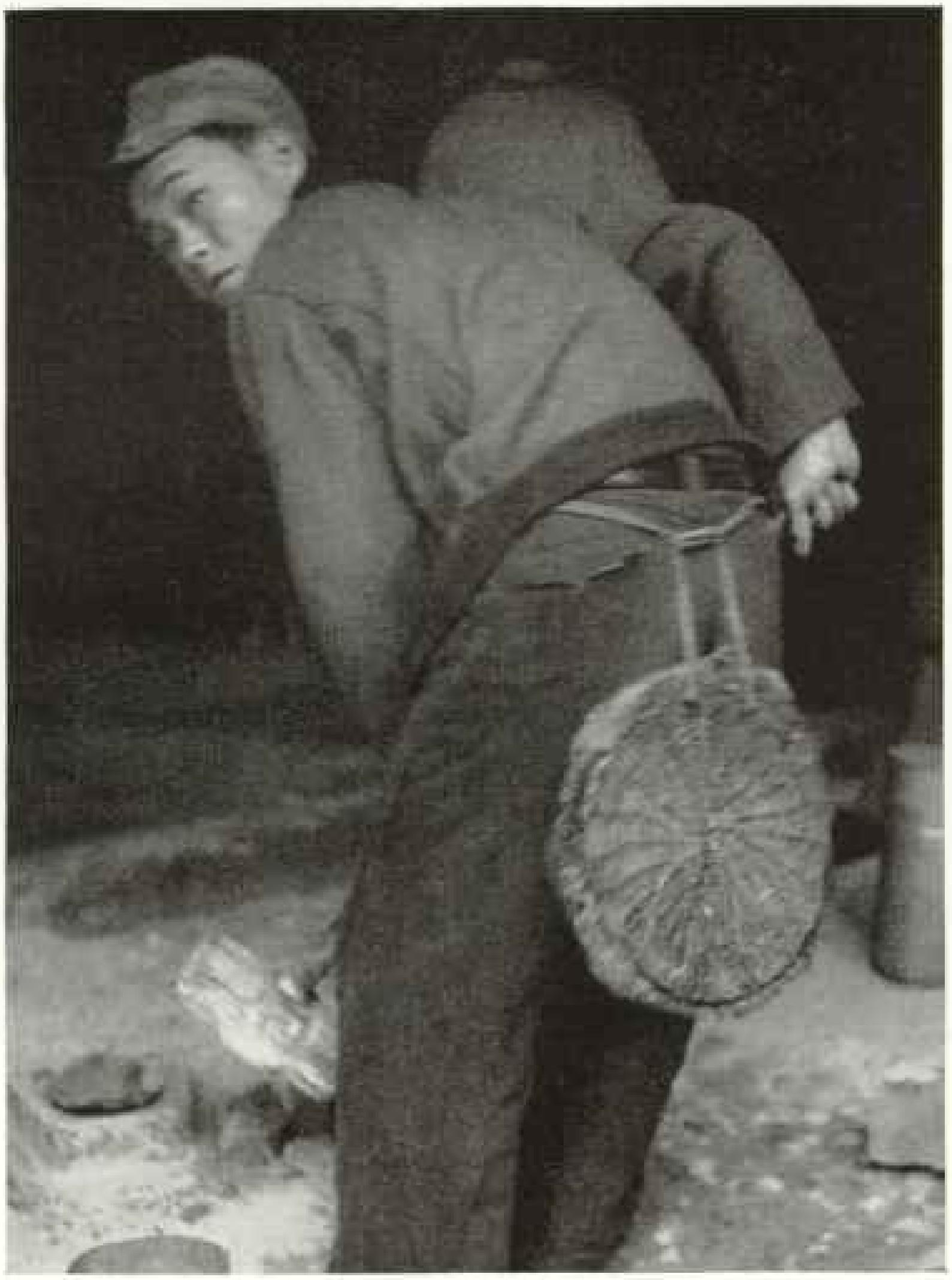
The foremast struck the lower beam, and a shower of vermilion splinters fell on the deck. The mast bent and cracked ominously and seemed about to break in two. The steel stay from the peak of the mast to the bowsprit broke and whipped about, lashing everyone who came within reach. The engine was hastily reversed, and *Kompira* backed out.

The priest, to make amends for his poor advice, put on a sacred performance of gorgeously costumed temple dancers for the benefit of our cameras (page 632).

Even more impressive were the maples, for it was now October, the beginning of one of Japan's two most colorful seasons, the other being the time of cherry blossoms. During October and November schools throughout Japan organize expeditions to Itsuku, and as many as 5,000 children a day come to see the maples. They picnic under the trees, romp about wildly, but rarely injure a tree or pick a leaf except from the ground.

Japanese maple leaves, very small and deeply indented, look much like stars. Their colors are breath-taking. Down Maple Valley (Momiji-dani) flows a picturesque brook overhung with hundreds of brilliant maples that are almost translucent as the sun shines through them (page 629).

We could view them in peace and quiet on Itsuku, for no wheeled vehicle of any kind is allowed lest its noise frighten the sacred deer. Since the entire island is considered sacred, there are many other restrictions. Formerly even birth and death were not allowed, unless they happened without warning. Expectant mothers and dying folk were required to go to the mainland. Now people may be born or die there, but the dead must be taken to the mainland for burial.



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Foresight Takes Care of Hindmost

If this Besshi miner has to sit on a rough spot, his portable cushion ensures comfort. Opened in 1691, Besshi copper mine is one of Japan's oldest. Many miles of tunnels extend under a thousand acres on Shikoku (page 638).

Chased by "Typhoon Ruth"

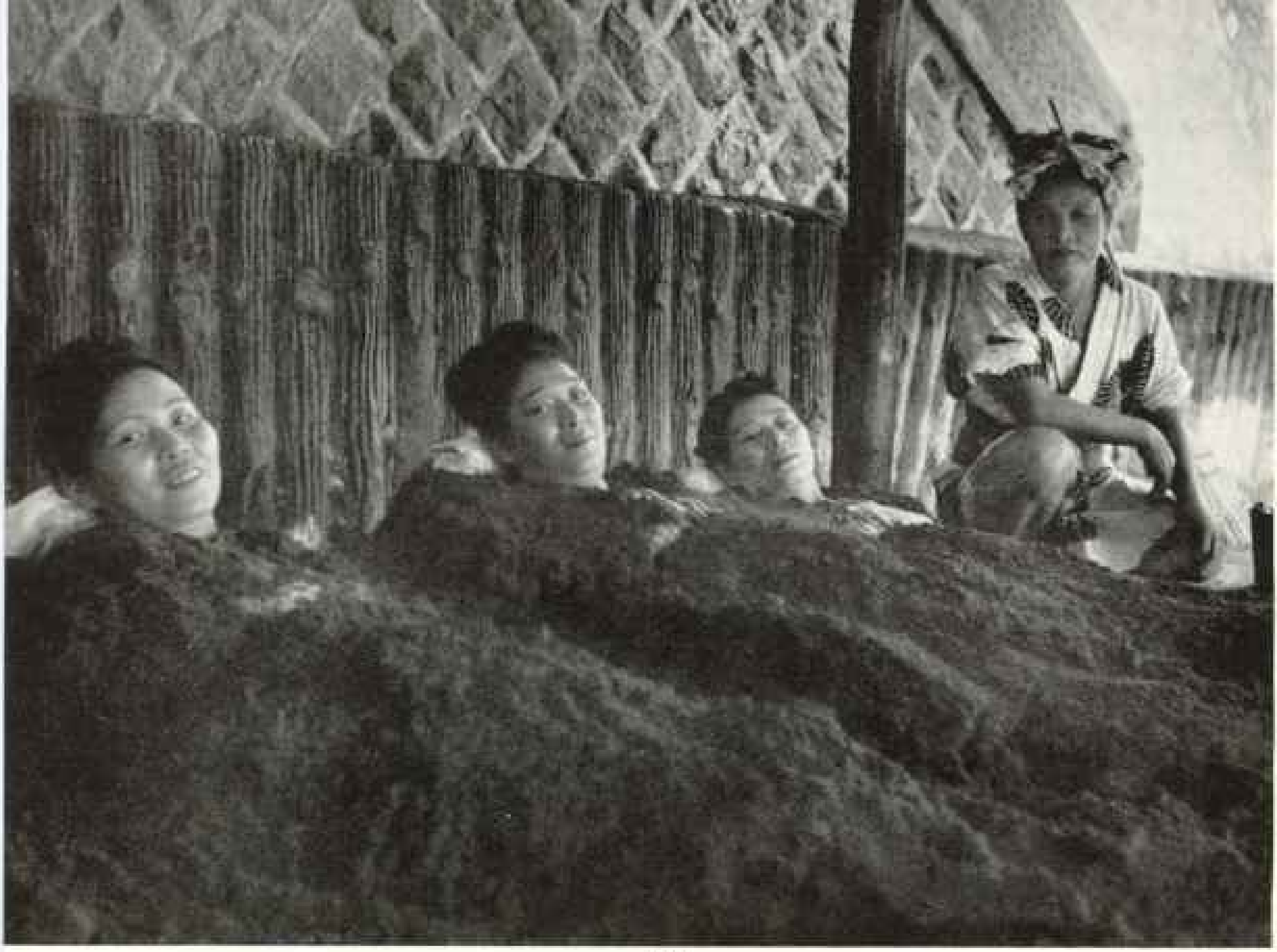
Although this was the season for typhoons, we had been touched by the edges of only two. Now, however, as we sailed across the great open western end of the Inland Sea, so wide that in three directions we could see no land, wind and waves began to promise something really serious. We barely reached Beppu before "typhoon Ruth" struck.

Navy and Air Force weathermen have long identified Pacific typhoons by women's names. Selected alphabetically, they add a touch of human interest to workaday designations. Ruthless Ruth was the worst typhoon here since 1935. It blew the Inland Sea into such fury that a thousand houses were inundated in Yamazaki alone. It blew whole streets of houses in Beppu straight out from under their roofs, which fell to the ground. Huge concrete piers buckled and crumpled as if made of cardboard.

But on the morning after, everyone was out rebuilding, and the Japanese once more showed that they know how to take disaster.

The finest Inland Sea ships of the Kansai and Osaka lines make Beppu their objective because of its attractions as an all-year resort. Its special inducements to visitors are its climate and its "hells" (pages 645, 650).

All Beppu steams and sputters with hot springs. They have such picturesque names as Bloody Pond Hell, White Pond Hell, Gold Dragon Hell, Green Hell. Beppu has hot



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Up to Their Necks in Hot Sand, Patients Take the Cure at Beppu

Beppu, on the Inland Sea shore, draws visitors even from foreign countries. Hot water is piped in abundance from boiling springs (page 645) to homes, railroad stations, and schools. Many persons suffering from rheumatic and nervous disorders take the sand treatment. This attendant has just buried her charges.

water for all purposes; every house has an always-ready hot bath. Twenty greenhouses heated by pipes running day and night with boiling hot water raise every sort of vegetable out of season. Fishing is good off Beppu because there are hot springs under the bay, and tropical fish brought to Japan by the Black Current (Kuroshio) thrive in these warmer-than-tropical waters.

Buddha of Concrete and Bones

Other than the hells, the most unusual sights of Beppu are the chrysanthemum show and the Great Buddha. Figures famous in Japanese history and legend, including the story of Peach Boy who grew up to conquer the demons on the Isle of Devils, were worked out life size in chrysanthemums. The Buddha, 80 feet high and the largest of its kind in Japan, was built in 1928 of concrete in which are mixed the bones and ashes of a million people who died without relatives.

Another long jump across the sea, and we slept on deck in the harbor of Mitajiri. Then next morning the captain came forward, all excited, saying, "The end of the Inland Sea!" Ahead, the main islands of Kyushu and Honshu overlap to hide the narrow Shimonoseki Strait (page 648).

We passed through the boiling tide rips of the strait, too busy packing to remember that the U. S. Hydrographic Office's *Sailing Directions for Japan* lists numerous wrecks in this vicinity and describes it as "the most difficult place to navigate in the Inland Sea." We fairly flew through with the tide to come to anchor in Moji's little harbor.

By force of habit we climbed a mountain to enjoy a final view of the Inland Sea. Its blue islands gradually turned melancholy as the sun neared the horizon. Its many capes and bays, its far reaches and white clouds, took on the appearance of an oil painting as the sun sank.

We came down to stand on the deck of *Kompira* one last time to enjoy the afterglow. Tomorrow we would take the train, while our companions sailed back to Kannonji.

Before Kompira's shrine we shared with them a last meal of rice and fish, a rather sad and silent meal, for in these six weeks we had come to have respect and affection for Wide-Margin-of-Safety, Good-Fortune-in-Autumn, and Literature-Pursuing-Sixth-Son.

Mount Vernon Lives On

A Century of Patriotic Labor Has Restored George Washington's Old Home as He and Martha Knew It

By Lonnelle Aikman

THE Presidential yacht *Williamsburg*, trim and shining, rounded a curve in the Potomac and slowed down off Mount Vernon.

By her starboard rail stood a little group of President Eisenhower's special guests for the day's cruise—a boatload of wounded and ill veterans from military hospitals around the Nation's Capital.

One of them, Pvt. Tommy Jones, his right hand swathed in bandages, stood by uncertainly.

"Sure, it's okay to use your left hand," called someone.

So Tommy Jones, too, saluted George Washington's old home, looking solemnly toward the stately white-columned mansion on the Virginia bluff high above the river.

It was the first time he'd saluted, he told us, since that grenade hit back in Korea.

Navy Tribute Is Regulation

The *Williamsburg* incident symbolizes the affection and reverence that Americans everywhere feel for Mount Vernon.

All passing U. S. Navy ships pay their respects to Washington's memory. By regulation, colors are half-masted, taps are sounded, and men salute (page 682).

The tribute goes back at least to 1801, when a newly commissioned man-of-war fired a 13-gun mourning salute opposite the late General's home.

Gradually such spontaneous gestures became custom. The tradition was finally standardized; in 1906 President Theodore Roosevelt made it official.

But Mount Vernon is not just a national symbol, a historic monument to commemorate the remote deeds of a successful general and President. Its appeal is to the human heart, as the home of George and Martha Washington.

It was in April, 1759, that young Washington introduced this Virginia plantation to his bride, the wealthy and lately widowed Martha Dandridge Custis. With them came her two small children, "Jacky" and "Patcy" Custis, who already had won a lasting place in their stepfather's affections.

"You must have the House very well cleand," George Washington (then colonel) wrote ahead to his Mount Vernon manager, "and Were you to make Fires in the Rooms below it w'd Air them. You must get two of the best Bedsteads put up . . . Enquire abt. in the neighbourhood, and get some Egg's and Chickens, and prepare in the best manner you can . . ."

The house to which Washington brought his Martha was far from the impressive mansion that it would eventually become. It included then only the central portion of the building we now see. There was no sweeping riverside veranda, with its eight tall pillars. Service outbuildings and quarters were small and few; gardens and grounds were limited.

True, the 27-year-old bridegroom had made certain improvements in the cottage he had acquired five years before from his elder half brother, Lawrence Washington. He had added another story and a new roof. The foundations were strengthened, rooms renovated and redecorated.

Almost the only thing unchanged about Mount Vernon was the name that Lawrence had given it for an admired former commander, Admiral Edward Vernon.

Best of all was the property's location. "No estate in United America is more pleasantly situated than this," George Washington once described it. "It lyes in a high, dry and healthy Country . . . on one of the finest Rivers in the world."

Here Washington planned a lifetime career as a Virginia planter. Behind him, in that honeymoon spring, lay the adventures of the British frontier campaigns against the French and Indians. He had achieved military distinction and had recently been elected to the Virginia House of Burgesses.

"I am now I believe fixd at this Seat with an agreable Consort for Life," he wrote to a friend.

Hearthstone of Washington's Life

Though "fixd" was hardly the word, Mount Vernon remained the hearthstone of Washington's life for the next 40 years, the place to which he hurried back after the Revolution was won and the eight long years of the Presidency served.

"I can truly say," he confessed as President in 1790, "I had rather be at Mount Vernon with a friend or two about me, than to be attended at the Seat of Government by the Officers of State and the Representatives of every Power in Europe."

Today Washington's beloved estate lives on in a restoration that has been built up, bit

Blossoms and Greenery Frame Mount Vernon as the General Knew It

All roads of the 500-acre estate lead to the Potomac-side mansion. George Washington's many service outbuildings, now restored, make this a villagelike scene. Kitchen (right) and office flank the home. Gardener's house, storehouse, spinning house, icehouse, and museum follow the curving path. The big greenhouse faces the garden. Headquarters of the Mount Vernon Ladies' Association, which maintains the shrine, stands at extreme left.

653 Kodachrome by National Geographic Photographer John E. Fletcher

Loving Care Has Preserved a Living Link with the Nation's Stormy Birth

"No estate in United America is more pleasantly situated . . ." said Washington of his beloved Virginia home. "It lyes in a high, dry and healthy Country . . . on one of the finest Rivers in the world." Here a visiting group, marching through a gate, turns off the outer road toward the bowling green, English-style kitchen garden, and dormered stable. Two small buildings framed by trees at upper center are the coach house and washhouse.

by bit, by an organization called the Mount Vernon Ladies' Association of the Union.

This patriotic society, America's oldest to be founded by women, had its beginning 100 years ago in a drive to buy and preserve Mount Vernon as a national shrine.

So thorough has been the job and so modest are "the Ladies," as they are respectfully referred to by their staff, that many visitors think the memorial is maintained by the Federal Government.

One moonlit summer night I was the association's house guest at its unobtrusive headquarters built in the shadow of the "great house."

My room, with Early American furniture and George Washington's picture on the wall, shared the pervading time spirit. As I looked out over the ghostly, moon-touched grounds, I could almost see the tall figure of Washington striding along on an evening walk.

Suddenly I *did* see it! Only it turned out to be one of the guards making his regular rounds.

Million Visitors a Year

Last year more than a million people visited Mount Vernon.

They rolled in by bus and car over the scenic 15-mile drive from the Capital, or, choosing the summer boat trip down the Potomac, tied up by shiploads at the site of the old Washington wharf.

A cross section of the American people, the callers bring interests that range from a scholarly quest for some little-known phase of George Washington's life to a folksy desire to see his false teeth.

Actually there is no denture exhibit. But staff officers say it is hard to convince inquirers of that fact, especially when they imagine they've seen it here in the museum's collection of Washington relics.

I heard of another slightly mixed-up tourist who stopped a guard on the path leading to Washington's tomb and sarcophagus. Would he direct her, please, to the "esophagus."

Such incidents are rare, however. It's more likely that someone whose hobby is 18th-century snuffboxes or gardens can tell even trained personnel something they didn't know.

"I'm still learning," said Charles C. Wall, resident superintendent at Mount Vernon, who has devoted 24 years to its never-ending tasks. "Our object is to re-create a true domestic scene. Each new detail brings us closer to Washington, the human being."

As a National Geographic writer I joined the perpetually moving lines of visitors. Once I trailed along with a queen (page 678).

From the formal west-front doorway of the family house we looked out, as Washington did, on an oval courtyard where the original sundial is back in place.

Beyond, along shade-dappled lanes, stretched a series of small white cottages such as served the everyday needs of long ago.

Washington's plantation was a self-sufficient unit. "It's astonishing what a number of small Houses the General has . . . for his Carpenters, Bricklayers, Brewers, Blacksmiths, Bakers," wrote a 1785 guest, Robert Hunter, whose diary is preserved in the Huntington Library, San Marino, California.

Present-day callers peer curiously at old-fashioned looms, reels, and wheels in the restored spinning house. There, one busy year, Washington's workers turned out more than a thousand yards of woven cloth.

Near by is the storehouse, keeper of the plantation's simple necessities—nails, paints, leather, garden tools, and seeds.

Stage-prop hams hang high in the old smokehouse. Wooden tubs in the washhouse are ready for hot, sudsy water to scrub working clothes. And in the coach house stands an 18th-century carriage whose renewed gilt-and-maroon magnificence is a sure attention-catcher for passing small fry.

Wandering housekeepers look in vain for a kitchen in the family dwelling. They find it in an annex at the end of an open arcade.

I came on two women there staring, fascinated, at rows of pewter warming plates, iron pots, and skillets grouped around a cooking fireplace big enough to hold a bed.

"But wouldn't everything be stone cold," muttered one, "by the time it got up to the house?"

"Not if they moved fast," her companion countered. "And think how *good*, with all that country flavor left in!"

Old-time Country Living Lavish

There is a hint of country lavishness in a faded recipe for a "Grate cake" on view in the museum. "Wrote by Martha Custis for her Grandmama," it starts out, "take 40 eggs . . . work four pounds of butter."

Washington kept his own dairy cattle and chickens, and produced vegetables, fruits, honey, and herbs in his kitchen garden.* He used what he needed and sent the rest, plus home-milled flour and the big wheat and tobacco crops from his outlying farms, to markets as near as Alexandria and as far away as England and the West Indies.

You can still see both kitchen and flower gardens alive and flourishing at Mount Vernon. With their typical 18th-century "pease," lettuce, and beans, their bright beds of fox-

* See "Home of the First Farmer of America," by Worth E. Shoults, National Geographic Magazine, May, 1928.

Kodachrome by Kathleen Revis

Here Washington Lived; from Mount Vernon's Veranda He Watched the Potomac

National Geographic Photographer John E. Fletcher

The Excursion Boat Comes In. Sight-seers Head for George and Martha Washington's Home.

Today's Potomac River steamers tie up where Washington met sailing ships bringing clothing, household goods, and farm equipment from Europe. From this point the master of Mount Vernon shipped his tobacco, flour, and wheat to England and the West Indies. Wharf and shelter are modern.

Mount Vernon Still Belonged to a Member of the Washington Family When This Lithograph Appeared in 1840

When Washington died, the estate passed to a nephew, Bushrod Washington. Later it went to a grandnephew, and then to a great-grandnephew. The Mount Vernon Ladies bought the property in 1858 and saved it from decay. Bit by bit they have restored buildings and grounds (page 679).

Visitors View the Broad Potomac from the Porch Where Martha and George Washington Entertained Guests

Original paving stones, imported from England, were laid in 1786. Replacements came from the same quarry in 1914.

Spare bedroom (left) and dining room open upon the broad central hall. Lafayette's gift to Washington, a key to the Bastille, hangs between the rooms (page 660).

National Geographic Photographer John E. Fletcher

Houdon's Bust Is Considered Washington's Best Likeness

Made in clay, the work was modeled from life when Jean Antoine Houdon visited the General in 1785. The French sculptor used it in preparing a full-length statue now in Richmond, Virginia. He left the bust at Mount Vernon. Though other possessions were scattered, this remained.

glove, larkspur, and cardinal flowers, they are among the most engaging of the restorations.

There are original plantings of boxwood in the formal patterns Washington knew. Apple and pear trees grow again. Trained against wall trellises or running horizontally along low fences, they are examples of the curious espalier and cordon techniques that the master borrowed from Europe (page 672).

Washington's Trees Still Survive

I asked Mr. Wall how many of Washington's own trees have survived on the landscaped grounds about the house.

"About 15, according to our horticulturist, Robert Fisher," he replied. "We have lightning rods on these for protection; but windstorms are hard on them. We lost one that way last summer."

Now, as in the past, Mount Vernon's heart beats strongest in the house where George and Martha Washington lived. Here the crowds are largest, voices hushed. For this building, filled with Washington's possessions, stirs memories of the Nation as well as of the man.

In his quiet, pleasant library, surrounded by books on history, farming, and military matters, the victorious general of the Revolution turned to the peacetime problems of statesmanship.

His letters addressed to other leaders of the infant Republic during the difficult postwar years urged national unity against the rivalries and confusions of the separate States. They helped pave the way for the Constitutional Convention of 1787 and a little later for Washington's own unanimous election to the Presidency.

Still another George Washington—country squire and courtly host—haunts his spacious Banquet Hall.

Joshua Brookes, a young Englishman entertained there in 1799, described the room as "elegantly furnished . . . mahogany chairs with yellow damask seats, white chintz window curtains with deep festoons of green satin."

It could be the description by a visitor of today.

Practically every article in the home is a story in itself, ranging from the educational to the fantastic.

The elaborately carved marble mantel in the Banquet Hall belongs to the fantastic variety. It came to Mount Vernon in 1785 through the courtesy of a pirate crew.

The mantel started from England, respectably enough, as a present from one of Washington's admirers, Samuel Vaughan. On its way it was seized by pirates, the story goes, along with other cargo.

When the buccaneers discovered the famous addressee, for some unknown reason, and despite the danger of being discovered and hanged, they had the consignment shipped on to Mount Vernon (page 662).

Of Keys and Music

"Listen to the man. It'll help you with your history lessons," I heard a sight-seeing mother say to her little boy as I walked into the broad central hall of the mansion.

An attendant was pointing out a huge glass-enclosed key hanging on the wall. "That key," he said, "opened the main portal of the Bastille in Paris. Lafayette sent it to Wash-

National Geographic Photographer John E. Fletcher

The Mount Vernon Ladies' Association Presents Its Centennial Exhibit

In 1853 Ann Pamela Cunningham, a semi-invalid, started her campaign to make the Washington home a patriotic monument (pages 670, 676). Her portrait hangs on the left; her associates appear on the far right. The cases contain historic documents pertaining to Mount Vernon and the association.

ington after the old prison fortress was destroyed during the French Revolution (page 659).

"Over there"—the speaker waved toward a table miniature—"is a model of the Bastille made from its own stone. People think it came from Lafayette, too. It was really the gift of a little-known Englishman."

From the hall we looked into the music room where the Washington family and neighbors gathered for singing and dancing. Washington loved to dance, though he admitted he could "neither sing one of the songs nor raise a single note on any instrument."

Relic Returned After 85 Years

The old harpsichord which now stands open in the music room as if ready for the next player was a present from Washington to Nelly Custis, his wife's granddaughter.

"That's a much-traveled instrument," Mr. Wall told me. "It was shipped from London to the Presidential Mansion at Philadelphia in 1793. When Washington retired from the Presidency, it came with the family to Mount Vernon. Later, Nelly married and took it away, and eventually *her* daughter-in-law returned it. It was the first piece of original furniture to come back.

"A strange thing happened about the maker's name plate," he continued, indicating a brass-rimmed label on the harpsichord. "An elderly man brought it to us in 1951, saying it had been in his family 85 years. It seems his grandfather and grandmother came here on a honeymoon trip. They brought with them their landlady's child, and the child picked up the name plate and gave it to them."

Leisurely we walked around the charming and livable old house. The family dining room contains many pieces the Washingtons owned—Chippendale ladder-back chairs, pictures, silver centerpiece, and china articles.

It was easy to imagine a gurgling, laughing child in the old high chair. It was used, in turn, by Nelly and George Washington Parke Custis. The youngest of Martha's grandchildren, they were adopted and brought to Mount Vernon after the death of their father in 1781.

In the downstairs bedroom, cozy with its four-poster bed and chintz décor, Mrs. Washington often put up the guest overflow.

Kodachrome by National Geographic Photographers B. Anthony Stewart and John E. Fletcher

An English Friend Sent This Marble Mantel to Washington for His Banquet Hall

"Too elegant . . . I fear for my . . . republican stile," wrote Washington when the gift arrived (page 660).

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National Geographic Photographer B. Anthony Stewart

An Exquisite Detail from the Banquet Hall's Carved Marble Mantel

The mantel (opposite) reached Mount Vernon in 1785 as the Banquet Hall was being completed. Antonio Canova was the sculptor. The dog's broken head (right) was stolen by a visitor but later recovered.

"The General absolutely insisted upon our staying," a London traveler of 1785 wrote in his journal. "I could not refuse the pressing & kind invitation."

As Washington's fame grew, the flood of distinguished visitors increased, along with the admiring or merely curious uninvited. "A well resorted tavern," the master once called his house.

The guests were entertained informally in the paneled west parlor, a room which in restoration holds an air of cheerful hospitality. Its molded ceiling, in 18th-century Adam style, and the carved Washington coat of arms over the mantel give touches of period elegance.

Here are family portraits—the companion pictures of George and Martha painted by Edward Savage in 1796, and an earlier study by Charles Willson Peale showing Washington handsome and debonair as Continental commander in chief.

Looking at the set-up tea tray and the game table with its scattered playing cards and odd fish-shaped chips, one half expects the room to fill up suddenly with men in queues and small-clothes. Or to see Martha Washington pass by in bouffant skirts and frilled cap.

Old Letters Clue to Furnishings

At bedtime many of Washington's guests had the honor, as one later reported, of being lighted to their rooms by the General himself.

There were six bedrooms on the second floor. These have now been refurnished in the period, with the aid of hints found in old letters and other sources of information.

As today's long lines of tourists file by, they admire the handsome Lafayette Room, named for its most famous occupant. They "ooh" and "ah" over the juvenile bed in the little room by the stairs where children and grandchildren slept.

Then they stop to stare in surprise at a cage in the Yellow Room holding a stuffed bird!

It's a cardinal, prepared for Mount Vernon by the Smithsonian Institution in Washington, D. C. Such caged birds often were kept in 18th-century homes. Washington's records tell of his buying a parrot for Patcy, probably from the captain of a passing West Indies trader.

Always Children Here

I was curious about the white-canopied crib in the Nelly Custis Room, for Nelly was beyond babyhood when she came here.

The crib, I learned, was for Nelly's little girl. The marriage between Nelly Custis and Lawrence Lewis, George Washington's nephew, took place at Mount Vernon in 1799 on the General's last birthday. Their child was born in this house less than three weeks before Washington's death.

In happiness or tragedy, there were always children around George and Martha Washington, though they were disappointed in having none of their own.

In the Blue Bedroom, so called from the painted woodwork, I knelt to read a faded letter pasted in the top of a small worn trunk.

It was dated 1830 and signed by another of Martha Washington's granddaughters, Eliza

From Bed to Tomb, Mount Vernon Gives Painstaking Details of Washington's Life as a Private Citizen

↑ Martha and George, sharing this room, could look out at the Potomac. The General died in the bed in 1799. His trunk stands at the foot.

↓ Children gaze at a wreath placed before Washington's tomb on his birthday anniversary. Mrs. Washington, who died in 1802, rests in a sarcophagus beside her husband's. Other family members are buried in an inner vault and beneath monuments outside the tomb.

Kodachromes by National Geographic Photographers B. Anthony Stewart and John E. Fletcher

666 National Geographic Photographer John E. Fletcher

A Guard with His Ember-eyed Dogs Checks the Mansion

Accompanied by Doberman pinschers, watchmen make their rounds all through the night. Searchlights flood the lawns and electric eyes guard against intruders. A high wall surrounds the estate (page 679).

Parke Custis Law. In it Mrs. Law, then herself a grandmother, recalls the trunk's past:

"It was that in which the cloaths of my Sainted Grandmother were always pack'd by her own hands when she went to visit . . . the General, whenever the Army were in quarters. I have stood by it . . . sadly distress'd at her going away—& oh how joyfully when she returned did I look on to see her cloaths taken out, & the many gifts she always brought for her grandchildren!"

Most Prized Article

But the most prized article that has come home to Mount Vernon is the huge four-poster mahogany bed, in George and Martha Washington's room, on which the General died.

Washington's last illness followed exposure to snow, sleet, and rain as he went about his usual outdoor activities. His last chore was to mark a new gravel walk by the Potomac.

His sore throat that developed grew steadily worse. Though three doctors were called in from near-by centers, Washington's life ebbed quietly away at 10:20 p.m., December 14, 1799.

The moment was recorded for history by one of the physicians, Dr. Elisha C. Dick, who stopped the mantel clock by cutting its weight cord.

This clock left Mount Vernon as a gift from Mrs. Washington to Dr. Dick, who in turn presented it to his and Washington's fraternal organization, Alexandria-Washington Masonic Lodge No. 22. It is now in the new George Washington Masonic National Memorial in Alexandria.

After Washington's death Martha closed up their bedroom, as was then the custom, and moved to a small third-floor room from which she could see the old family tomb.

Through the dormer window of this room, unfurnished and unexhibited today, I, too looked out toward the tomb.

National Geographic Photographers B. Anthony Stewart and John E. Fletcher

Visitors Strolling Down South Lane Pass the Reconstructed Coach House

George and Martha may have ridden in the Samuel Powel coach, which Mount Vernon has exhibited for half a century. The General's "white chariot" was broken up for souvenirs long ago.

In fancy I could picture again the simple funeral procession, including the General's saddled and riderless horse, as it moved slowly from the portico down the snow-covered hillside.

The old tomb is empty now. In 1831 the bodies of George and Martha Washington, together with those of other members of the family, were removed to the new vault, built in accordance with the specific and practical provisions in Washington's will.

Visiting Celebrities Make News

Day after day, year in and out, modern pilgrims stand silently before the ivy-framed gateway to this tomb. Even the youngsters' gay chatter dies away momentarily. On Washington's Birthday, organization follows organization in presenting floral tributes. The Veterans of Foreign Wars alone, in 1953, laid 29 wreaths at the grave.

Most of the visitors to the Washington shrine are plain Americans—seniors and juniors, boy and girl scouts, honeymooning tourists, and GI's.

But royalty and other news-making celebrities, accompanied by reporters, photographers, and State Department protocol officers, often pay their respects and leave a wreath at the tomb.

Four British sovereigns—ruling then or later—have called at Mount Vernon to honor the rebel Washington. The latest was Princess Elizabeth, now Queen, who came with her handsome husband in November, 1951.

A few months later I was privileged to join the official party of Queen Juliana of the Netherlands and her husband, Prince Bernhard (page 678).

For Juliana this was a repeat performance. On her previous trip she had been a princess, eclipsed by her reigning mother, Wilhelmina.

Now the mother of four daughters herself, Queen Juliana made the tour of the house with a homemaker's attention. When she left, she wore a corsage of white stock, a typically 18th-century flower cut from Washington's garden.

To riffle through the pages of Mount Vernon's two-volume guest book is to bring back many a past news era. I came on the signatures of King Albert and Queen Elizabeth of Belgium, General of the Armies John J. Pershing, and Queen Marie of Romania, the "Marie" in bold letters that take up almost a quarter of the page.

Spits and Crane, Pewter Warming Plates, Corn-grinding Mortar, and Bellows Were Part of 18th-century Fireplace Cookery

In his library Washington balanced accounts, studied crop reports, and wrote letters that influenced American history (page 660). Beside a bookcase stands his terrestrial globe; on the table are his telescope and riding crop. Here a visitor inspects a double-barreled shotgun, or fowling piece, used by the General.

"Here's the top of the book," said a staff official, as I turned to a double-page spread for January 1, 1942. On opposite sides were "Franklin D. Roosevelt" and "Winston S. Churchill," written the same day they signed the first United Nations declaration.

Beginning with James Buchanan, virtually every U. S. President has paid a call at Mount Vernon. Some have come often. On one trip Theodore Roosevelt and party rode up on horseback through a driving rain.

Just before the Civil War broke, a one-paragraph item in the Washington *Evening Star* noted that a prominent Washington resident had sailed down to Washington's old home by the steamer *Thomas Collyer*. It was Mrs. Abraham Lincoln.

Library Collection Is a Gold Mine

Digging into Mount Vernon's past, historians and biographers find the association's reference library a mine of information.

In its quiet, secluded rooms at headquarters George Washington's daily activities are referred to as if they happened yesterday. "I wish," murmured gentle Miss Irene Warren, the librarian, "that I could have helped him sort his papers. He kept a record of just about everything, and it must have been a terrible job."

Among the priceless items preserved in the archives are dozens of Washington's handwritten letters, his manuscript diary for 1797, and a little cash-account book he carried around with him. There are even a number of Martha's original communications, far rarer than those of her husband.

One large collection of letters, written during the Revolution, reveals the day-by-day steps through which the modest family house at Mount Vernon was finally expanded to "mansion" size.

This correspondence, including instructions and reports on wings being added for the library and Banquet Hall, was between the General in the field and his distant relative and estate manager, Lund Washington.

Washington as Architect

Even during the anxious period following the fall of New York City in 1776, the Commander in Chief wrote Lund Washington just what he expected of his new Banquet Hall:

"The chimney of the new room should be exactly in the middle of it," he directed; "the doors and every thing else to be exactly answereable and uniform . . . in short I would have the whole executed in a masterly manner."

Confidence in Mount Vernon's future (and his country's) could hardly go further!

The finishing touches to the estate came after the war. The bowling green was added in 1785. Next year the high-columned porch was completed with flooring stones imported from England. The crowning ornament for the house, the weather vane in the shape of a dove of peace, was placed on the mansion in 1787.

For all these and earlier improvements, the record indicates that Washington was his own architect and landscape gardener. Like other 18th-century gentlemen in America, he borrowed and adapted what he needed from contemporary structures and illustrated architectural books. "Undertakers," as contractors were then called, and skilled workmen, when they could be found, did the rest.

One interesting detail of construction credited to Washington's ingenuity was the use of rusticated boards of Virginia pine to sheathe the mansion and service houses. Painted white, beveled, and sanded for roughness, the boards give the impression of stone blocks (page 680).

Nor was Mount Vernon's master above taking a hand on the job. "He . . . often works with his Men himself: strips off his Coat & labours like a common Man," commented a guest of 1785.

Ladies to the Rescue

The period between Washington's death and the revival of Mount Vernon as a patriotic shrine was an interlude of disintegration.

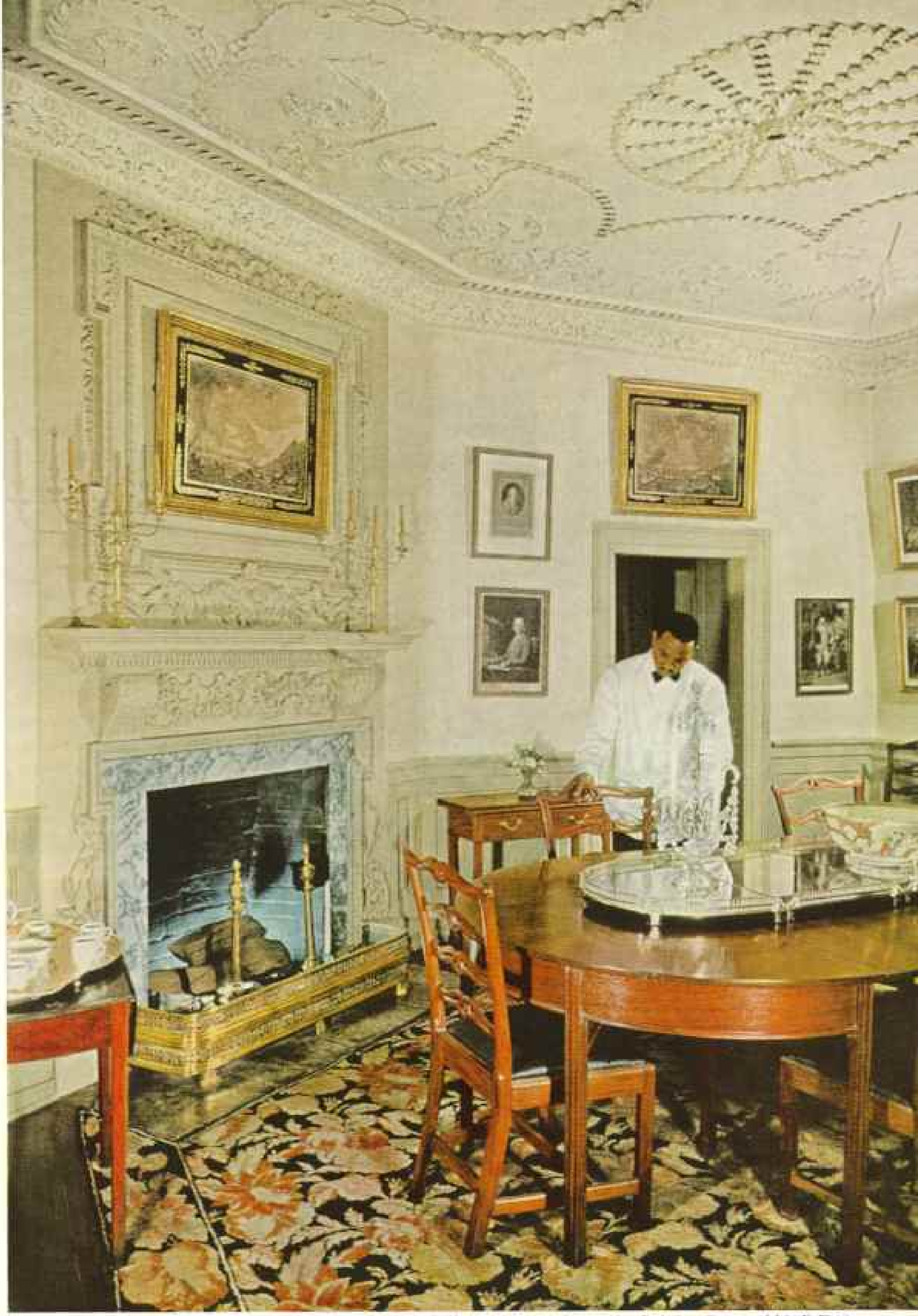
The 8,000 acres that Farmer Washington had gradually accumulated were divided and subdivided among heirs. His and Martha's possessions were scattered far and wide. Their house passed first to one of Washington's favorite nephews, Bushrod Washington; then to a grandnephew, a great-grandnephew; and finally to the Mount Vernon Ladies' Association of the Union.

How the Ladies rescued Washington's old homestead from eventual oblivion is itself a drama of struggle and achievement, with a heroine of frail body and indomitable will.

It began with an incident aboard a steamer sailing down the Potomac on a clear moonlit night in the fall of 1853.

"I went on deck as the bell tolled and we past [sic] Mount Vernon," Mrs. Robert Cunningham, a passenger returning to South Carolina, wrote to her daughter soon afterward. "I was painfully distressed at the ruin and desolation of the home of Washington." If the men of this country couldn't do anything, she went on, why shouldn't women try?

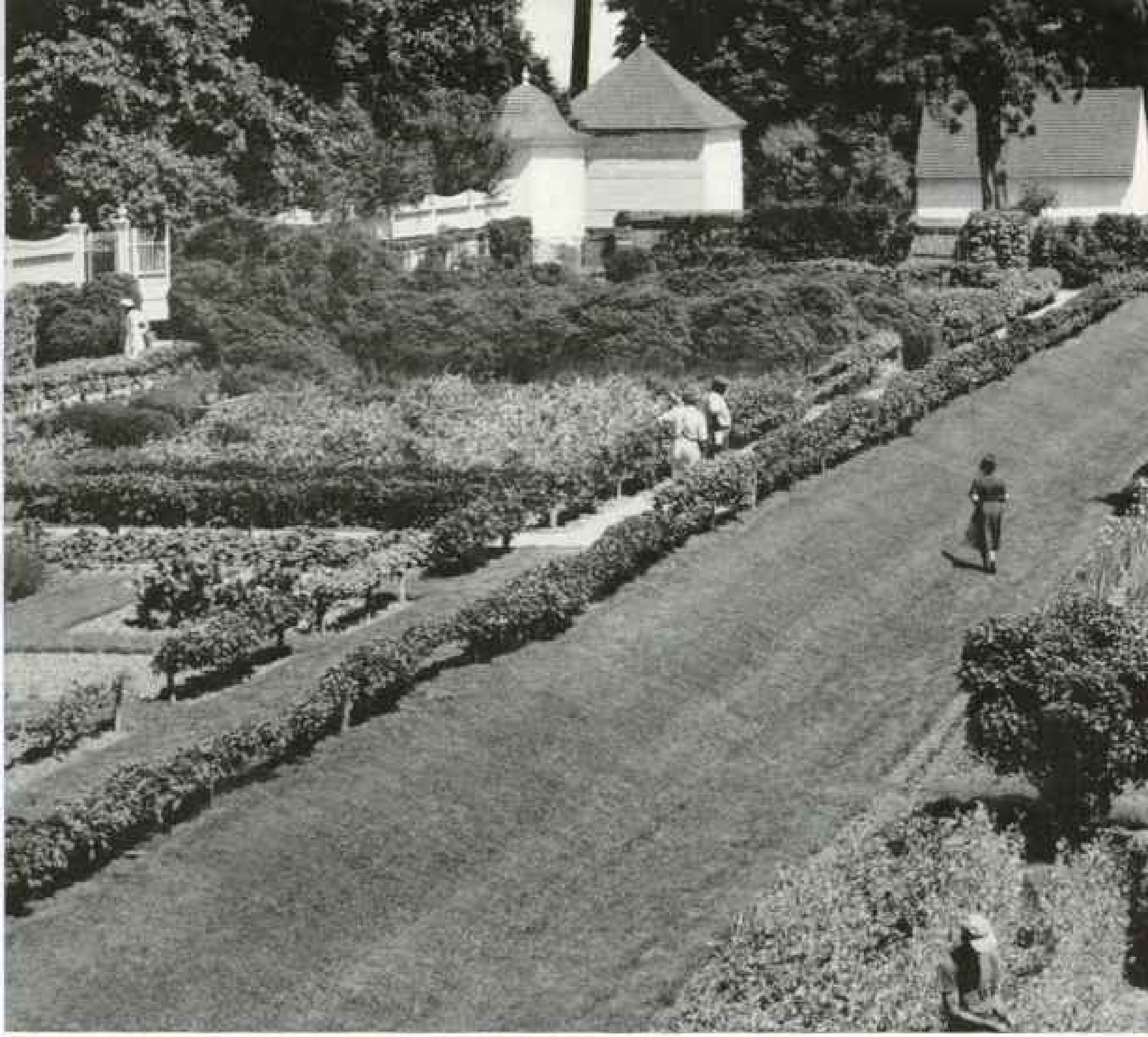
Why not indeed, thought daughter Ann Pamela Cunningham. A red-haired semi-invalid whose energies had had little outlet since a girlhood accident, she found in Mount Vernon a cause worth fighting for (page 661).



Kodachrome by National Geographic Photographers B. Anthony Stewart and John E. Fletcher

Dining-room Ceiling and Mantel Decorations Were Added During the Revolution

The General directed the work by letters between battles. Most of the furnishings were here in his time.



↑ Old Kitchen Garden Flourishes Again

Commonplace peas, onions, radishes, and strawberries are cultivated in Mount Vernon's 18th-century ornamental beds. Edging the walk, apple and pear trees grow like hedges along low fences, in the cordon method that Washington introduced into his plantation from Europe.

← Mount Vernon produces its own honey, as it did long ago. The rounded hive copies the old-time shape but compromises with modernity by storing the honey in removable-frame units (page 679).

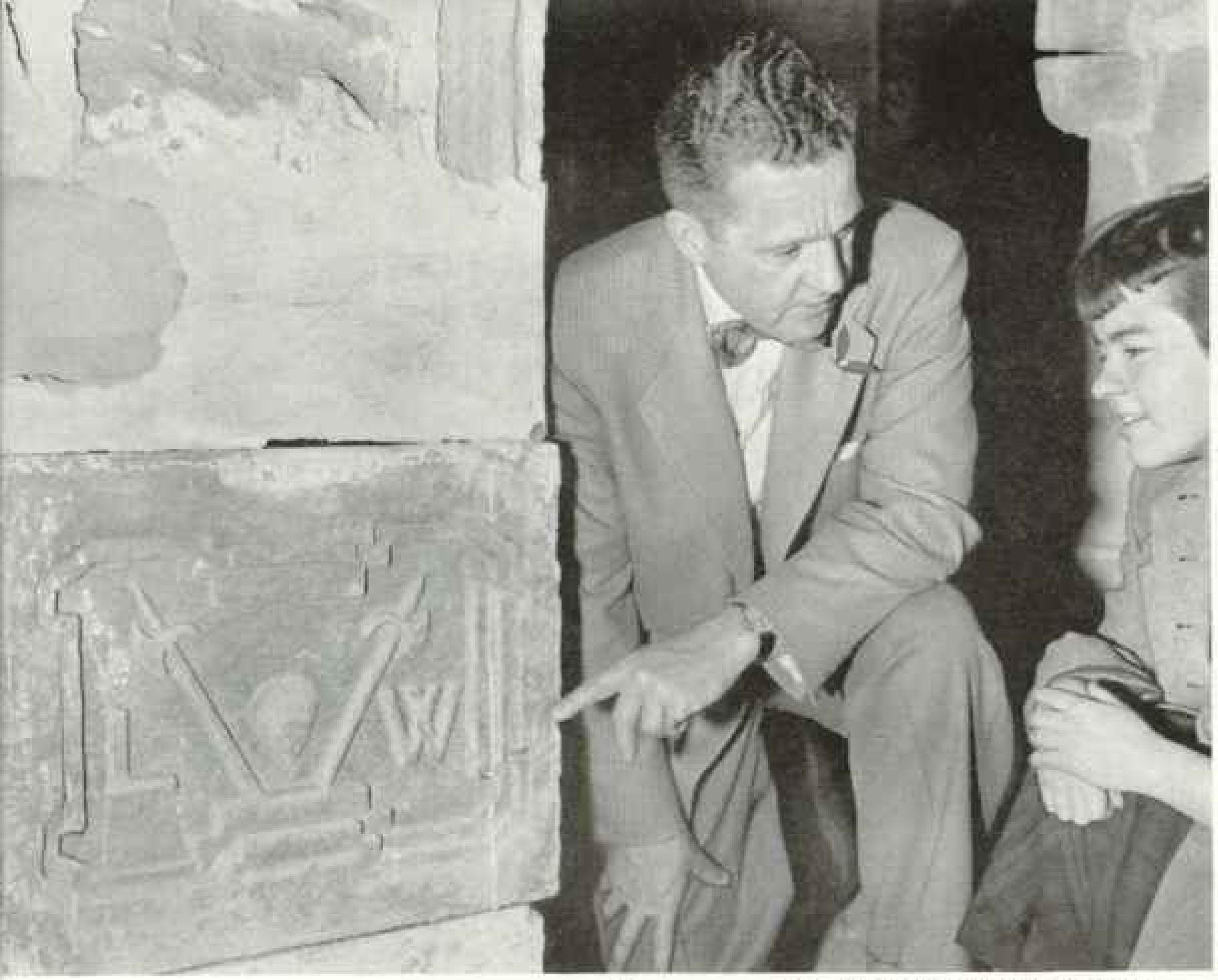
→ Fan-shaped apple trees are trained against the latticed wall through the espalier method, also a European art.

National Geographic Photographer
John E. Fletcher

Boxwood Planted in 1798 Has Grown High

At least some of the flower garden's thick hedges are believed to have come from the original Mount Vernon plantings. Boxwood forms both edging and background for flower beds arranged in formal European style.

 Kodachrome by National Geographic Photographer John E. Fletcher



National Geographic Photographer John E. Fletcher

Who Laid Mount Vernon's Cornerstone? Historians Cannot Agree

Initials on this block could refer to George's half brother or to their grandfather, both named Lawrence Washington. Superintendent Charles Wall (pointing) believes the elder Lawrence installed the stone in the 1690's when he built the first house on the site. This stone is a copy; the museum keeps the original.

Already the Federal Government and Virginia had declined to buy the estate from its last private owner, for whom it had become an intolerable burden. Miss Cunningham decided to go to the women about it.

On December 2, 1853, an open letter appeared in the Charleston *Mercury*. Addressed to the "Ladies of the South," it called for funds to purchase Mount Vernon "as a monument of love and patriotism."

The writer signed herself "A Southern Matron," lest readers criticize an unmarried woman seeking public attention. Several other letters from the Southern Matron were published before Ann Cunningham grew bold enough to set up a committee in her own name.

Later she gathered about her a group of outstanding women, one from each State. Their society was incorporated under Virginia law as the Mount Vernon Ladies' Association of the Union. With Miss Cunningham as regent, each of the other members held the title of vice regent—an all-officer structure still in effect.

Meanwhile, the project was catching on. Around the country, women—and men—contributed to the cause. Clubs, school children, newsboys, the Naval Academy, West Point, the Seventh Regiment of New York, and actor Edwin Booth were among those who gave.

The greatest single lift to the campaign came through the efforts of the gifted orator and well-known statesman, Edward Everett.

Ann Cunningham Missed the Boat

Everett, who was to become the forgotten earlier speaker when Lincoln made his Gettysburg Address, donated the entire proceeds of a series of lectures and articles. In all, he collected more than $69,000 toward the total goal of $200,000.

By 1856 the Ladies had the money to negotiate for Mount Vernon. But the owner, John Augustine Washington, Jr., had changed his mind about selling!

Stubborn Ann Cunningham refused to accept no for an answer. To persuade Washington to reconsider, she made the painful journey to Mount Vernon, where she argued for her project with all her woman's power of persuasion. It was no use.

National Geographic Photographer John E. Fletcher

A Carpenter Makes New Gate Posts in the Colonial Manner

Craftsmen in Mount Vernon's well-equipped workshop (background) perform restoration miracles on old and valuable objects such as the 18th-century coach on display at the estate (page 667). These posts are destined for the west gate, the general's entrance to his "Mansion House Farm."

Deeply disappointed, she was carried back to the wharf—only to find that the steamer had gone on without her.

The long wait for the next sailing gave Miss Cunningham another chance. Before she left, she felt she had won her victory, though it was two years before the fruits were gathered in the association's purchase of the house and its surrounding land.

About 200 acres at that time, this property has since been augmented to nearly 500 acres—roughly the equivalent of what George Washington called his Mansion House Farm.

Washingtons Moved Out in 1860

The last Washington family to live at Mount Vernon moved out in the spring of 1860. Among parting gifts to the new owners were the key to the Bastille, the terrestrial globe George Washington kept in his library, and the priceless bust of the General made from life by Houdon (page 660).

But the Ladies' problems had hardly begun. The Civil War loomed before the colossal tasks of restoration could even be planned.

As a southerner, Miss Cunningham returned to South Carolina for what she thought would be a temporary stay. She was there for the duration. In her place, her secretary, Sarah Tracy of Troy, New York—young, pretty, and valiant—kept the Washington memorial going.

It was a tough and adventurous assignment. Miss Tracy's letters, written on the job and collected now in the Mount Vernon reference library, make fascinating reading.

The estate lay directly between the two hostile armies. Cannon sometimes roared only a few miles away. Supplies were cut off.

"*Candles* and *Oil* disappeared entirely," she wrote. "I laughed [about the hardships] until there was *no meat* for the servants! . . . Laborers must be fed and on something more substantial than would satisfy *me*."

To win neutrality for Mount Vernon and permission to carry the mail and necessities of life, Sarah time and again bearded the Union generals in Washington. Once President Lincoln gave her the essential credentials.

Even so, passes were not always enough. On occasion, the small determined guardian of Mount Vernon ran the dangerous block-

↑ Queen, Prince, and Hostess Inspect the Guest Book

Queen Juliana of the Netherlands (left) and her husband, Prince Bernhard, were among recent visitors to George Washington's old home. Mrs. Frances P. Bolton, Congresswoman from Ohio, received them in her capacity as a vice regent of the Mount Vernon Ladies' Association.

Here they meet in the family dining room. The candelabra came from a member of the Lee family. Robert E. Lee married a great-granddaughter of Martha Washington.

← Oranges Ripen in the Greenhouse

Mount Vernon's horticulturist, Robert B. Fisher, shows a guest an orange tree suggesting those raised by Washington.

The original greenhouse was completed in 1789 and destroyed by fire in 1835. It was replaced only recently after years of library research and on-the-spot digging.

The big window is one of a row overlooking the garden.

Kodachromes by National Geographic Photographers B. Anthony Stewart and John E. Fletcher

ade, dodged through woods, and argued with trigger-nervous sentries.

Through it all, Mount Vernon remained unharmed. It was an island of peace to which both Union and Confederate soldiers came, curious to see how the father of their once united country had lived. Stacking their guns outside, they behaved almost invariably with patriotic respect and restraint.

At war's end, when Ann Pamela Cunningham returned, she found not deterioration but repairs.

There was even a romantic fillip. Sarah Tracy later married Upton Herbert, a cousin of John Augustine Washington, who had stood at her side during the wartime trials as the association's first superintendent.

Work Never Done

Since the Civil War, work on Mount Vernon has never ceased.

The association has just reconstructed George Washington's big greenhouse, which burned down in 1835. This structure, the last of the major building projects, was put up only after years of research.

The greenhouse proper, facing the flower garden, smells now of warm earth and plants and is true to Washington's time in typical orange trees and in underground flues such as heated the early building. Its wings represent the old slave quarters and the once busy cobbler's shop, re-created now with workbench, tools, and worn shoes.

Gradually, as Mount Vernon's basic construction has taken form, more attention is being paid to scene-setting detail.

I was surprised recently to find workmen removing the bricks in the foundation of the long-exhibited spinning house.

"They looked too modern," explained Mr. Wall. "So we're substituting smaller, less regular ones. These are the real thing. They're discards from the inner brick walls of the reconstructed White House!"

Mount Vernon's enormous collection of 18th-century furnishings and belongings has been acquired by gift, loan, and purchase.

Valuable pieces have been obtained from descendants of the Washington family and friends; from antique dealers, art galleries, and even junk shops. They've been lent by private collectors, museums, and universities, and picked up at obscure auction sales.

Each year brings additions—a wig box, say, a mourning locket, letters, books, and rare old china.

I saw a small battered trunk one day in the office of Mr. John B. Riggs, Mount Vernon's research associate. "This has just come in," he said, "from a descendant of one of Washington's servants. The copper plate engraved with Washington's name just matches one on a trunk we have."

Likely articles sent to Mount Vernon get careful checking.

"We've been offered three original banquet tables," Mr. Wall chuckled. "If we accepted everything, we could fill three mansions."

As more information has come to light, sometimes through the visitors themselves, certain objects have been discarded or decorations changed. A wallpaper pattern once used in Washington's bedroom, for example, has now given way to the plain whitewashed plaster the General knew.

Maintaining Mount Vernon as an exhibit requires the services of as many people as worked here in George Washington's day.

Among the association's 85 employees are guards, engineers, handymen, carpenters, gardeners, maids, cooks, secretaries, librarians, and researchers.

The estate has its own cattle, sheep, horses, dogs, and a beehouse producing honey. The beehives, incidentally, are a striking example of reconciling old and new. Under the rounded straw facsimiles of old-fashioned hives are standard removable-frame units required today (page 672).

A stickier problem of combining historical accuracy and modern needs was involved in the installation of heating and lighting facilities.

"You really have to search for them," said Mr. Wall as he showed me a warm-air vent beneath fireplace logs and a concealed fluorescent light bar above the doorway of the windowless larder.

Upkeep and Protection Huge Jobs

To protect the mansion from fire, the estate's central-heating plant, put in more than half a century ago, is 400 feet away. No one is permitted to enter the big house after dark. An elaborate fire-fighting system has been worked out. It includes the latest equipment: automatic fire detectors, chemical-gas installations in the walls, and extra water supply.

Sitting in the administrative office one day, I heard a clanging. The fire truck already was on hand when I rushed out. But it was a false alarm.

Powerful searchlights play over Mount Vernon lawns at night to pick up intruders bold enough to scale the estate's high walls. Trained watchdogs accompany the guards on their rounds (page 666). Electric eyes at strategic spots are ready to give the alarm.

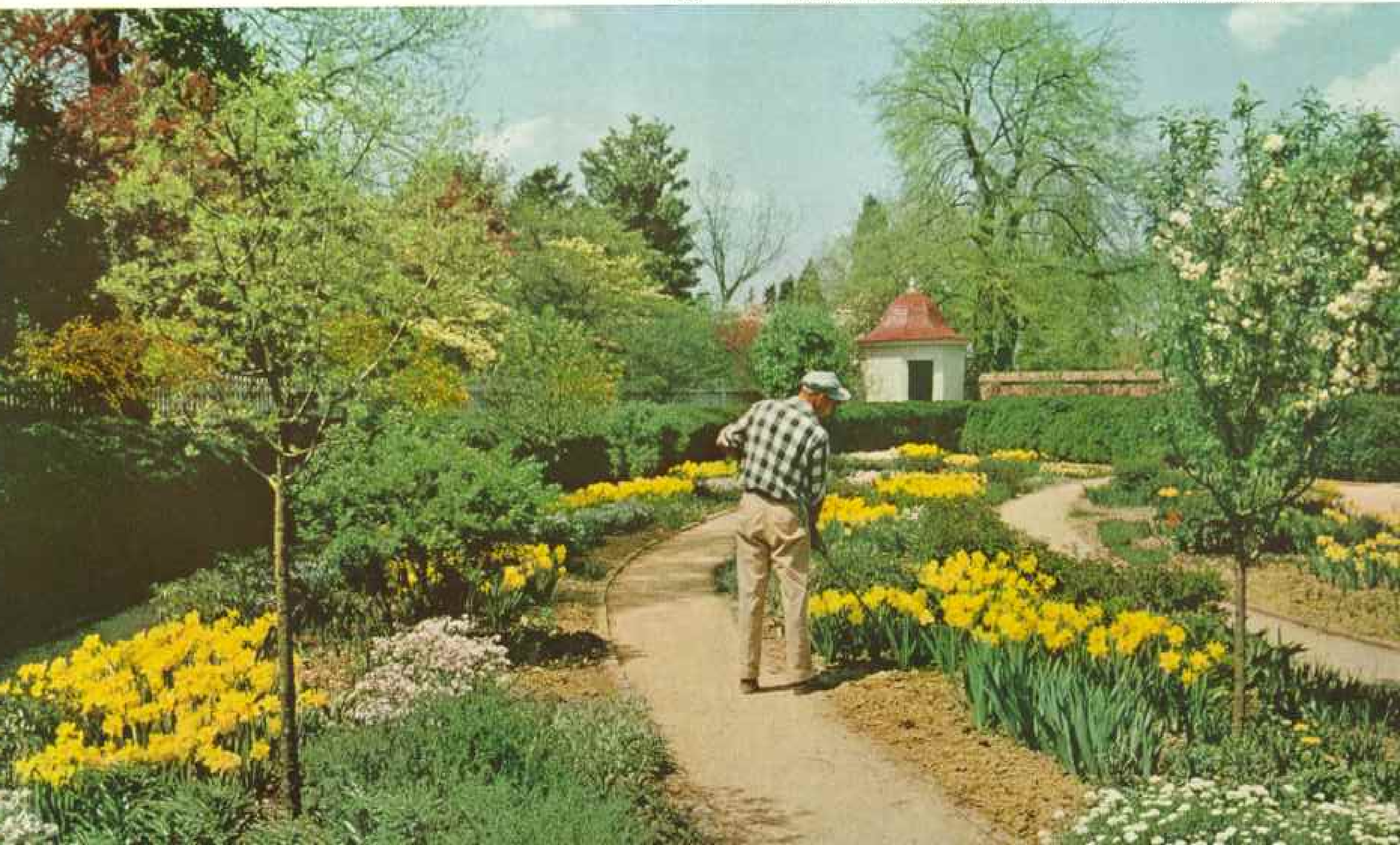
"Yes, it's true," said Mr. Wall, "that small objects are wired down to discourage souvenir collectors. But vandals and pilferers are the least of our worries. Not one in a thousand

Mount Vernon's Hose Cart Amuses Sight-seers

Modern fire-fighting equipment includes automatic detectors, built-in chemical-gas sprayers, and a pumping fire engine. West façade reveals how Washington used rusticated pine boards as sheathing. Beveled edges give the impression of stone blocks.

Paths Wind Among the Flowers to a Garden House That Washington Once Referred to as the Schoolhouse

Kodachromes by National Geographic Photographers B. Anthony Stewart and John E. Fletcher



Kathleen Revis

Mount Vernon Always Rates a Salute from U. S. Navy Vessels Passing by Day

Hospitalized veterans were President Eisenhower's guests aboard the White House yacht *Williamsburg* before she was decommissioned June 30 (page 651). Her skipper, Comdr. Julian T. Burke, *Jr.*, stands on the left.

visitors would touch anything. If anyone tried, the others would stop him."

Yet the crowds themselves could be a hazard. Washington's house has been given inner steel supports to withstand the marching feet of a million visitors a year. The floors where these armies pass are protected by a special covering, replaced as it wears out.

The funds for all these maintenance chores and supplies come from entrance fees, which are waived in the cases of children under 12, pre-college school groups, and uniformed members of the armed services.

No salaries are paid except to Mount Vernon's actual working staff. Association members (including the regent, elected from the ranks every five years) serve for life without pay.

Ladies Celebrate 100th Birthday

This October the Ladies came again from all over the country for their annual administrative meeting at Mount Vernon. But something new had been added for 1953—a year-long exhibit commemorating the 100th anniversary of the whole project. It is built around the association's founder and relics of her early days of doubt and struggle.

From an old-fashioned gilt frame Ann Cunningham's dark, intense face broods over the exhibit. It is a reminder of what one woman's daring and imagination could accomplish.

But even Miss Cunningham's most soaring hopes could never have pictured what happened here last year on Washington's Birthday. Early in the morning a dozen or more men poured out of the power and transmitter trucks that drew up to the old mansion. Adjusting reflectors and the complex mechanisms of giant cameras, they went about their assignment of showing Mount Vernon to a 20th-century television audience.

It wasn't as incongruous as it looked. If the charm, dignity, and order of this 18th-century home have something to offer the harried 20th century, the modern age in return provides the most advanced mechanical devices to permit the maximum number of people to view it.

"Let them see," Ann Cunningham wrote prophetically 79 years ago, "that, though we slay our forests, remove our dead, pull down our churches, remove from home to home, till the hearthstone seems to have no resting place in America, let them see that we know how to care for the home of our hero."

Native's Return to Norway

An Old World Town Takes Back to Its Heart an Emigrant Son, Home After a Quarter Century to Visit Family and Haunts of Youth

By Arnvid Nygaard

With Illustrations by Andrew H. Brown, National Geographic Staff

IF MY family thought my disappearance strange just the day following my return to Mandal after 25 years away, they gave no sign. Perhaps they guessed I had climbed Uranienborg, the midtown hill that overlooks so many landmarks of my youth.

My mother at least must have remembered how, as boys, my playmates and I often went there to search the sea that rippled invitingly out to the horizon. On Uranienborg's crest, dreams knew no restraint. My young friends and I shared a common yearning—to sail away over that horizon as soon as we grew up.

Back to Boyhood Scenes

Well, I was one who had fulfilled that hope. Now, from my home in America, I was back again, scanning the old familiar scene.

The red-tiled roofs of Norway's southernmost town huddled at my feet. As of old, small ships lay in the bend of Mandal River where it curves away to meet the sea. On a distant island the red-and-white finger of Ryvingen Lighthouse still spiked the sky.

Two-and-a-half decades had wrought little visible change, it seemed to me at first.

Nearing Mandal the day before, I wondered if I had perhaps stayed away too long. Would the sights, sounds, and feel of the place hold the same appeal a generation later? Would friends of long ago remember me?

My mother and two sisters had driven to the port of Kristiansand to welcome me back to the land of my youth. When we met on the dock, there was an awkward instant of seeming almost strangers—but only an instant.

Then my mother greeted me, saying, "I can scarcely believe you're home. Remember, you were 'surely coming' twice before."

"Looks like you plan to stay," said Ellrid with a laugh, spotting my three suitcases and army foot locker.

Nora failed of words, but her warm smile gave an affectionate "hello."

Passing years and turbulent events had wrought changes in us all. Ellrid, on vacation from her position as dietician in a hospital, had been 18 when I sailed away. Now bright eyes and fresh complexion belied her graying hair. Nora, only two when I left, had grown up to become a spare right hand for my mother, now nearly 75 (page 686).

Since my going away, these and others of my family had lived through the depression era, a world war, and five years of German occupation. My father, a newspaper publisher and editor for more than 40 years, had died in 1943. The thought of never seeing him again hadn't even occurred to me when I left.

When our car bounced off the old bridge over Mandal River and entered the town itself, I saw the same neat cluster of white houses I remembered. Windows were gay with geraniums and petunias. Store Elvegate (Big River Street) looked much as in my boyhood days—narrow, cobbled, and jammed with bicyclists darting among the crowds afoot.

Our family home at the foot of Kirkeheia (Church Hill) was little altered. The annual dress parade of tulips brightened the garden. I missed the red currant bushes, an apple tree, and a pair of plum trees, all casualties of time. But spruces my father planted, pines and birches that were saplings when I left, now cast long pools of shade.

Inside, our house had been remodeled and re-equipped. But it still held out to me the restfulness of the well-loved and familiar.

Midnight came and went before the first gush of news and gossip had spent itself. Yet, at 58° N., 1,300 miles farther north than New York City, a dim, greenish light still suffused the sky.

Brothers Meet After 25 Years

Dozing, I recalled fleetingly the long journey from Washington, D. C., where my wife awaited my return.* For how many years had I dreamed of this homecoming!

Next morning, in full sunlight at 4:30, magpies chattered outside my window. Other mornings the crying of gulls awoke me.

"My, how fat you are!" my brother Fridtjof greeted me, with a laugh, when I stepped into the office of the family newspaper, *Lindesnes*. I must be a big gun, he added. Demurring, I seized his right arm in both my hands.

Across piles of newspapers in his crowded office, Viktor, my oldest brother, reached for my hand and shook it hard. A bridegroom when I had left Mandal, Viktor was now the father of five children.

* Mr. Nygaard has served as the National Geographic Society's chief translator for 23 years.

Arnvid Nygaard, Returned from America, Fondly Surveys His Norwegian Birthplace

Seaside Mandal had small space to grow; so it built new houses and a road on man-made land. Here the author, home after 25 years, looks across Mandal to distant Uranienborg (pages 683, 691).

Editor-in-chief of *Lindesnes*, Viktor had built up circulation to 5,000. In addition, he was mayor of Mandal (chairman of the town council) for his second term. During the occupation, German censors vilified Viktor for "noncooperation" and threw him into a concentration camp near Oslo.

What a shame it was, Viktor said, that when the only emigrant among us at last came home, our youngest brother, Ottar, should be in Spain on business! I hadn't seen Ottar —and still haven't—since he was 17.

Leaving the *Lindesnes* office, I threaded old familiar streets. They were a-bustle with people, mostly strangers to me—a new generation. Then a figure I instantly recognized popped out from a cluttered shop. It was Gabriel Tobiassen, bicycle, lawnmower, and small-motor repairman.

"*Takk for sist!*" called out Gabriel, grinning as he held out his hand.

Now, takk for sist ("thanks for the last time we met") is the common greeting between friends who have recently visited together. In a flash the phrase bridged 25 years.

Mandal's business ebbs and flows through an hourglass constriction between hills and river. Shops, office buildings, and hotels appear to have been dropped there at random. This helter-skelter growth has left a zigzag kink in the main street, Store Elvegate, that is a photographer's delight but a truck driver's nightmare.

Main Street 12 Feet Wide

Flaskehalsen ("the bottleneck"), unquestionably picturesque, slows traffic to a walk. Opposite Adolf Qvist's watch repair, optical, and music shop, Store Elvegate is a scant 12 feet wide (page 687); at the corner of Bondeheimen Hotel, it measures barely 13 feet from wall to wall. This is the only route through the middle of town.

When two vehicles meet in these crooked

Scorning Still Waters, a Farmer's Horse Drinks from the Fountain's Running Stream

Country folk years ago established Bondeheimen (left) as an inn where they could eat and sleep when in Mandal. Though cars clog streets never designed for them, the fountain still refreshes an occasional horse.

narrows, one or the other must back up to a wider spot to allow passing.

There's a saying, "In Mandal people walk in the middle of the street." Along Store Elvegate, devoid of sidewalks save for two short stretches, there's no other place to go.

So it was no surprise to find that in Mandal the pedestrian still is king. It took me a week, however, to attain the proper air of casualness. But at last, at the blare of a horn, I could step as unconcernedly as my friends into a doorway. It is a point of honor not to stop talking (page 691).

Mandal's nerveless bicyclists astonished me. Many a housewife scoots downtown through churning traffic with little Kari perched on a rack over the front wheel of the family bike and hugging perhaps the household cat. On the back "deck" sits young Ole, munching a chocolate bar. On the return trip, groceries dangle from the handle bars.

From the busy streets I stepped into the quiet of the Mandals Sparebank (Mandal Savings Bank). I wanted to say hello to the president and chief clerk, old acquaintances, and to reminisce with John Knudsen, a boon companion of my youth who also works there.

John went with me to a *konditori* (confectioner's) for lunch. We recalled old-time ski-jumping contests and trips through forest and mountains. The longer we talked the less John Knudsen seemed to have changed.

"Carriage Trade" Lost to Cars and Buses

After lunch I ran into another friend. Christen Christensen, now in his 70's, operated a stable near our home during my youth. We knew him as a *vognmann*, or drayman.

Often I had tossed my suitcase into one of Christensen's folding-topped, four-wheeled carriages and jumped up on the narrow seat beside the driver. I would wave goodbye to my mother, and off we'd rattle to the quay, where I boarded ship for school in Oslo.

Mother Nygaard Feared She Might Never See Her Wandering Boy Again

What memories were evoked by the author's boyhood home, its familiar furniture, and the family album! And when the reunited Nygaards were not reminiscing, they were eating. Three square meals a day were sandwiched between morning, afternoon, and evening snacks. Mr. Nygaard gained 15 pounds.

Christensen loved his horses. On meeting him again, I felt he had no regrets that his retirement coincided with the almost complete disappearance of horses from Mandal's streets.

Strolling here and there, I discovered that the passing years had indeed brought change to the town, some of it not immediately apparent.

A weather vane still crowns Stangheia, a hill across the river, but no longer do its twin cannons boom out to warn citizens and fire fighters of a blaze in the town.

In my boyhood, a fireman had to run from the fire station, across the bridge, and up the hill to light the fuses which loosed the rusty pieces' roar. It was Progress with a capital P when an electric switch, installed in the firehouse, set off the warning guns.

A siren and the telephone jolt present-day firemen into action. They ride to the scene in clanging, sparkling fire engines.

Mandal, in the outskirts, has stretched its seams. The plain of Vestnes, to the west, lay undeveloped until the German occupation, when the enemy built an airfield and barracks there. Now new homes along wide streets have taken over much of the area.

The march of time also has trodden under a favorite playground of my childhood, Skåranshukta, a pond in the northeastern part of town. In winter the first ice formed there. We boys, impatient for the ice to reach a safe thickness, tested it even when it rippled under us.

So—inevitably—we often fell through. Instead of going home for dry clothes and certain punishment, we ran to the boiler room of a near-by sawmill. While we dried our clothes, the old stoker teased us.

"Your mother stopped by a while ago, Arnvid," he would say. "She told me the next time you fall through the ice and come

Adolf Qvist Surveys Bicycle Traffic from His Shop Window on Mandal's Main Street

A watchmaker and optician, Mr. Qvist looks past two mandolins and a Hardanger violin (left) into the bottleneck in Store Elvegate (pages 684, 691). Untouched by fires or modernizers, this block appeared unchanged to the author. A snow and ice guard runs like a fence across the distant roof.

in here to get dry, I should just throw you into the furnace. Then you wouldn't have to stand around shivering while your clothes dried."

Mill and pond are gone. Where we used to skate, and where in summer we picked cattails and rowed about in leaky skiffs, I found modern homes with lawns and gardens.

Mandal has luckily remained unscathed by any major fire for almost 150 years. Old buildings, repaired but unchanged, are good for decades more. None claims real antiquity, but a few evoke admiration for fine proportion and artistic workmanship. One is Bondeheimen (the Farmers' Home), a handsome building that names the central square of Bondeheimsplassen.

A gracious old mansion, Skrivergården, is Mandal's City Hall today. Judge Christian Fridrichsen built it in 1766; the man who designed the house, a Scot, imported sandstone from his native land for its exterior facing.

I often walked with my brother Viktor from his editorial desk at *Lindesnes* to his mayoral desk in Skrivergården. In the exercise of his town duties Viktor placed heavy reliance on a fine gentleman, Kristian Fjeldsgaard, who has faithfully served Mandal so long—since 1909—that I call him "Mr. Mandal."

Author Welcomed as "Spy"

Often I'd join Viktor and Fjeldsgaard at a konditori near the City Hall. Between bites of open-faced sandwiches and pastry and gulps of hot coffee, Mr. Mandal would tease me about being a kind of "spy." He jokingly claimed I'd been sent back to learn how an orderly civic government should be run.

Life in Mandal seems to promote longevity. I kept meeting people I had thought were old even before I left for America.

The January, 1952, census shows that Man-

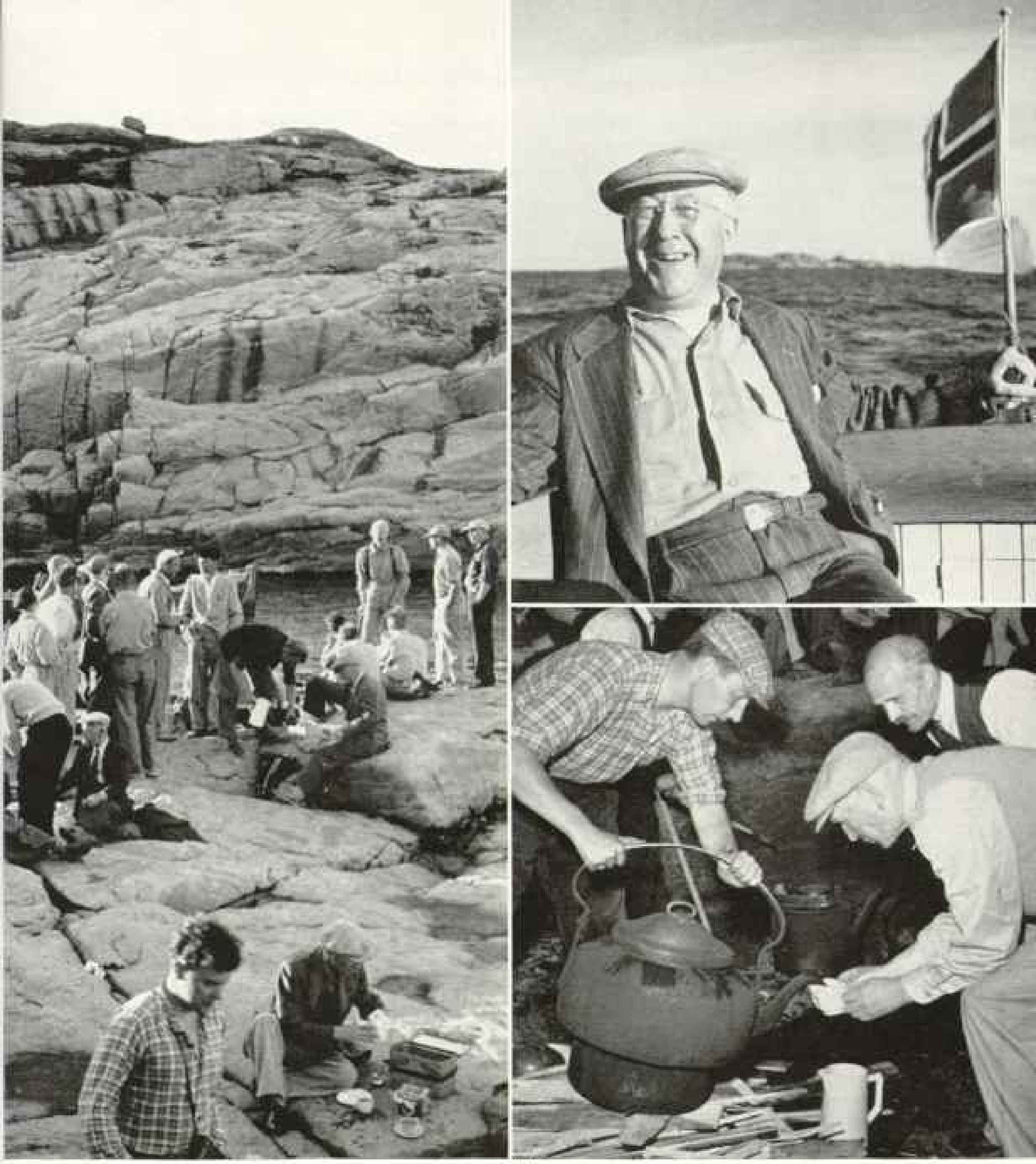
Picnicking Fathers and Sons Take Annual Leave from Wives and Mothers

One Monday Mr. Nygaard forsook his womenfolk and took off in his brother's motorboat (upper right) for the Big Boys' Picnic on Naudholmen, a rocky islet. There he and friends fished, sang, brewed coffee (lower right), and ate lunches packed by their loyal women, who were glad to get rid of them for the day. When a young man and his girl friend appeared, the bachelors-for-a-day indignantly turned them away.

dal then had 4,501 people. Of that number, four were 95 and over, 12 between 90 and 95, 52 between 85 and 90, and 58 of 80 to 85.

Mandal has contributed to the stream of Norwegian emigrants who like myself have sought fame and fortune, or just a new start, in America. Some have returned to their birthplace. Partly on this account, and partly because of America's world influence, everyone in the town takes an interest in the United States. They know of the aid given through the Marshall Plan; appreciation is sincere.

By invitation, I spoke to the local Rotary Club about Washington, D. C. Delivering my talk was not difficult, but answering the volley of questions taxed my knowledge.



That same day I ran into Olaf Spilling. He was one "auld acquaintance" who never would be forgot.

"Lucky you went to America, Arnvid," he said, with a twinkle in his eye. "Otherwise you might have my job today, and I might be out of work!"

Spilling, then the manager of a small sawmill, hired me when I got out of high school. There were just the two of us in the office: Nygaard, clerk, and Spilling, boss. Now, as head of the important Marnar Bruk sawmill, Spilling supervises more than 100 men.

Some 400 years ago trading settlements east and west of Mandal exported from 400,000 to 600,000 pounds of salmon yearly.

Mandal Honors the Salmon

Danish merchants finally sent ships right into the lower Mandal River. They bought salmon and farm products direct from landholders along the valley. Stores and warehouses sprang up; these and the traders' homes formed the nucleus of today's town.

Though the silver leaper is far less abundant today, Mandal honors the fish's part in

its origin. In its coat of arms three salmon swim on a shield topped by a crest.

Early Mandal boomed as a trading and shipping center. Its merchants and shipowners grew rich; sawmills and shipyards thrived. Huge keel and mast timbers from inland forests were premium export items.

In sail's heyday as many as 120 ships of several nations lay moored in the harbor of Kleven, Mandal's near-by deepwater port. By 1878 Mandal's sailing fleet numbered 128 vessels.

In the age of steam the town never acquired an important fleet, and manufacturing has become its mainstay. The largest plants make rope, marine engines, wire, and cable.

Mandal also has shipyards. Other works turn out mats, paper products, textiles, furniture, and truck and bus bodies.

Local meats, vegetables, and fruits are far cheaper in Mandal, I found, than in larger cities. Strawberries or fish, for instance, cost only half as much there as in Oslo.

No dish, in my opinion, surpasses a boiled Mandal salmon served with a sauce of grated horse-radish and sour cream. Two other favorite foods of my young manhood I missed because of the time of my visit.

My mouth waters when I think of the big crabs that arrive with autumn. Another fall delicacy I had to forego was auks, tasty sea birds we used to brown in the oven and then bake in a game sauce.

Boats Substitute for Cars

Mandal still turns to the sea to play. Nearly 400 motorboats, most of them built there, jam the water front. Substitute for the American's ubiquitous car, they are about 22 feet long, with a 6- or 7-foot beam, and are remarkably seaworthy.

Bays, fjords, and island clusters make the region a paradise for cruising. On summer evenings the air is rarely free of the chug-chug-chug of boats nosing out toward the sunny skerries. Some set a course for holiday cottages (Norwegians call them "huts") that snuggle in coves or perch on headlands.

Every fine afternoon Fridtjof's boat went bobbing out to sea, jam-packed with our family, friends, and baskets of picnic fare. In some sheltered spot among the bleached and surf-smoothed rocks we loafed and talked.

The youngsters pounced on periwinkles and pulled ribbons of seaweed out of the tide wash. They kept an eye cocked for shells, bright stones, and sea urchins.

Someone always made a fire and brewed coffee. We all tucked away sandwiches and slabs of *blot kake* (soft cake), topped with gobs of whipped cream.

Fishermen pulled out "box fishing" outfits, characteristic of southern Norway. They resemble small cooking pots. A wooden handle inserted across their mouths gives a firm grip on the rig; the line is wrapped around the outside. The fisherman grasps the handle in his left hand. When he holds the line out from his right side and swings his fly-, or spoon-rigged, hook round and round and lets fly with it, the line uncoils freely.

Picnic for "the Big Boys"

More than 25 years ago a group of Mandal businessmen promoted a picnic "for men only." The idea caught hold, and the Big Boys' Picnic became an annual affair. When I was there word got around on Sunday, July 6, that next day the Big Boys would picnic on the sea-scoured rock of Naudholmen.

All Monday afternoon motorboats swept out of the river mouth and headed for Naudholmen. I was with a group in my brother's boat. Mandal, temporarily a town of women and children, dropped out of sight.

Throughout the early evening, boats kept arriving until more than 130 nuzzled the shore. Men brought sandwiches, cakes, and cookies. Coffee was boiled in huge kettles; volunteers passed among the picnickers pouring out the hot, strong brew (page 689).

When daylight faded, the five or six hundred men gathered around the huge bonfire. Every stick of the wood had been brought by boat. A band played and everyone sang.

When the flames died down, the Big Boys ambled down to the shore, jumped into boats, and headed for home—and the complications of a society half in skirts.

All around Mandal I found impressive relics of the German occupation, for the Wehrmacht stationed a sizable force there. Because of its sand beach, deep coves, and far-from-impregnable terrain, there always was a chance of counterinvasion.

On Sjøsanden beach the Germans laid thousands of mines. They fortified every high point around with trenches, bunkers, and gun positions. Norwegians did most of the work, impressed for the wretched job of making their land impregnable to their friends.

Imprisoned for Spreading News

Guns and wooden buildings are gone, but rolls and barricades of rusty barbed wire still lie about. Dark, dank underground works remain as monuments to a colossal—if fortunately futile—effort.

A typical victim of the war years was an old acquaintance, Lars O. Rolland. During the war he helped distribute the gist of British broadcasts picked up on a hidden radio. Mandal Savings Bank employees ran this underground news service.

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Pedestrians and Bicyclists Duck into Doorways as a Bus Squeezes Past

When two cars meet on narrow Store Elvegate, one has to back up to a wide spot in the street and let the other pass. Mandal old-timers acquire the ability to dodge traffic without breaking off conversation (page 685). Some rural buses carry milk, produce, calves, and sheep as well as passengers.

Most of this group, including Rølland, were arrested by the Germans. Worst offenders ended up in Germany, where several died from malnutrition and disease. Among the fatalities was Rolland.

Mandalitters Help Onetime Enemies

With charity and forgiveness, the Mandalitters, a few years after the war, were sending packages of food and clothing to needy families in Germany.

Mandal people, I noticed, rarely talk about World War II or the possibility of another. They go to store or office, picnic on their islands, live comfortably and cheerfully. They cherish faith in their country and each other, and refuse to worry.

Seven weeks sped by, and the day approached when I had to leave. Late one clear night I climbed Uranienborg again. In the town below, a few windows gleamed, and reflections of harborside lights swam faintly in the river.

Beyond pine woods and ocean beach, islands were black cutouts against the lead-hued sea. The waning moon cast a pallid trail across the water.

The tranquil scene still stirred memories and hopes. It also raised a nagging question: Would I ever see all this again? Thrusting aside the unanswerable riddle, I said goodbye to Mandal, small, peaceful, and in a special sense my own.*

* For other articles on Norway, see the two-volume National Geographic Magazine Cumulative Index, 1899-1952.

FRANKLIN L. FISHER

1885–1953

To THE Board of Trustees, the Officers, the entire staff of the National Geographic Society, and a host of friends across the Nation, the sudden passing of Franklin L. Fisher brings a deep sense of loss. Mr. Fisher, Illustrations Editor of the NATIONAL GEOGRAPHIC MAGAZINE since 1915 and Life Trustee of The Society since 1945, suffered a fatal heart attack in Los Angeles on August 11, 1953. He is survived by his widow, Ami D. Fisher.

Mr. Fisher had gone to Los Angeles to receive the La Belle Award on behalf of the National Geographic Society. The Society and the NATIONAL GEOGRAPHIC MAGAZINE had been chosen for this honor by a committee of the Photographic Society of America for outstanding contributions to the development of color photography in magazine illustration. Fittingly he represented The Society, for his energy, resourcefulness, and vision had contributed greatly to the pre-eminence of the NATIONAL GEOGRAPHIC in this field.

A native of Horseheads, New York, Mr. Fisher began his professional career in 1907 in New York City, where for three years he engaged in supplying news and feature photographs to newspapers and magazines. Coming to Washington in 1910, he headed the Harris & Ewing Photographic News Service, which he managed until his appointment in 1915 to the staff of the NATIONAL GEOGRAPHIC MAGAZINE.

Always a pioneer in color photography, The Magazine had presented its first color series five years earlier, in 1910.

Working closely with Dr. Gilbert Grosvenor, the Editor, and with Dr. John Oliver La Gorce, Associate Editor, Mr. Fisher built around him an outstanding corps of skilled photographers and illustrators. The NATIONAL GEOGRAPHIC for many years was the only magazine to photograph systematically in color and to date has presented 17,812 natural-color photographs and paintings—today 64 or 72 pages of color in each issue.

During Mr. Fisher's tenure, The Magazine achieved a notable series of photographic "firsts." Also with the unremitting efforts of the able staff working under his direction, The Society's library of photographs has grown to a matchless collection representative of peoples, places, natural history, and interesting areas throughout the world for future use in The Society's publications.

Franklin Fisher had a zest for life and for friendship. He was a constant and discriminating reader, well informed and scholarly. With a fine sense of humor, understanding and sympathetic, he was a source of sound advice and encouragement to his friends in many walks of life. The world was brighter for his work and personality.

Crete, Cradle of Western Civilization

With United States Help, Hard-working Cretans Have Erased War's Scars from Their Historic Bomb-rocked Island

By Maynard Owen Williams

With Illustrations from Photographs by the Author

CRETE, since my last visit, had played a heroic part. Axis forces in World War II had bombed its airfields, clogged its medieval ports, laid low its chief cities. Not since about 1400 B. C., when fire and plunder broke forever the power of the Sea Kings of Crete, had such violence shaken this island cradle of Western civilization.

In prewar days I had roamed the lovely isle from end to end. I hung my clothes on masses of pink oleander while I swam in the wine-dark sea. I photographed muleteers as they rested in humble taverns beside the dusty road, and shy mountain women clad in authentic old costumes assembled from the chests and closets of a whole village.*

I knew Crete as an island of peace and beauty—and had seen how explorers with the spade had uncovered its tremendous contributions to the flowering of civilization on the mainland of Greece. Here in the home of the first great sea power Cretans used linear characters for writing centuries before the time of the Phoenicians. Their art shows pale Parisian-looking ladies in high heels, big hats, and tight corsets; and bronzed, slim-waisted, long-haired men (page 703). In housing and sanitation, too, Cretan civilization reached a high level 3,500 years ago.†

Hard Work Has Paid Off

Within minutes of my return in a shiny DC-3 I saw evidence aplenty that the friendly, hard-working Cretans of today have performed miracles in restoring their war-torn island, largest of the isles of Greece. As if to show what they have had to overcome, one section of Canea (Khaniá), a short jeep ride from the airport at Máleme, still lies in tumbled ruins. But around it remain few evidences of war's destruction; here, beside Canea's medieval fortress, I saw Cretan menfolk hard at work building new homes.

Alongside Canea's harbor a colorful crowd gathered after church to see a steamer come in. Here are crowded warehouses where once were great galley slips that served the far-ranging argosies of rich merchants of Venice.

Four years ago, I knew, these warehouses bulged with relief supplies from the United States—milk for undernourished children and grain for a stony island that had had poor crops. Now, with Crete's economy healthy enough to permit the shipment of fruit, wine, and olive oil, Canea's warehouses are regularly filled with export goods.

Big, smiling John Asher, an American friend working with and for the Cretans, went with me on a trip around the island. Both of us had acquired some of the local tastes, and when we stopped for a tardy breakfast we were pleased to find that the main course was Cretan cheesecake.

This delicacy, good rich peasant fare, appeals to the stomach rather than the eye. Two feet in diameter and an inch thick, the well-browned tongue-burning pastry is stuffed with cheese made from the milk of goats and sheep.

When a customer arrives, a goodly slab of *bougatza* is cut off and sprinkled with sugar. With a huge knife the delectable mass is further cut into mouth-sized, piping-hot pieces.

Roads Built, Malarial Swamps Drained

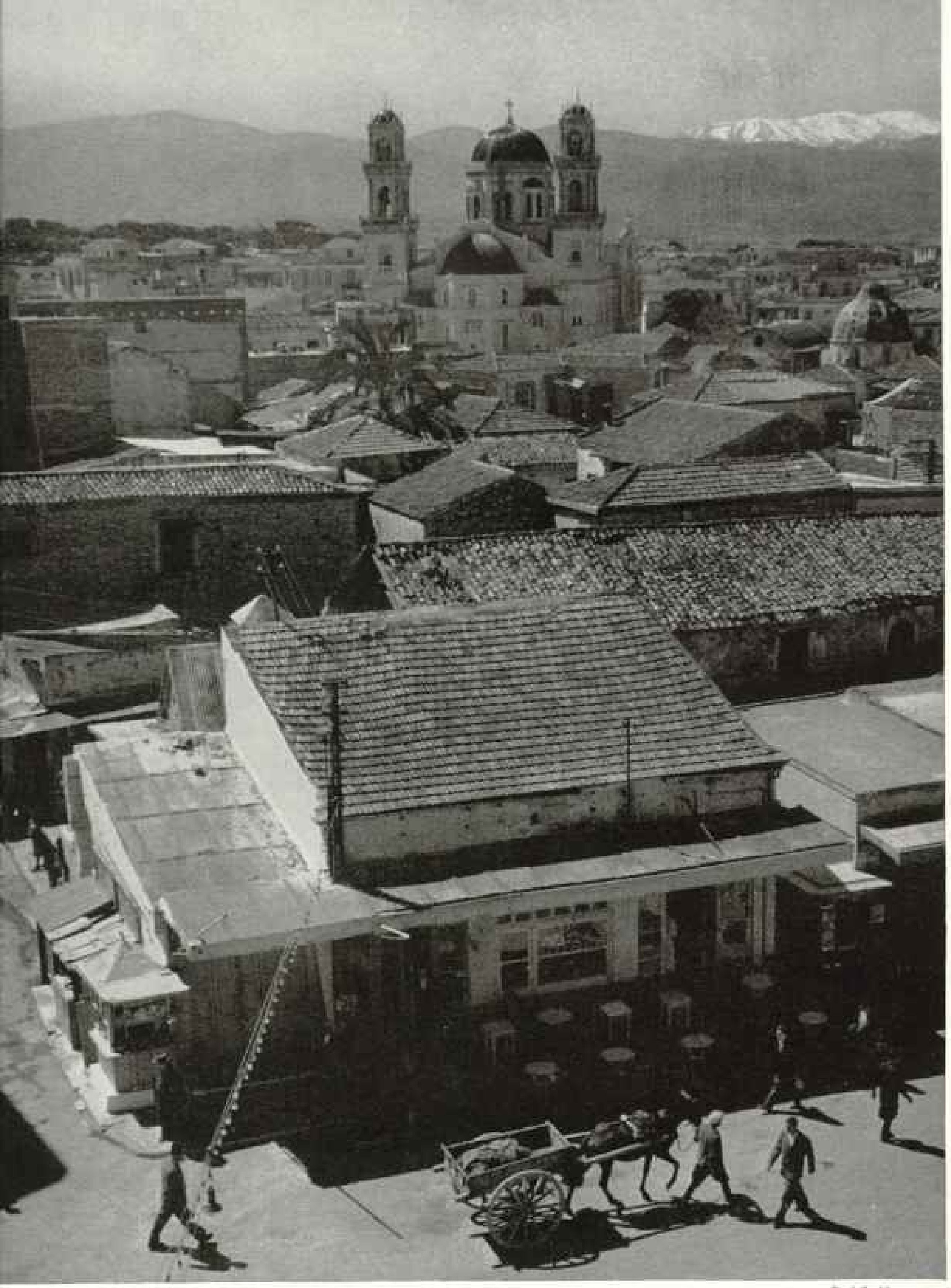
On the narrow isthmus between Canea and Suda Bay (Kólpos Soúdhas) we stopped to inspect a new rock crusher serving Crete's good-roads program, which already has considerably improved the island's transportation facilities (page 697). Near by we saw where new ditches have drained death from mosquito swamps. Malaria, thanks to DDT from the U. S. and a drainage program carried out in part by the Cretan villagers themselves, is no longer a scourge of this sunny isle.

Suda Bay, east of Canea, is the finest harbor on the island. It was used by the Minoan Sea Kings, among the first men known to have set a sail to snare the wind. Here, early on May 20, 1941, German dive bombers, fighters, and transport planes towing glider trains began their blitzkrieg from the sky. By June 1 Crete had joined mainland Greece as an Axis-occupied area.

Near the western end of great Suda Bay, the only Cretan harbor well enough protected for large vessels, the British cruiser *York* once lay where Axis raiders left her. Today Suda Bay and Crete's other ports are almost free

* See, by Maynard Owen Williams, in the National Geographic Magazine: "War-torn Greece Looks Ahead," December, 1949, and "Where Ancient Sea Kings Held Sway," 14 ills. in color, February, 1929.

† See "The Sea-Kings of Crete," by James Baikie, National Geographic Magazine, January, 1912.



694 Paul G. Almasy

Candia's Cathedral Rises from a Sea of Tile Roofs. Mount Ida Lifts a Snowy Head

Saracen raiders, converting Candia into a fortress, circled it with a huge moat and palisade. Venetians later enlarged the fortifications to withstand the Turks for 21 years—modern history's most prolonged siege. Mount Ida (8,878 feet), pinnacle of Crete, is a fabled birthplace of Zeus.

from war's wreckage, thanks to a self-supporting clean-up campaign. Scrap iron and steel from wrecked warships paid the gigantic bill for clearing harbors of twisted, rusting hulks.

Returning from a visit to the lighthouse and old fortifications on Suda (Soúdha) Island, our little boat was greeted at Kalivia by scores of youngsters (page 701). In their hands were home-grown gifts of fresh flowers. Some wore flower wreaths in their hair.

Kalivia has set a shining example for all Crete. Every village man gives two weeks of his time each year to community projects: roads, drainage ditches, a power system. Started in 1937, the idea has spread throughout Crete.

Our ride eastward on the Cretan mainland was like unrolling a pictorial scroll—smiling countryside between snowy mountain and sparkling sea.

Outside a humble inn we stopped to rest our spines and scald our taste buds with "Turkish" coffee, while the sun glinted on a clear little stream, bridged again after war's destruction of communications. Whether some Anzac commando or German paratrooper here paid with dynamite for a few hours of safety makes little difference now. Traffic moves along the vital highway from Canea to Candia, a city fortified by the Saracens, who chose it as their capital. Known as Iráklion (anciently Herákleion) to its residents, the city of Hercules was called Candia by its Venetian rulers (opposite).

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A Cretan Farmer Clings to Time-honored Fashion

Loose white shirt, frogged vest, and tasseled-scarf beret mark the native dress. Old-time warriors designed the headgear as easy to pack, simple to wear, and impossible to dent or batter.

Once Candia's battlements echoed the din of high adventure and stubborn siege. Within the Venetian walls oppressed citizens hoped Genoese or Turkish troops would bring more tolerant rule. But the massive ramparts were stronger than the people's discontent: Crete remained under Venetian control until 1669 when it succumbed to Turkish arms.

Some of these walls long ago gave up their martial role to do "commercials." I saw them blazoned with Greek words for "Goodrich Tires"!

Like Canea, Candia in the last war took a beating from the air. Today much has been rebuilt. Candia's busy port shuttles cargoes of table grapes, raisins, olive oil, and fruit to Britain, Central Europe, and the Americas in return for grain, building materials, and fuel.

Candia's only "railway" was built to serve sea traffic. Its purpose was to dump huge stone blocks from an inland quarry into the sea and so extend the breakwater and enlarge the harbor. Imaginative engineers named Candia's three tiny locomotives *Minos*, *Theseus*, and *Ariadne*, thus adding highbrow but fascinating legend to their workaday task.

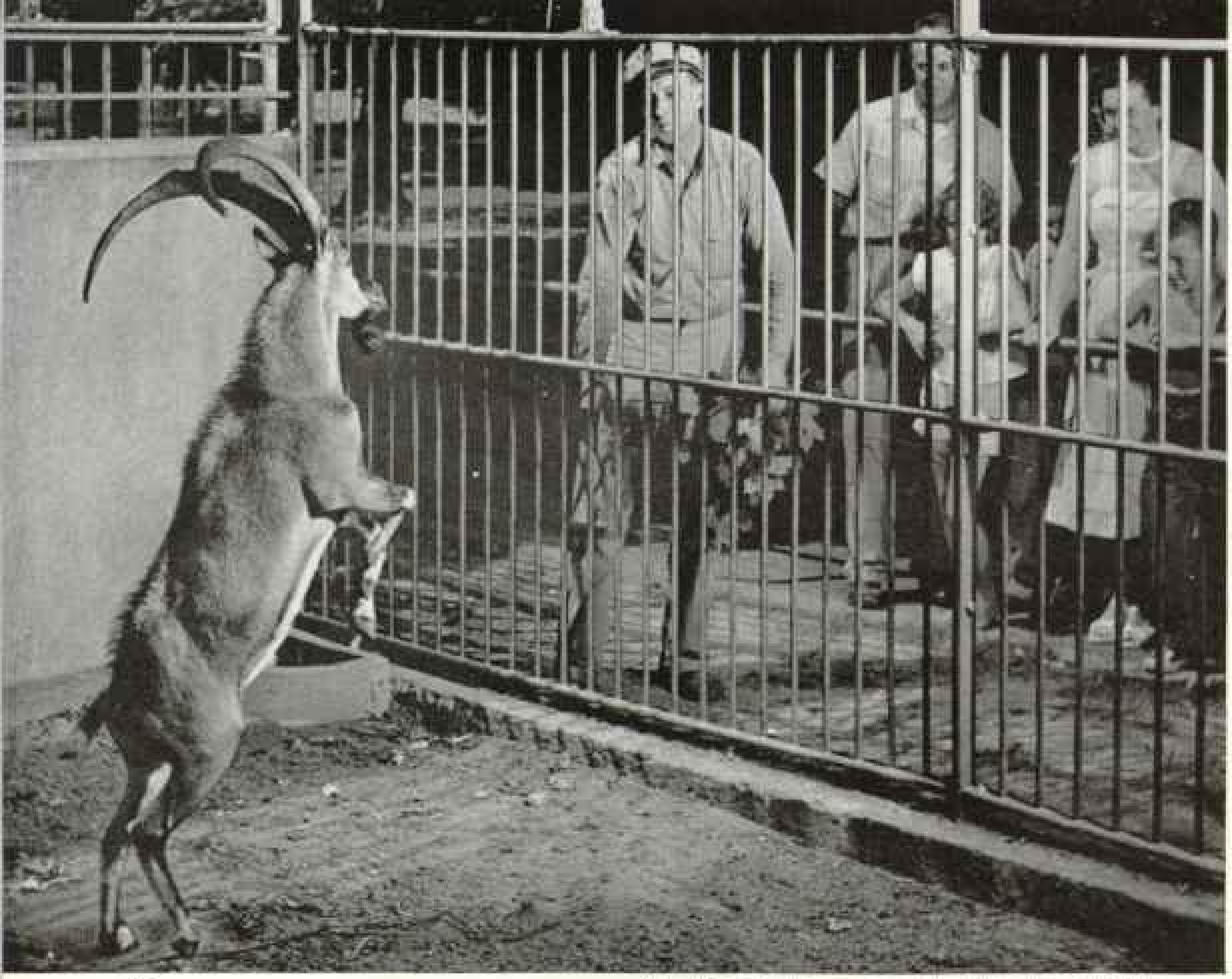
Theseus Whistles at *Ariadne*

Once during a previous visit I chuckled at hearing *Theseus* whistle at *Ariadne*—flirtatiously, I fancied. I remembered Theseus not as a switch engine but as the far-ranging conqueror of the Amazons, consort of their queen, and slayer of Crete's monstrous Minotaur, Public Enemy No. 1 in Greek mythology.

Ariadne, too, was no clanking machine but the loving damsel who saved young Theseus' life with a slender thread, enabling him to retrace his steps and so escape from the Labyrinth of King Minos at Cnossus—and ultimately escape her too!

Before going out to the Palace of Minos, one first should see unique treasures of the Minoan Age in the Candia Museum. Here in years gone by I photographed huge Ali Baba

National Geographic Photographers J. Baylor Roberts and Donald McBain



A Bearded Ambassador of Cretan Good Will Greets Visitors to Washington's Zoo

A wild goat *(Capra aegagrus)*, Kri-Kri was born among the island's White Mountain crags, a last stronghold of his kind. He was sent to President Truman in thanks for aid to Crete (page 698). Too agile for a pet, he found a home at the National Zoological Park. Screening at top of the cage restrains 10-foot leaps.

jars covered with graceful prehistoric designs.

Standing on the site of Cnossus, one wonders how this tiny island town, which once numbered 12,000 masters and 70,000 artisans and slaves, could have extended its influence so far. For a modern comparison I turned to Rockefeller Center in New York. Here a mighty monument of modern civilization lifts its head high above its neighbors. From it communication lines run far across the world; its population of workers and visitors on a busy day is twice that of Cnossus when Minos ruled.

The palace of the Sea Kings at Cnossus was no skyscraper, yet it too stood out impressively. Covering almost twice as much acreage as the United States Capitol, it had no rival closer than Egypt or Babylonia.*

One can judge how labyrinthine the palace was from the intricate ground plan. Because the rooms stood on many levels, each had to be removed when archeologists excavated the one below. Archeologist Sir Arthur Evans reconstructed some of the lavishly decorated halls and so enabled visitors to visualize the beauty of a long-forgotten age (page 703).

Aphrodite, rising from the foam, enjoyed no such luxurious bath as did the Minoan queen in her charmingly embellished tub. It took the world thousands of years to catch up with conveniences and comforts with which the Sea Kings were familiar.

Minoan Monuments Beautiful but Dumb

As yet, mute Minoan monuments have not given up their secrets. The linear Cretan script has never been deciphered. But Cretans were great traders. International trade involves treaties. International treaties are often recorded in more than one language. If a treaty recorded in unknown Cretan and known Egyptian characters comes to light, the

* See "Crete, Where Sea-Kings Reigned," by Agnes N. Stillwell, National Geographic Magazine, November, 1943; also *Everyday Life in Ancient Times*, with articles on Greece by Richard Stillwell and Edith Hamilton; 215 illustrations. Published by the National Geographic Society, 1951.

A National Geographic Map

American Equipment Helps Add New Roads to the Map of Crete

Some 3,500 years ago the finest roads in the world threaded the mountains and plains of Crete's 3,235 square miles. Today the island is undertaking an ambitious highway program. Using United States machinery, Cretans have resurfaced highways from Canea to Saint Nicholas and from Candia to Timbákion. New roads connect Málleme with Palaiokhóra, Réthimnon with the new harbor at Ayía Galíni, and Kastéllion with Ágioi Dhéka.

mute testimony of monuments may become eloquent, and Crete's historical horizon may be pushed back by hundreds of years.

A Connecticut Yankee at King Minos's court might have felt at home. Modern admirers of pin-up girls would delight in paintings of slender Minoan maidens who turn graceful somersaults over the deadly horns of bulls larger than any existing in Greece today.

Buxom members of the painted audience suggest a fecund Mother Goddess; also pictured are shy maidens wearing diaphanous blouses and a ceremonial knot, like a shoulder-high Japanese *obi* (sash). When the excavator came upon one such youthful ancient, her girlish charm preserved by an artist dead for 4,000 years, he exclaimed, "La Parisienne!" The Minoan maiden reminded him of Paris.

How deep-chested and wasp-waisted were Cretan men was revealed when frescoes in the south porch were unearthed and painfully reconstructed (page 703).

Bumper Crops Reward the Farmer

As we jeeped east from Candia toward Saint Nicholas, or Áyios Nikólaos (page 700), and the prehistoric sites of Gourniá, Mókhlos, and Sitía, we passed wide fields of scarlet poppies. Near Mállia the white sails of scores of windmills fanned silver-gray olive trees as they lifted water to fields where women were harvesting grain and digging potatoes (page 702).

Energetic Cretan farmers have not been idle while foreign aid has flowed into their land. Bumper postwar crops of grapes, olive oil, and citrus fruit, the island's principal exports, attest Cretan energy and resourcefulness.

As a result, United States aid has dwindled to a trickle. During the 1951-52 fiscal year, 455,000 tons of grain were sent to Greece, 23,400 of it direct from U. S. ports to Crete. During 1952-53, only 10,000 tons were sent direct. Of 279,000 tons of grain imported by Greece during that period, the Mutual Security Agency paid for only 193,000 tons; the Greeks, thanks to a reviving foreign trade program, were able to pay for the rest.

Not all of Crete's foreign aid has come from the United States Government; U. S. citizens have played a part as well.

Last August the dedication of a 200-bed hospital near Candia was attended by a group of United States citizens of Cretan descent. Members of the Pan-Cretan Association, they represented the many Cretan Americans living in this country. The Pan-Cretan Association contributed $450,000, and the balance of $800,000 came from counterpart funds made available to Greece through the U. S. foreign aid program. The hospital stands, appropriately, on a hill overlooking the ruins of Cnossus, symbol of Crete's ancient glory.

On the day following the ceremony at Candia, another hospital was dedicated on the island. A 70-bed structure at Réthimnon, on Crete's north coast, it cost $800,000. For this the Pan-Cretan Association gave a token $50,000; the Greek Government paid the balance out of U. S.-sponsored counterpart funds.

Wall Preserves Greek Laws

The road across Crete is picturesque enough, and the Mesará Plain is broad and rich; but the star attractions south of the mountains are Phaestus and Hagia Triada, both with Minoan palaces, and Gortyn, a metropolis in Greek and Roman days.

Old columns and headless statues still abound in Gortyn, but olive trees and grain fields have obscured the site. Today's chief interest is a curving wall, higher than my head and 10 yards long, its inner surface covered with some 17,000 Greek letters recording an early Greek code of law.

We write and read from left to right; the Arab from right to left. The men who carved the Gortyn law code, following a Hittite custom, wrote in both directions.

An Indian might call the method that of Heap-Big-Ox-Plows-Field. But the Greeks had a shorter phrase, *boustrophedon*, "the path of the turning ox."

Before I flew back to Athens, the gods of the air gave me a final bonus. The morning flight had been delayed. Iolanthe Naxaki volunteered to model the colorful Cretan costume worn on feast days and in historical pageants (opposite).

Symbol of Liberty and Gratitude

Not long after my return from Crete, a visitor from that friendly, sun-drenched island took up residence in Washington, D. C. He is a Cretan agrimi, a mountain goat with black beard and sweeping horns (page 696). A symbol of liberty to the people of Crete, Kri-Kri was captured in the island's rugged White Mountains (Lévka Óri).

Daily, visitors to the Nation's Capital pause before Kri-Kri's enclosure in the National Zoological Park to exchange a glance with this ambassador from the far end of the Mediterranean and to read the words on a marble tablet which came with him:

PRESENTED TO THE PEOPLE OF THE UNITED STATES BY THE PEOPLE OF APANACHORI, CRETE, AS A MARK OF FRIENDSHIP AND GRATITUDE FOR MARSHALL PLAN AID.

Surely no more unusual ambassador ever came to us than this high-jumping animal with his message of appreciation from the people of a war-impoverished land to those who extended a helping hand from America.

Kodachrome by Maynard Owen Williams

A Cretan Mirror Reflects a Sculptured Form Like Those on Ancient Greek Vases

Iolanthe Naxaki, whose dark eyes and brows are typically Greek, models the Cretan costume. Her filmy kerchief goes back to the shawllike *peplos* of ancient Hellas. In remote villages, coin necklaces represent life savings.

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Cretan Fishermen of Mirabella Bay Spread Their Nets on Sun-baked Wharves of Saint Nicholas

Smiling Youngsters and Bright Flowers Welcome the National Geographic Photographer to a Seaside Village

Kalivia lies beside Suda Bay, for centuries a haven of Mediterranean sea power. The author, landing in the mayor's launch, found this warm greeting awaiting him. Kalivia's happy children, many of them war babies, retain no memories of Crete's invasion by German parachute and glider troops.

Kodachromes by Maynard Owen Williams

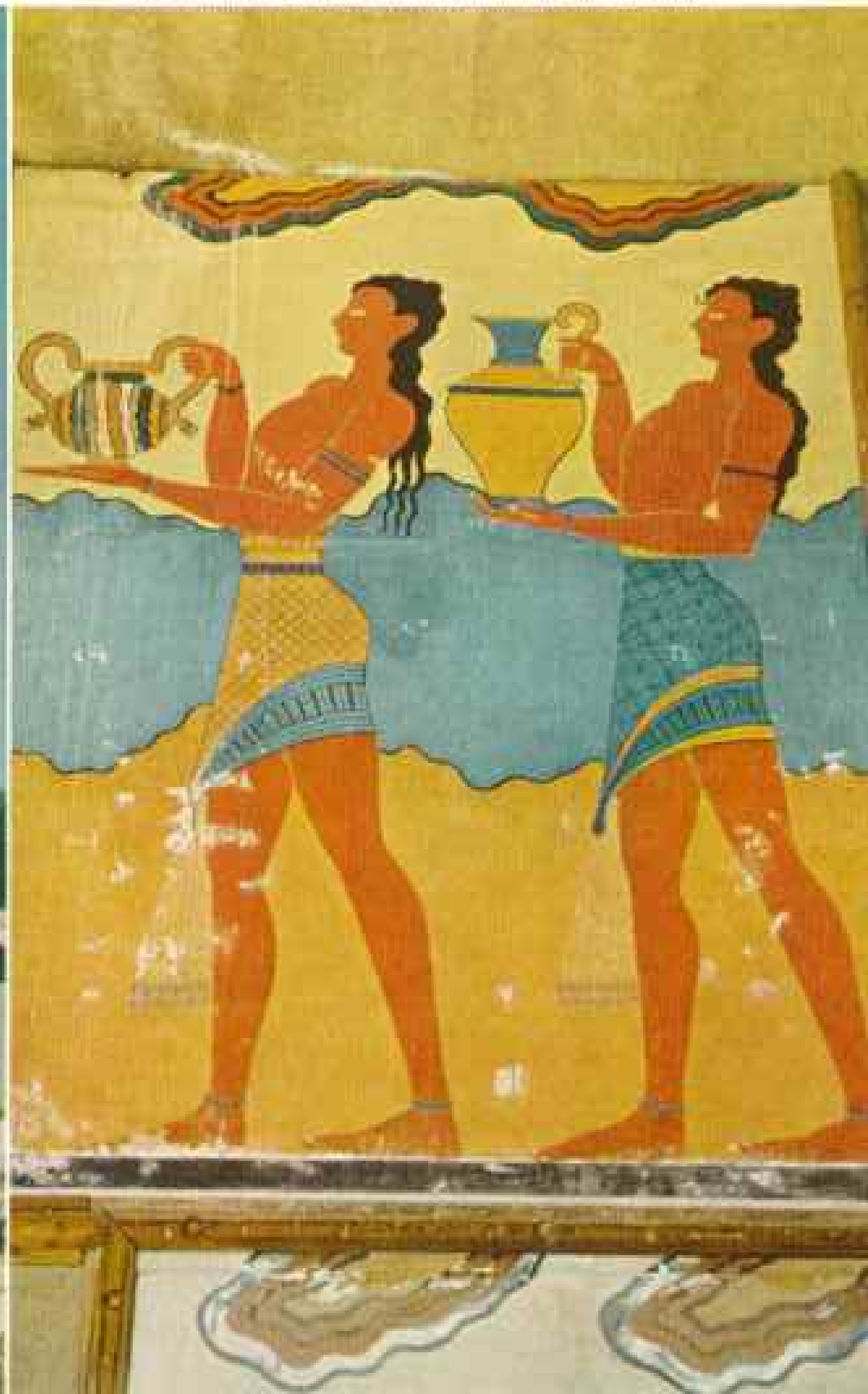
White Sails of Cretan Windmills Hum and Spin Like the Clattering Wings of Pigeons Wheeling in the Air

Thousands of these mills, their sails adjusted to the strength of the wind, pump irrigation water. Each, like a man on a checkerboard, sits in its small field.

Kilted Youths with Bulging Chests and Wasp Waists Parade Across Cnossus Palace Gate. Cretan Art Was Modern 3,500 Years Ago

The Sea Kings' residence remained a Greek myth until half a century ago, when archeologists unearthed the spot where Theseus slew King Minos's Minotaur. This man-bull's Labyrinth proved to be not the deliberate maze of legend but the accident of a complex rebuilding job; it owed its name to the *labrys*, the Minoan double ax. Cnossus, home of Europe's oldest civilization, had linear writing, coinage, and baths. Minoan artists, with a flair for action, were years ahead of their time.

Kodachromes by Maynard Owen Williams and Jack W. Evans



Greeks, Whose Love for Athletics Inspired Our Olympic Games, Line Up for a Sprint in Canea, Crete

In honor of Greece, the first modern Olympiad was held in Athens (1896). Flame from ancient Olympia is borne to the modern international games. As the birthplace of Eleutherios Venizelos, Cretan patriot and Greek statesman, Canea received its stadium as a gift from his widow.

A Sack Borne by Old and Young Is the Cretan Carryall

Crete, settled by ancient Greeks, has remained intensely Hellenic no matter who ruled the island — Romans, Saracens, Venetians, or Turks.

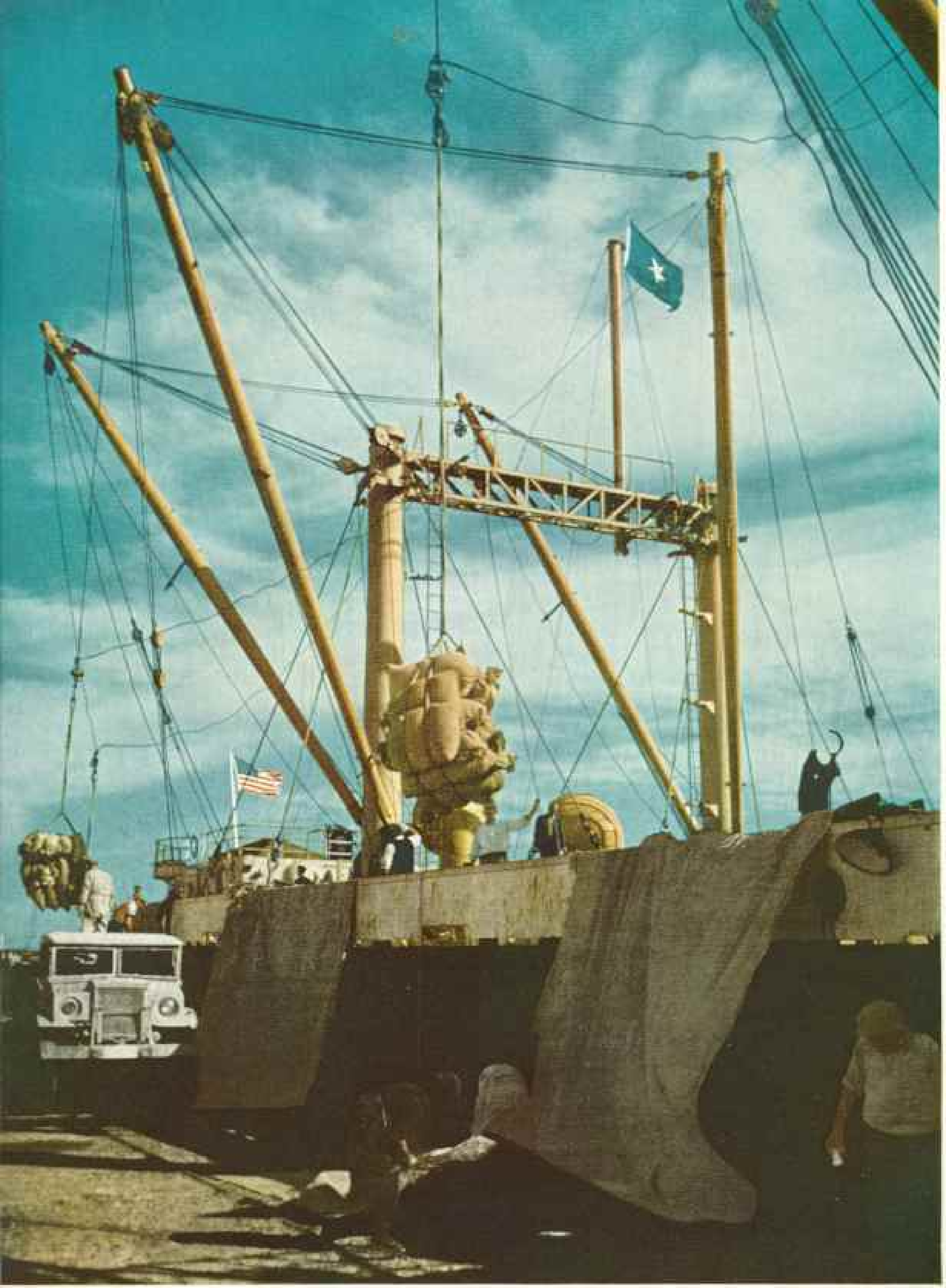
→ If this bearded farmer in Moirais market place were to turn around, the back of his aproned trousers would reveal the typical dress still found on many Greek islands. Tight as puttees below the knees, his pants swell to an incredible bagginess in the rear. A stranger glimpsing the sagging seat might imagine the wearer smuggling out no less than a watermelon. Actually, any personal cargo is stowed in his capacious knapsack.

The latter convenience, a commonplace all over rural Greece, calls to mind the gaily colored maguey bags carried by cotton-drawered, sandaled Indians in Mexico City.

→ No one knows how much of a Minoan heritage exists today, but the average Cretan's resemblance to King Minos's springy youths has often been remarked. He has the same alert expression, slender bones, slim waist, and deep chest (page 703).

This young man of Canea wears modern dress and a student's cap.

Kodachromes by
Maynard Owen Williams



Kodachrome by William M. Tait

Candia Witnesses a Gesture of Good Will: U. S. Wheat Swings Ashore

American aid to Crete has dwindled to a trickle. Today healthy people work newly drained swamps and irrigated plains as a result of millions given by the United States since war paralyzed the island's economy.

We Lived in Turbulent Tehran

An American Quaker Educator's Wife Tells of Housekeeping for Two Years in the Colorful, Strife-torn Capital of Iran

By Rebecca Shannon Cresson

FOR two of the most troubled years in modern Persian history, our family of four lived in Tehran, capital of Iran.

We arrived amid all the excitement attending Premier Mohammed Mossadegh's seizure of the Iranian oil fields. Workmen were repainting the gas pumps, systematically effacing the insignia of the Anglo-Iranian Oil Company. Behind the elaborate grill of Parliament's iron gate, Iran and Great Britain engaged in stormy conference.

When we left the country, storm signals still flew. Unrest and rioting disturbed the capital, reflecting bitter conflicts involving the Shah, the Premier, the army, and the Communists. On the day we sailed into New York Harbor, headlines greeted us with news that military revolt had overthrown Premier Mossadegh, and the young Shah had returned from Rome to reclaim his throne (page 718).

"What was it like to live in Iran during these troubled times?" friends ask us.

"Most of the time quite ordinary," we reply.

We did get caught up in the turbulence on occasion, and vivid memories of the disturbances we witnessed still linger.

Just after we arrived, my husband and I stood on our balcony listening to gunfire. "What have we brought our children into?" we asked each other. Another time a bullet ricocheted over our young son's head as he scampered home through the garden. And I shall not soon forget the experience when my husband and I, riding near Parliament, came suddenly face to face with a terror-stricken mob and saved ourselves only by dodging into an alley hardly wider than our diminutive taxi.

Author Retains Happy Memories

Yet happier memories surge up to blot out the scenes of violence. I remember with special pleasure the subtle humor and lightheartedness of the people; the devotion of our household helpers, Yaksabet and Batúl, when all of us took to our beds with serious cases of flu; the vividness of a Persian garden; the beauty of blue-tiled doorways, of olive-green minarets, of intricate filigree in the silver shops; the gawky superciliousness of camels filing past Parliament; the brilliance of the skies, obscured only at mealtime by the haze from charcoal fires across the city.

Tehran's sparkling fountains looked unbelievably cool and refreshing that sweltering June day when we arrived with all our possessions. Our 16-day trip overland from Afghanistan had been long, hot, and dirty, the kind that makes one wonder why he ever thought of doing it. Tehran seemed a world apart.*

At the time, we paid scant attention to the nationalization of the oil fields on which the world focused so intently. Our thoughts centered with curiosity on our new environment and job. The American Presbyterian Mission had asked us, a Quaker family, to come to Tehran to help in their school.

School a Babel of Tongues

Originally started for mission children, Community School had quickly grown until it offered American-type education to 500 children who could not easily fit into the Iranian school system. They represented 31 nationalities—a miniature United Nations. Besides the youngsters from the missions and the English-speaking colony, there were children from many embassies, refugees from half a dozen countries, and even Iranians who had special permission from the Ministry of Education to attend a school run by foreigners. Some were children of Iranian officials; one was Premier Mossadegh's grandniece.

The 30-odd teachers used only English in their classes although, like the students, they came from widely varying national and religious backgrounds. Many of our youngsters spoke four or five languages. Within a few moments one day I heard Hebrew, Russian, Armenian, Persian, and English as I passed a handful of boys practicing on the basketball court.

Osborne, my husband, was vice principal of Community School, with many additional tasks as business manager and mathematics teacher. Our daughter Wetherill entered sixth grade, where she soon decided that a Girl Scout looked too childish in waist-length curls and rapidly emerged as quite a young lady, with shorter haircut, longer dresses, and lipstick.

Our son Os quickly developed an enthusiasm for soccer and was tremendously excited about being in a real fifth grade after two years of classes at home.

* See "American Family in Afghanistan," by Rebecca Shannon Cresson, National Geographic Magazine, September, 1953.

Maynard Owen Williams

Enveloping *Chadars* Shield Tehran Women from Winter's Winds and Men's Stares

Banned in the 1920's, the chadar, an ankle-length shawl, has made a comeback. Moslem women sometimes pull it across the face in lieu of a veil. A horse-drawn droshky contrasts with modern buildings and wide avenue.

A Stick-brandishing Mob Rips Down a Political Sign in Tehran

Rioting last August that swept Premier Mossadegh from power and returned Mohammed Riza Shah Pahlevi to his throne is here directed against headquarters of the Iran Party, which supported Mossadegh.

As for me, I hurried across the compound each morning to tend library and serve as substitute teacher if necessary, after dealing with the problems that beset a housekeeper in Iran.

The school provided us with a large and comfortable house so that we might harbor two boarding students from provincial mission stations. The extra room came in handy, for we soon had a houseful of pets. These included two ducks, auburn Sobh and black Shab (Morning and Night), and a dog named for Iran's highest peak, although he had no shred of the dignity of Demavend, the 18,934-foot snow-capped cone of the Elburz Mountains north of Tehran.

American Refinements Added

Our rooms, filled with furniture inherited from departing missionaries, seemed very American in spite of mud walls a yard thick, high ceilings, tiled floors, and such decorations as hubble-bubbles (water-cooled tobacco pipes) converted into lamps.

Like our furnishings, the plumbing was not strictly Iranian. We had semi-American toilets in separate rooms just outside the main part of the house. They flushed when you threw a pitcherful of water down them, provided you learned the correct angle and speed.

Each bedroom had its own washstand and towel rack, and we boasted a bathroom with a tin tub shaped like a mummy case. A kerosene heater at one end provided hot water. When the tub's plug was pulled, water emptied into an open trough below.

Sometimes, when I thought wistfully of gleaming American plumbing, I remembered that Persia had known a highly developed culture when much of Europe was still in a primitive stage, and that some of Iran's artistic products are still the envy of the industrialized part of the world.

The kitchen's kerosene stove was a great improvement over the charcoal stove of Afghanistan, although at first it smoked furiously in spite of my best efforts. The houseboy next door taught me to wrap wet rags around the burners to cool them in summer, but I kept my distance from the stove after we acquired our Iranian servants—Yaksabet as cook and Batul as waitress.

Yaksabet, a woman of Armenian extraction, was about 48. Both of her children had been educated in an American mission school.

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Iran, the Persia of Old: Famed for Poetry, Rugs, and Oil

Desert wastes cover fully half the high plateau, but fertile regions remaining have long inspired poets and painters. Proud Iranians remember that 2,500 years ago their ancestors subdued most of the known world.

Batūl, at 40, had a 25-year-old son. Like Yaksabet she was a Christian, although all her family were Moslems.

Changes in Batūl's home during the two years we were in Iran reflected the force of Western influences throughout the country. Batūl's elderly mother kept house in old Iranian style when we first knew her, folding away sleeping pads each morning and serving meals on a cloth on the floor. By the time we left she had adopted the use of chairs and tables.

Housekeeping Difficulties

Os enjoyed practicing his Persian lessons at Batūl's house in winter. In the living room a pot of charcoal was placed under a low table covered with a quilt. The family sat on the floor around the table with bolsters at their backs, their knees under the quilt and their toes pushed close to the glowing coals. Os liked to join the group with little Mariam, Batūl's niece, close by to prompt him as he read his Persian. I suspect that Batūl's mother sometimes fed him candies and pistachios.

What I should have done without Yaksabet and Batūl I do not know. Housekeeping is doubly difficult when walls are of mud and floors are rough stone, concrete, or tile. A hasty cleaning of house and furniture was often necessary just before guests arrived, for a film of dust soon settled over everything.

Tehran is in a land where parched soil or desert predominates, and a grassy ground cover is lacking in most places except in the lush semitropical country around the Caspian Sea. Lawns are virtually unheard of in Tehran, although every house of any consequence has its carefully tended flower garden surrounding a pool that holds irrigation water used between infrequent rains.

Iranian servants freely voice their opinions. Ours were no exception. Batūl, for example, didn't approve of our nightly cup of coffee before retiring, simply because the idea was strange to her. Rather than force the issue, I made a tour of the house each night to assemble the coffee tray—to the kitchen for milk, the study for powdered coffee, and the dining room for cups.

When Batūl had her holiday, Yaksabet would sometimes indulge me and prepare the coffee tray before she left after dinner. But in other ways she was very strict with us. If we asked for out-of-season or expensive food, Yaksabet was apt to have a sudden loss of memory.

One day both servants disapproved when I suggested caviar sandwiches for a large tea party. I insisted on them: caviar comes from Iran's Caspian shore and costs only a fraction of its lofty price in the United States.

So I tore off to my scheduled duties in the library, a teachers' meeting, a Scout meeting, a Persian lesson. Back home just in time for the tea, I hastily inspected arrangements. There were caviar sandwiches all right—if you could call them that. Close inspection revealed a few dark specks of caviar smeared across each buttery surface.

Aside from such deviations, however, our household helpers took orders most willingly. In polite Iranian fashion the gardener always responded by passing one hand before his face and murmuring "Chashm," Persian for eye. Thus did he tell us symbolically, "May my eyes be put out if I fail," although in current usage the expression means merely a polite "yes."

Yaksabet did most of our shopping. When she needed more household money, she modestly asked for *kam-ipul* (a little money). If pressed for an exact amount, she would admit to wanting anything from 25 rials (25 cents, when we left) to 1,000 rials, but it was always "kam" in the first mention.

I tried to persuade Yaksabet to buy food for several days at a time. But the habit of daily marketing was too deeply ingrained, and she disliked hiring a porter.

Each morning she took her basket and for several hours toured the scattered food shops. Here she would find the vegetable dealer; blocks away would be neatly tiled butcher stalls, their freshly killed beef and lamb hanging in the warm sunshine.

711 National Geographic Photographer J. Baylor Roberts

An American Car in Iran Refuels at a Hand Pump

Gasoline is no problem in oil-rich Iran; the capital's streets are filled with American and European cars. Before nationalization of the oil industry, pumps bore the insignia BP for British Petrol.

Much farther on would be sellers of flour; of potatoes or rice; of melons—especially Persian melons of unforgettable flavor; of shiny red pomegranates and occasionally oranges and bananas; of fresh dates, unpackaged and full of sticks, but more tasty than any I have come across elsewhere; of walnuts, almonds, and pistachios, and squash and watermelon seeds.

Milkman Rides a Bicycle

Tehran's streets are alive with vendors (page 716). During summer's heat men with porous earthen jugs, a glass, and a bit of ice sell cooling drinks on the streets. Others roast ears of corn over charcoal. In winter, itinerants offer steaming slices of beetroot and kabobs, the latter being chunks of meat broiled on skewers. Many cry their wares in a melodious minor-key patter.

The milkman came to our house with cans mounted on either side of his rear bicycle wheel (page 717). If Yaksabet or Batūl was not there, he would find a pan in the kitchen and dip out our daily supply. His services even included lighting the stove and putting the milk on to boil, a process of home pasteurizing we never skipped.

Lavash, paper-thin bread, also was brought to us across the rear wheel of a bike. This we dried and crumbled for cereal or toasted in place of crackers. The egg man carried a yard-wide basket on his head. It held so high a pyramid that every day we expected to witness a messy disaster.

Home from the market, Yaksabet prepared many a delightful dish. She introduced us to *fesenjan chelow*, now my favorite Iranian food: tender fluffy rice buried under a black, deadly-looking stew of pomegranate juice, walnuts, and wild fowl. It is delectable, but so forbidding in appearance and strong in flavor that it takes a bold eater to appreciate it at first try.

Along the street called Naderi, Western-

Picnicking Families Celebrate the Iranian New Year in the Elburz Foothills

Spring ushers in the holiday and two weeks of celebrations. On the thirteenth day families journey into the country and symbolically shed their troubles by casting green plants into running streams. No meal seems complete without samovar and tea glasses.

type stores maintain prices that are "fees." Everywhere else one must bargain, for merchants automatically ask much more than they expect to get.

For better bargaining I usually took along one of the children; their Farsi, the official language, was more fluent than mine. Wetherill once chided me: "Mother, I am so embarrassed when you use Farsi in front of people who speak it so much better than you do!"

Two Techniques in Bargaining

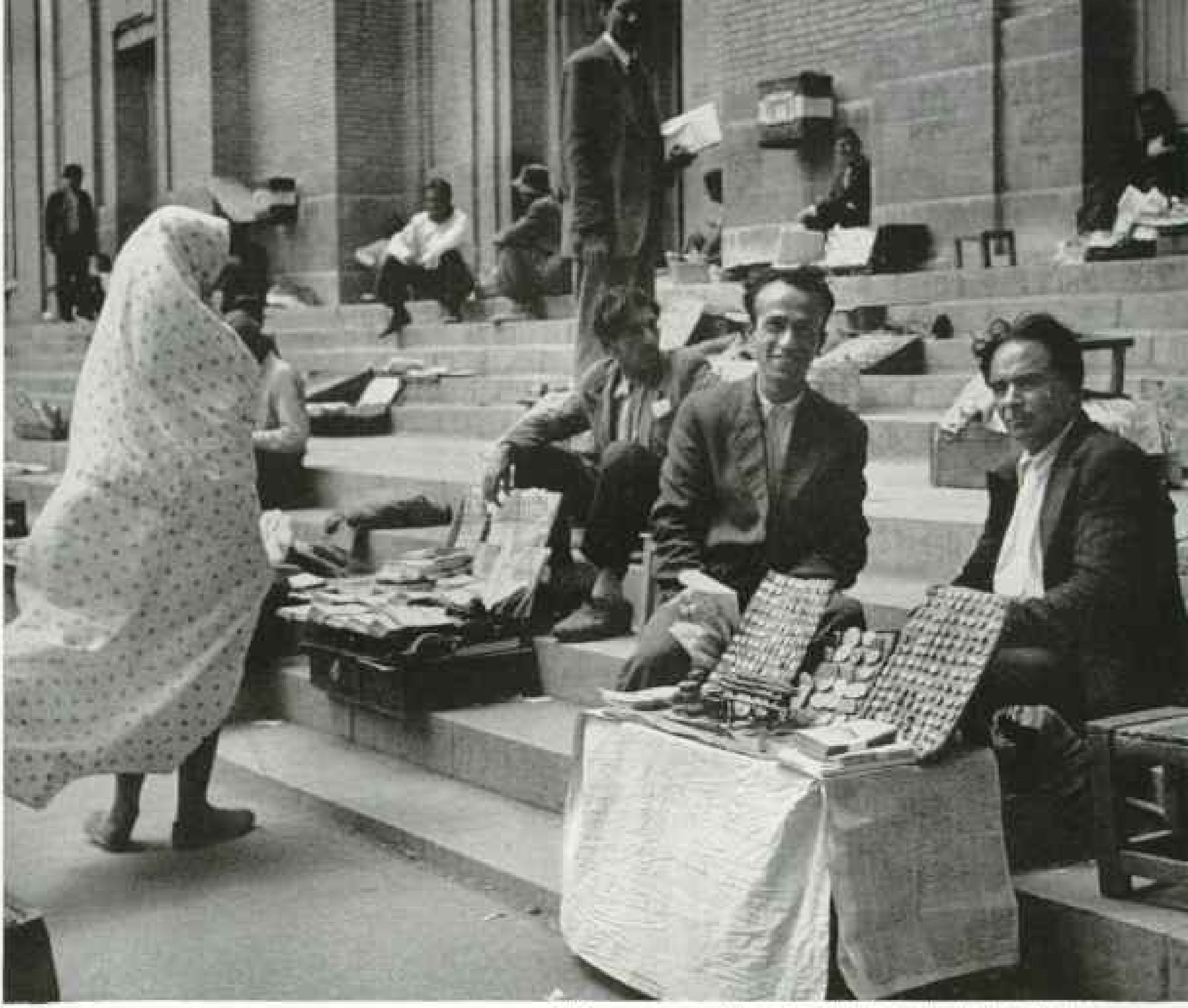
When shopping, Wetherill usually smiled, then looked sad if the quoted price was too high. Os's technique when asked a stiff price was to grin cheerfully, click his tongue, and tease the merchant with the word *shaitun* (devilish). Both systems worked fairly well, although Wetherill's blue eyes and both children's American accent clearly identified them as foreigners who were expected to pay higher prices than were the Iranians.

Shopping expeditions sometimes carried us to the city's old section, to the huge Old Bazaar, which stretches for blocks in every direction under a great vaulting of brick.

There, from narrow, shadowy stalls, come the hammer beats of brass and copper smiths and the glow of their tiny forges. In countless other stalls shoemakers cobble, tailors ply their needles, carpenters work in wood. Artisans of every type abound, most of them working entirely by hand.

There too are found the stalls of merchants by the hundreds, selling almost any conceivable object from a bobby pin to a fine piece of jewelry or a rug or a bolt of dress material. Each merchant has a small selection, and if you do not find just what you want, he borrows additional stock from a neighboring vendor. Meanwhile his neighbor is just as likely to be trying to entice you away with some other choice.

As one threads the endless cobbled aisles of the Old Bazaar, assailed by a medley of



713 National Geographic Photographer J. Baylor Roberts

Scribes Double as Vendors on the Steps of Tehran's Post Office

These open-air businessmen read and write letters for a price. In addition they sell stationery, envelopes, and other small supplies, and brass seals engraved with the purchaser's name. The young woman wears a brightly patterned chadar (page 708); older women prefer darker colors.

babbling voices, whistles, and shouts; it takes an agile foot to dodge the flow of heavily laden donkeys and porters. And it requires a case-hardened heart to resist boys selling notions—persistent lads who assume a most dejected air if the answer is "Nakhair" (no).

Silver merchants sell their wares at every turn. How any of them make a living is beyond my understanding. In most shops silver sells by weight, regardless of the man-hours that have gone into workmanship.

The napkin rings Yaksabet gave to Osborne and me for Christmas were beautifully engraved by a Russian Armenian. Wetherill wrote our names for Yaksabet so they could be engraved on the rings: "Osborne C. Cresson" and "Rebecca S. Cresson." When we received the gifts, we found that they were inscribed "C. Cresson" and "S. Cresson." The craftsman had started from the right and written toward the left, as in Persian calligraphy, and there wasn't enough room to include our first names!

I scouted the shops constantly for specimens of older Persian craftsmanship from the days when designs were simpler and more attractive, less doctored to meet the presumed tastes of travelers from other lands.

Batül could never understand this. She chuckled over many of my selections, saying, "My mother threw that away 20 years ago."

"Alaska Man" Sells Popsicles

Since time immemorial Persian clothes have been hand-tailored. Within the last several years ready-made suits and dresses have come on the market in Tehran. The ready-mades cost more and do not fit so well; yet men and women eagerly seek them because they have the Western touch.

Western influence is noticeable in other, smaller matters. The Popsicle man who came by our street was called the "Alaska man." And a popular brand of *mast* (a food similar to yoghurt) is "Mickey mast," complete with a mouse on the label.

714

Sun-baked Tehran, Home of a Million, Looks Up Enviously at Snowy Elburz Mountains

This aerial view shows the western part of the capital. On the plain just north of the city lies Camp Amirabad, where American soldiers were quartered in World War II. Now it houses students of Tehran University.

715

U. S. Air Force, Official

Roosevelt, Churchill, and Stalin Met in the Iranian Capital a Decade Ago

Broad, straight avenues testify to modernization by the late Riza Shah Pahlevi, whose family name honors the dark thoroughfare at right. It leads on to suburban Shimran in the mountains.

National Geographic Photographer J. Baylor Roberts

Porous Jars Cool Water for Parched Throats in Hot and Dusty Tehran

Some people have private wells, but most use water from the near-by mountains, buying it from vendors or drawing it from stone ditches known as *jubes*. Water stored in these raffia-capped jugs seeps through the porous clay, and evaporation cools the contents.

Many of our prized possessions reveal much about life and customs of Iran. On my wrist, for example, I wear a heavy silver bracelet from which dangle three silver mountings set with flat pieces of carnelian and brass. Each is carved in intaglio with the elaborate characters of Persian script. They are authentic signature seals once used by Iranians who were unable to write. I have known of government workers in Tehran who carry such seals in their pockets and use them as a time-saving device to sign official papers.

Our copper henna pot always reminds me of Batūl's mother, whose hair was dyed a bright carrot red. Iranian women commonly touch up their hair with dye. As they age they use red dye instead of black to conceal the white strands. Thus the mixture of black and red hairs reddens with the passage of time until, as in the case of Batūl's mother, nothing but gaily hennaed hair is left.

A little brass bowl carved with verses from the Koran tells something of an old-time Iranian custom. From a hole near the lip hangs a wire supporting 40 iron rings of irregular shape. I was told that in times past, when someone in a household fell ill, a mullah (spiritual leader) was called to the house to fill the bowl with water and count off a prayer for each of the submerged rings. The belief was that the prayers passed through the rings into the water, which was then used for anointing the sick person.

A bit of silver designed to hold a piece of pumice stone for scrubbing calls to mind the public baths frequented by many Iranians.

Well-educated professional people of Tehran told us that a weekly visit to the bathhouse is essential to keep clean, even though one bathes at home. I suspect that the motivation for these visits is as much social as hygienic.

Stone Scrubs Elbows and Feet

Women carry elaborate equipment to the baths. Aside from towel and washcloth, a comb, and soap in a crocheted bag, there's a big rug or quilt carryall, a fancy cloth on which to spread articles, a metal tray on which to stand while drying, a pitcher, a triangle of cloth with which to tie up the hair after shampooing, and a pleated "modesty skirt," an 18-inch strip worn as an apron so that the body is never completely exposed. A piece

of pumice stone is used for scrubbing elbows and feet, and a softer, more porous stone rubs the rest of the body clean.

Iran celebrates three Christmases: one on the 25th for Protestants and Catholics, and two in January for Armenians and Russian Orthodox. Thus Christmas trees in Tehran—pines brought from the Caspian—are on sale for what seemed to us an abnormally long time.

March 21 is New Year's Day in Iran. Shortly before, many Iranians celebrate with a fire ceremony, perhaps a holdover from the ancient Persian religion of Zoroastrianism, whose god of goodness and light, Ahura Mazda, gave his name to the modern incandescent bulb.

Servants in our compound laid bundles of straw two feet apart in series of threes. At dark the fires were lighted, and we all went out to jump over the flames with Batûl. When old-time Iranians did this, they said, "My sickness go into you," believing that any illness would be destroyed by the flames.

A Cycling Dairyman Ladles Milk for Yaksabet the Cook

When the squeak of his horn did not bring Yaksabet or Batûl the waitress to the door, this milkman entered the author's kitchen, filled a pan, and set the milk on the stove to boil (page 711).

Everyone entertains at New Year's. At Batûl's tea on our first New Year we sat on the floor and helped ourselves to numerous dishes of nuts, candies, cookies, and squash seeds. Perfume was sprinkled on our hands, and we rubbed it on our hair as a gracious gesture. As at all Iranian social affairs, we drank cup after cup of tea.

While there we read a few pages of Mariam's Persian first reader and found that Os could add Persian numbers. He was especially fast on the Iranian abacus, getting answers faster than his father could add in his head.

The Shiite sect of Islam, to which most Iranians belong, especially reveres three descendants of the Prophet: Ali, his son-in-law, and Husain and Hasan, his grandsons. All three are recognized by the Shiites as the lawful successors to Mohammed in the leadership of Islam. The month of Muharram is a period of mourning for the Shiite martyrs. Flagellants, both men and boys, parade nightly through the streets, carrying banners and lashing themselves with chains.

These religious celebrations reach their climax on the Tenth of Muharram, the day Husain was killed in battle. At the end of the month candle parades express sorrow for his loss. Living close to several mosques, we heard men parading past our walls far into the night, and the mournful chant "Huuuuuuuusain! Huuuuuuuusain!" rang in our ears.

Chant of the Bricklayer

Persia is a land of poetry. Even everyday speech is full of elegant and flowery images, perhaps because the Iranians know the work of their poets far better than English-speaking people know Shakespeare.

I saw this illustrated particularly well when Community School remodeled an old hospital. All day long I listened while the masons built their walls, the boss bricklayer chanting:

One for father,
One for mother,
One for baby,
Hurry up, another.

At the last word in each line an assistant on the ground tossed up a brick. At times bricks were flying 15 feet or more to the ca-

Wide World

Iran's Shah, Returning from Brief Exile, Salutes an Honor Guard at Tehran Airport

Last August, four days after mob threats had driven the Shah from his country, a military coup overthrew the government of Premier Mossadegh and brought Mohammed Riza Shah Pahlevi back in triumph. The 34-year-old monarch wears the uniform of a marshal of the air force.

dence of this ancient quatrain. Thus do Persian workmen inject a measure of beauty into the most mundane tasks.

Reverence for such great Persian poets as Firdausi and Saadi is expressed in magnificent tombs. In Tehran, as in other Iranian cities, streets bear the names of these beloved writers.

Real Flavor Found Outside Tehran

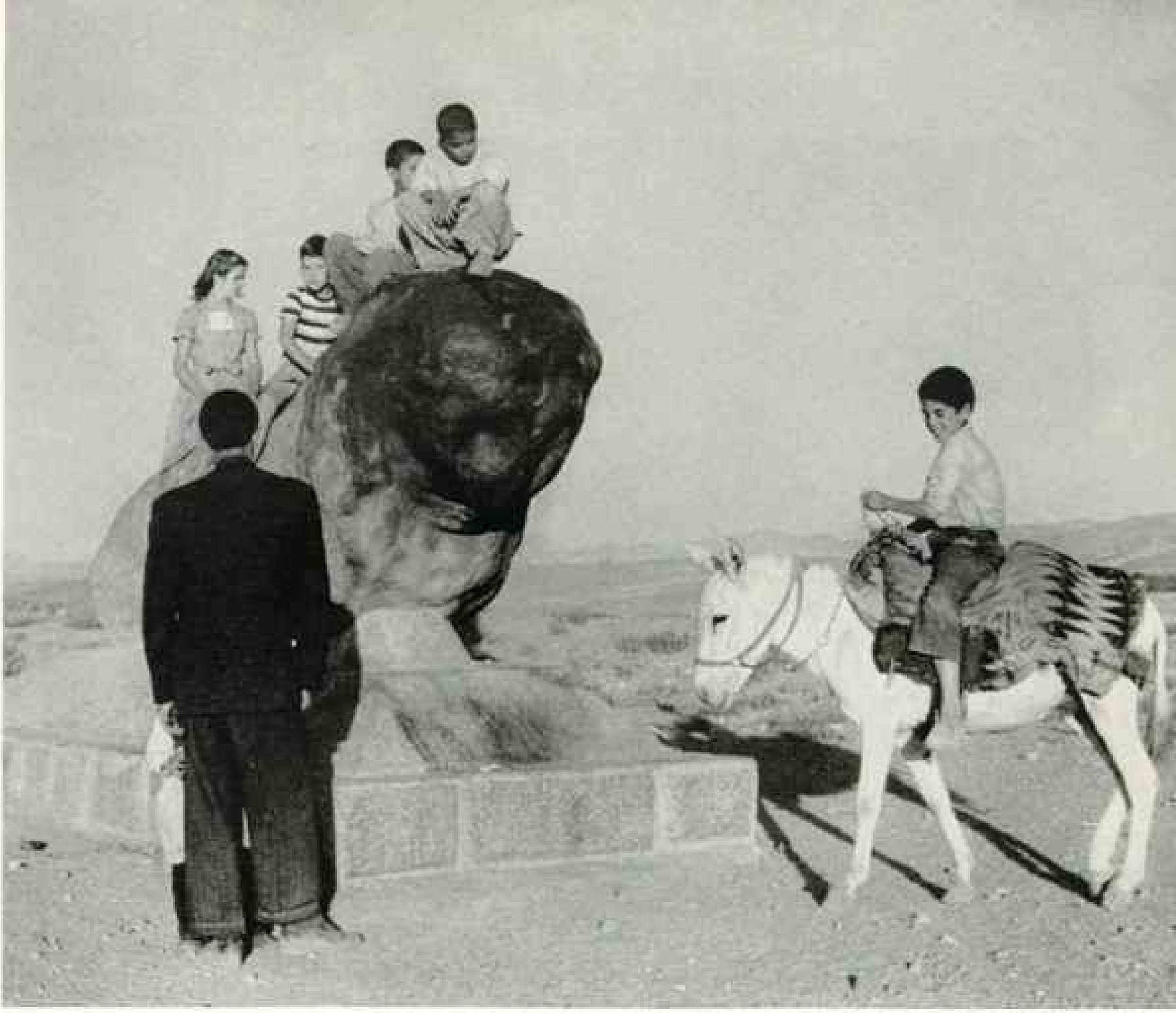
Tehran's wide avenues and new buildings testify to the extensive modernization program begun by the late Riza Shah Pahlevi, father of the present Shah. These improvements, together with the presence of refugees who have flooded in from Afghanistan, Asiatic Russia, Iraq, Turkey, even Europe, give the capital a cosmopolitan atmosphere unlike any other part of the country.

For the real flavor of old Persia we went elsewhere. At Hamadan, at the base of Alwand Mountain (Kuh-i-Alwand), 175 miles southwest of Tehran, the echoes of history rang in our ears. There, at the oldest existing Persian city, we imagined we heard the hoofbeats of mounted warriors and the marching bowmen of Cyrus the Great, of Darius the First, and of Xerxes, who made Persia a world empire two and a half millenniums ago.

There we surveyed the ruins of the citadel at the fabled city of Ecbatana with its seven circled walls, one silvered and one gilded. Only bare mounds remain except for the lion of stone which once adorned a gate. It no longer looks much like a lion; women have rubbed the head into an expressionless blob in hopes that pleas for children might be answered (opposite).

By an ancient trade route near Hamadan, we saw inscriptions carved in living rock by both Darius and Xerxes, each proclaiming himself to be "King of the Great Earth, even to afar." The trilingual inscriptions, in the Old Persian, Elamitic, and Babylonian languages current at the time, helped decipher many other cuneiform writings.

At Rai (Rhages), on the barren plain



719

Osborne C. Cresson

Hamadan's Disfigured Lion Guarded the Gates of Ecbatana Long Ago

This stone carving and a few barren mounds outside Hamadan are all that remain of ancient Ecbatana, summer capital of King Darius and King Xerxes. Women praying for motherhood have oiled and rubbed the stone face into shapelessness. Wetherill and Os Cresson (left) found boys carving initials in the lion's back.

south of Tehran, we visited ruins of a majestic city built just after the time of Alexander the Great and destroyed by Genghis Khan. There we picnicked at what might seem to be a ghoulish spot—beside the Tower of Silence where Zoroastrian believers used to leave the bodies of their dead to the vultures, until the practice was forbidden by Riza Shah. The children looked at the bones with surprising calm and hunted the darkening sky for scavenging birds.

On the way home from Rai we passed rows of one-room houses where families dined out of doors by the light of lamps. Some Iranians had rolled themselves in blankets or shawls, preparing to sleep with heads completely covered in spite of the warm night.

Communists at the Back Door

Peace House, a Communist youth club and propaganda center almost at our back door, kept us constantly aware of the activities of Soviet agents in this buffer land. Twice police raided the place. Hostile incidents, stirred by both ultra-nationalists and Red agents, ranged from the posting of propaganda signs to acid throwing and stoning of military vehicles.

We often knew in advance when riots were coming, for they usually accompanied previously announced Communist meetings. These disturbances were remarkably localized, occurring especially in the vicinity of Parliament or the University. And they kept to fairly regular hours. Disturbances stopped at noon for lunch and siesta, beginning again about 4 or 5 o'clock. By nightfall the streets were deserted once more.

Sometimes we would see store-front shutters half lowered as merchants kept business going while constantly scanning the street for trouble.

In our own neighborhood bodies lay in near-by mosques after one riot. Mourners crowded the streets; buses carried black banners; and loud-speakers, now used by

National Geographic Photographer J. Baylor Roberts

Massive Gems Worth Millions Stud These Successors to the Peacock Throne

Persia's Nadir Shah, who invaded India in 1738, brought home the fabulous Peacock Throne of the Great Mogul at Delhi. Although the original throne mysteriously disappeared, its name is often applied to two more modern thrones. One is this magnificent golden chair, encrusted with enormous emeralds, rubies, and pearls, which is thought to contain parts of the Peacock Throne. The other, surmounted by a revolving wheel of glittering diamonds (background), was made for Fath Ali Shah when he married the Peacock Lady of Isfahan a century and a half ago. Both are museum pieces in Tehran's Gulistan Palace.

muezzins to call the faithful to prayer, blared prayers for the dead and verses from the Koran.

So we lived in Tehran amid a certain amount of tension, conscious at times of martial law and curfew. But in truth our lives were relatively cloistered behind the walls of our compound; the political disturbances had little direct effect on us.

It was the same with the earthquake which destroyed a village only 25 miles from Tehran. Newspapers in the United States said Tehran itself had been badly shaken. My mother wrote "I realize you've been through difficult times. . . ."

We laughed when we got that message, for none of us knew there had been an earthquake except Osborne, who had happened to look up and noticed the picture over his desk swinging back and forth.

Old Iranians say that the world is perched between the horns of a cow, and that when the cow gets tired and shakes her head, she causes an earthquake.

Persia's cow was as kind as were Persia's people when we lived in turbulent Tehran.

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

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus. By dating the ruins of vast communal dwellings in that region, The Society's researches solved secrets that had puzzled historians for 300 years.

In Mexico, The Society and the Smithsonian Institution, January 16, 1939, discovered the oldest dated work of man in the Americas. This stone is engraved, in Mayan characters, November 4, 291 B. C. (Spinden Correlation). It antedates by 200 years anything else dated in America, and reveals a great center of early American culture, previously unknown.

On November 11, 1935, the stratosphere flight of the world's largest balloon, *Explorer II*, sponsored by The Society and the U. S. Army Air Corps, reached a world-record altitude of 72,395 feet. Capts. Albert W. Stevens and Orvil A. Anderson took aloft a ton of scientific instruments and obtained results of extraordinary value.

A notable undertaking in the history of astronomy was launched in 1949 by The Society and Palomar Observatory of the California Institute of Technology. This project will photograph the vast reaches of space and provide for observatories all over the world the most extensive sky atlas yet made.

In 1948 The Society sent seven expeditions to study the sun's eclipse on a 5,320-mile arc from Burma to the Aleutians.

A Greek cargo ship sunk in the Mediterranean 2,100 years ago was found and investigated in 1953 by the National Geographic Society-Calypso Marine Expedition led by Commandant J.-Y. Cousteau of the French Navy.

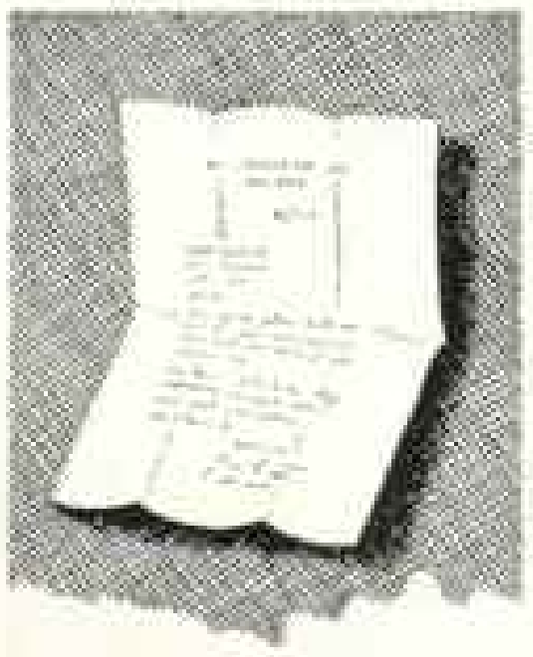
The National Geographic Society and the Royal Ontario Museum in 1951 explored and measured newly found Chubb meteor crater, 11,500 feet in diameter, in northern Quebec.

The Society and individual members contributed $100,000 to help preserve for the American people the finest of California's sequoias, the Giant Forest in Sequoia National Park.

One of the world's largest icefields and glacial systems outside the polar regions was discovered in Alaska and Yukon by Bradford Washburn while exploring for The Society and the Harvard Institute of Exploration in 1938.

EXECUTIVE STAFF OF NATIONAL GEOGRAPHIC MAGAZINE

"DEAR SIRS: By 1960 please send me these items..."



The facts in this letter are not imaginary. They merely sum up what economists predict for the United States by 1960.

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If possible, arrange more leisure time for me. I do not wish to work longer hours to pay for increased purchases.

You will, of course, find me new products better than the old. You have done this in the past, but please increase your efforts.

Please tell the electrical manufacturers to be making 2 times as much by 1960. I am increasing particularly my purchases from them.

Very truly yours,
(signed) The American Public

What this letter calls for is clearly understood by any company or industry that has earned public good will and hopes to keep it.

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Second, products now on sale must *do* more if people are to get more for their money. Examples may help here. Engineers at General Electric have multiplied the efficiency of turbines, the light from lamps, the power of x-rays, and so on. Such engineering is and must be an always expanding program.

Third, new products must be found to make known products obsolete by comparison. To find new truths, research in America must increase. At General Electric, new research facilities and people are being added.

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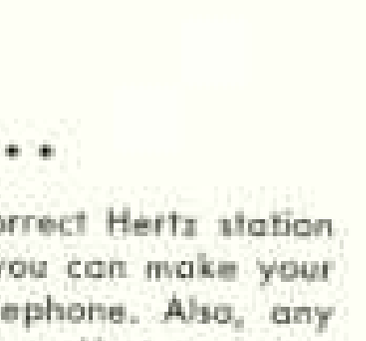

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NEW TRACK LAYOUT PRINTING KIT PLUS SET OF EIGHT FULL-COLOR BILLBOARDS WITH THE NEW 1953 LIONEL CATALOG...

40 PAGES IN FULL COLOR!

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☐ I enclose 50¢ for Big-3 Coupon offer above.
☐ 10¢ for Catalog only.

Name.....

Address.....

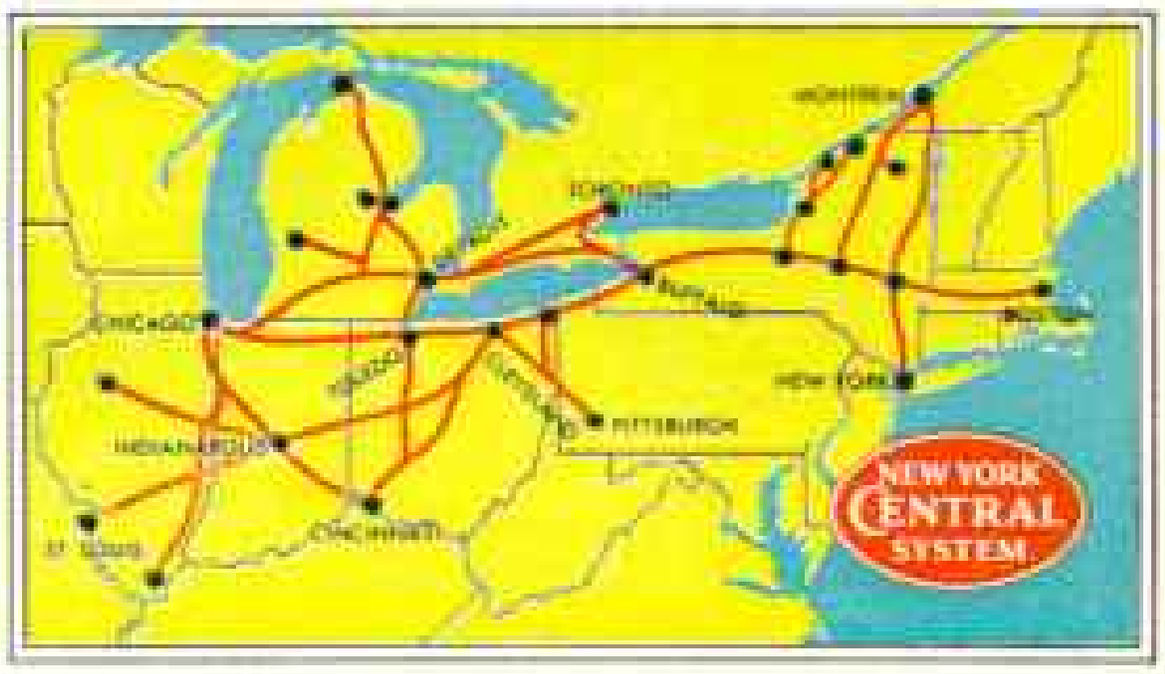
City.....*Zone*.....*State*.....

One by one, the windows close their eyes

. . . for a wonderful Water Level Route sleep

Nighttime on New York Central. Long ago, the last, leisurely dining car patron pushed back his chair with a contented sigh. Only a few night owls still chat over refreshments in the club car. One by one, shades come down and lights go out as this great hotel-on-wheels glides along gentle, low-level valleys. The guests, in their Pullman private rooms, drift off to slumberland . . . with a downy comfort and a deep-down sense of all-weather security no skyway or highway can match.

GOING OUR WAY? Throughout this area, you'll find New York Central streamliners and dreamliners to make your trips a daylight delight or an overnight vacation.



New York Central

The Water Level Route—You Can Sleep

The Bolex Stereo System includes taking and projecting lenses, screen, and two pairs of Polaroid glasses. ***$397.50****

Complete with Bolex H-16 DeLuxe camera. ***$715.50****

Stereo Close-up device permits true stereo close-ups. ***$67.50****

3-D or 2-D Movies for Christmas? Bolex offers both

No matter who it is you're camera-shopping for, Bolex is the surest-to-please camera you can give. Is it someone who wants thrilling 3-D today? Bolex brings it to them with Hollywood quality.

Is it someone who wants the ultimate in *2-D* now, with easy conversion to *3-D* later on? Again, give Bolex.

Give Bolex and you give such appreciated features as automatic threading, full eye-level focusing, unlimited forward and reverse hand winding . . . all of them *Bolex exclusives*, every one. They've made Bolex the camera most wanted by serious movie-makers. They've helped Bolex win 1953's top filming awards around the world. They'll rate *you* as No. 1 Santa with anyone who's hoping for a camera!

Bolex owners . . . receive regular free mailings of Bolex Reporter by registering serial numbers. Offer applies only to residents of U.S.A. Overseas subscriptions, $3.00 four issues.

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Outside U.S.A. write to Paillard, S. A. Ste. Croix, Switzerland.

Enjoy the finest in 16mm Movie Making with Bolex®

Bolex H-16 DeLuxe camera. Octameter finder gives automatic field of view for all lenses from 16mm to 6" telephoto. Eye level focus, automatic threading, footage counter, audible indicator, "C" mount turret. With Switar 25mm F:1.4 Kern lens $496.50*

****includes F. E. T.***

We're enjoying days of fun and rest on a

Glorious Quickie Vacation in the Southwest Sun Country

We didn't think we could spare the time or money until we put our plans in TWA's hands

For years Jim and I have dreamed of spending a vacation out here. But Jim could never get more than a week, and the Southwest seemed so far away . . . not to mention the expense. So naturally I was surprised when Jim came home one night last week and calmly announced, "Pack your bags, honey. We're Arizona bound!"

When I finally got him to stop teasing, he explained. Jim had to make a cross-country trip on business. And when he found out TWA's transcontinental routes also served the Southwest, he had an inspiration. "TWA's Family Half-Fare Plan* makes the trip so inexpensive for two, you can come with me and we'll enjoy a week's vacation down where it's warm and sunny on the way home after my meeting."

And that's exactly what we've done. TWA helped us plan our trip so that we could stop off here in Phoenix at no additional fare. We hired a car and toured the glorious Valley of the Sun. We've been up to Boover Dam. We've seen the Petrified Forest and Indian reservations. Yesterday Jim played golf. Tomorrow we're going on a trail ride up into the mountains.

Even the trip by TWA has been part of our vacation. Those big TWA Constellations fly so smoothly I nap like a kitten in my lounge chair. And the hostesses are ever attentive—bring you magazines, pillows, refreshments, anything you need for your travel comfort.

Here our holiday isn't over yet and we're already planning another va-

cation. TWA's 300-mph speed gets you places so quickly and TWA's Sky Tourist flights are so economical, Jim and I are talking about making another dream come true —on a TWA tour of Europe.

For complete information on TWA's popular "Quickie Vacations" see your travel agent; call, write or visit your nearest TWA ticket office.

Typical examples of TWA fares to Phoenix, Arizona

FROM	Sky Tourist fare	First Class Skyliner fare
NEW YORK	$94.00	$139.90
CHICAGO	69.00	95.60
KANSAS CITY	51.00	71.05
LOS ANGELES	18.00	23.75

ALL FARES PLUS TAX AND SUBJECT TO CHANGE WITHOUT NOTICE

*TWA's Family Half-Fare Plan is effective on all first-class TWA Skyliner flights Monday through Wednesday. One adult pays full fare; only one-half fare for each other family member (husband or wife, children over 2 and under 22).

Fly the finest . . . FLY TWA

TRANS WORLD AIRLINES

U.S.A. - EUROPE - AFRICA - ASIA

You're smarter than most businessmen

IF YOU GET 4 OR MORE RIGHT ANSWERS IN THIS IMPORTANT QUIZ

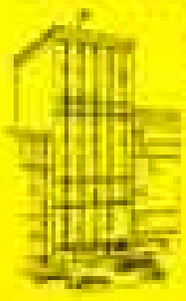
1. How often is there a fire in the United States?

- ☐ a. Every 30 minutes
- ☐ b. Every 26 seconds
- ☐ c. Every 11 minutes

2. How many firms that lose their accounts receivable and other records in a fire go out of business?

- ☐ a. 9 out of 100
- ☐ b. 17 out of 100
- ☐ c. 43 out of 100

3. How much protection is a fireproof building against destruction of business records?



- ☐ a. Stops fire before it can do much damage
- ☐ b. Simply walls-in an office fire, makes it hotter
- ☐ c. Complete protection

4. How "safe" are records in any safe that doesn't bear the Underwriters' Laboratories, Inc. label?

- ☐ a. Completely safe
- ☐ b. Safe from any serious damage
- ☐ c. Likely to be incinerated

5. What do you have to do to collect fully on fire insurance?

- ☐ a. Simply phone your insurance agent
- ☐ b. Prepare a "best guess" of losses
- ☐ c. Provide a "proof of loss" statement within 60 days, verified by records

6. Where do prices start for genuine MOSLER Record Safes—the name that means the world's best protection?

- ☐ a. $500
- ☐ b. $140
- ☐ c. $875

For correct answers, turn page upside down. ↓ 3-c 2-c 1-c 4-c 5-c 6-b

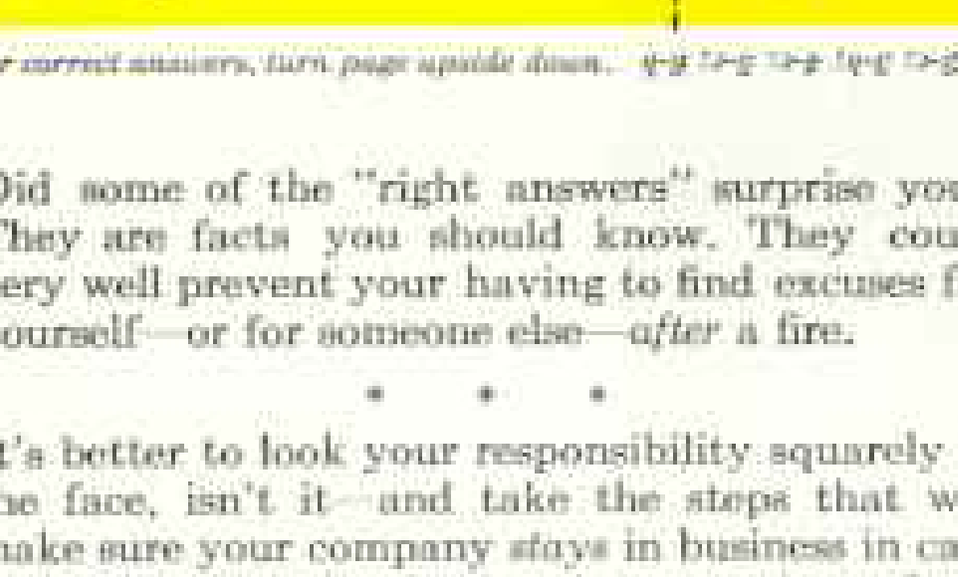
Did some of the "right answers" surprise you? They are facts you should know. They could very well prevent your having to find excuses for yourself—or for someone else—*after* a fire.

* * *

It's better to look your responsibility squarely in the face, isn't it—and take the steps that will make sure your company *stays* in business in case of an office fire. Remember—43 out of 100 firms that lose their business records in a fire go *out* of business. *Don't take that risk. For yourself. Or your company.*

Find out how little it costs to provide the world's best protection for your records—with a Mosler "A" Label record safe. See it. See the new modern styling that makes it a handsome addition to any office.

Check the new, exclusive Mosler convenience and security features, too, including the famous "Counter Spy" Lock. You'll know why, today, Mosler Safes are more than ever the largest selling record safes in the world. Consult classified telephone directory for name of your Mosler dealer, or mail coupon for FREE FIRE DANGERater, today.



FREE! FIRE DANGERATER. Tells you in 30 seconds how much protection your vital records need—to make sure you stay in business. Easy to use. Accurate. Authentic. Based on experience with thousands of fires. Considers over a dozen vital factors about your business. Gives you a reliable answer. Mail coupon for your DANGERater, now. Tomorrow may be one day too late. **FREE!** *No obligation.*

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Since 1848

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Please send me (check one or both):

- ☐ Free Mosler "Fire DANGERater" which will indicate my fire risk in 30 seconds.
- ☐ Illustrated catalog showing the new series of Mosler Record Safes

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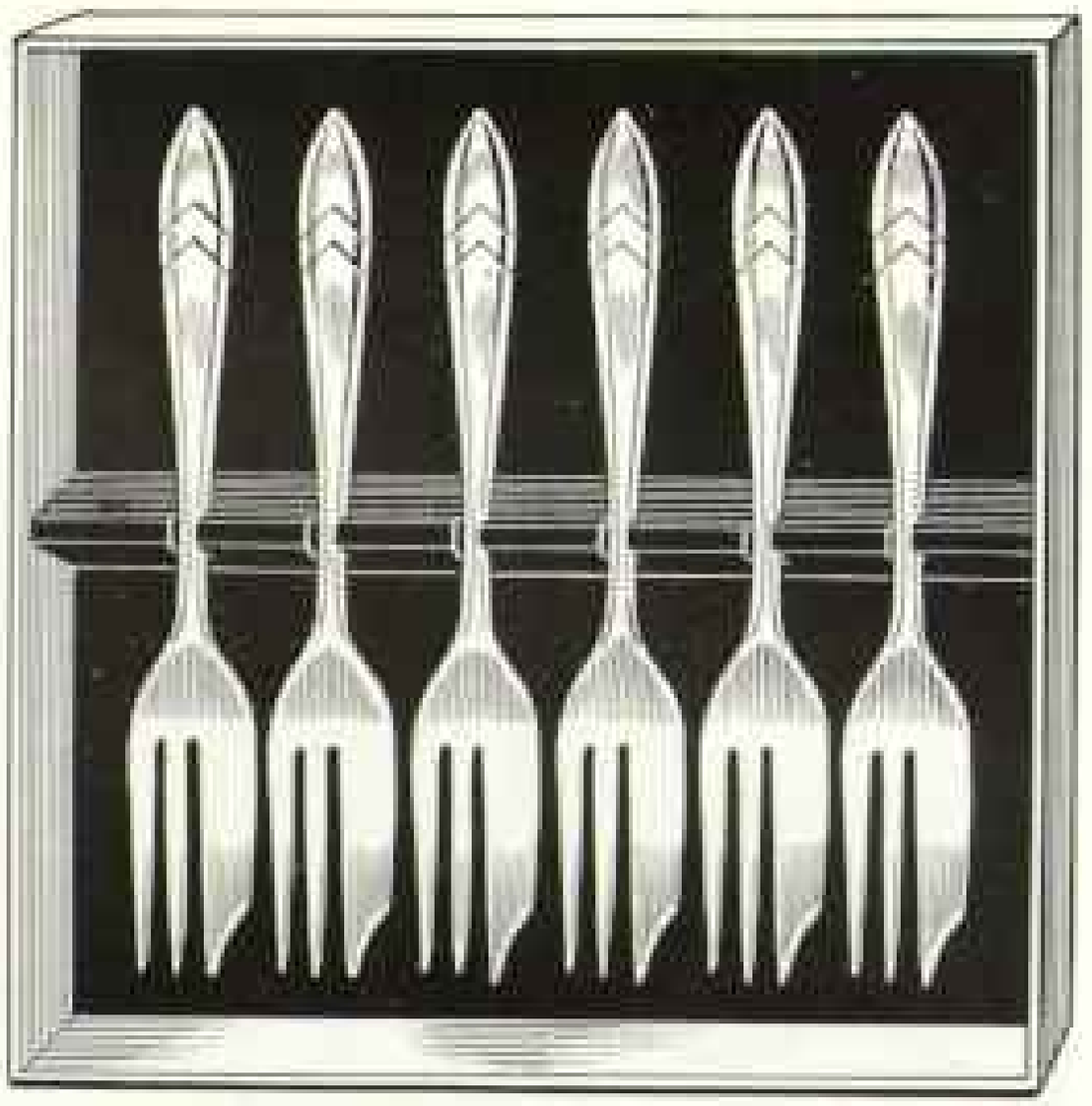
FIRM NAME .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

Yours without charge

– SENT DIRECT FROM SHEFFIELD, ENGLAND



THIS EXQUISITE 6-PIECE PASTRY FORK SETTING

IF YOU JOIN THE AROUND-THE-WORLD SHOPPERS CLUB NOW!

To demonstrate the quality and uniqueness of the Around-the-World Shoppers Club selections sent to members *every* month from abroad, we want to send you this beautiful 6-piece nickel silver Pastry Fork Setting, with our compliments if you join the Club now!

This is the famous LOXLEY set, one of the most honored products of Sheffield, and if obtainable here would probably be priced at $5.00 retail. It is typical of the values and quality of the gifts our members receive every month for only $2.00 each, *postpaid, duty free.*

Imagine yourself shopping in the tiny villages and the big cities of Europe, Asia, Africa, South America, the Near East and the Far East. Imagine yourself examining the hundreds of unusual articles peculiar to each land, many of them hand made, then selecting the very choicest in interest, usefulness, beauty and value, and having them sent to you for only $2.00 each!

Yes, you can now enjoy the thrill of receiving a surprise package every month from France, Italy, Spain, Holland, Sweden, England, India, Japan or some other distant shore—for only $2.00 delivered to your door. You pay no postage, no duty. The value is guaranteed to be more than satisfactory to you in every single instance.

How, you ask, can this be done? The secret is the new, unique service offered by the Around-the-World Shoppers Club—plus the magic of the American dollar. Foreign nations are in urgent need of dollars to support native industries. They are glad to offer tremendous merchandise values in exchange. Thus you get more for your money—and are lending a helping hand to our neighbors around the world at the same time.

Conversation Pieces From Abroad

Our representatives abroad are constantly searching for the best items and the biggest bargains available. They not only attend the great international fairs and exhibitions, but they travel the highways and byways of foreign lands to discover the unique, the unusual, the beautiful articles which are destined to become conversation pieces when worn, displayed or used in America.

With each package will come the fascinating story of the origin and significance of the article—adding glamour to each shipment.

A Thrilling Surprise Each Month

Think of the fun of receiving exotic "surprise packages" month by month! It is like shopping around the world! That is the thrill of Club membership. Each month you'll look forward to the arrival of your foreign shipment with eager anticipation. Each month you'll experience the crowning thrill of the treasure-hunter when you open it to see what delightful surprise it has brought!

Membership Costs Nothing

There are no membership fees or dues. You pay only for the regular monthly selections on the following plans: the 3 months plan (3 consecutive shipments for $6.00); the 6 months plan (6 consecutive shipments for $11.50); the 12 months plan (12 consecutive shipments for $22.00). All postage is paid, but the U.S. Post Office Dept. charges a fee of 15¢ for delivering foreign packages, which is collected by postman and cannot be prepaid.

You May Cancel At Any Time

You may cancel your membership at any time (please give 30 days' notice to allow for transmittal to our foreign offices) and the unused portion of your payment will be refunded in full. Even better, if you are not delighted upon receiving your first regular monthly selection, you may keep it *free of charge* along with your LOXLEY Pastry Fork Setting gift and receive a full refund of the total amount paid.

Extra Reward For Joining Now!

Why not start your membership right now, while you can have this EXTRA GIFT sent to you direct from Sheffield? Use the coupon to join—or write, enclosing your remittance for the membership term desired. Do it *today*; you won't want to miss a single shipment!

A WONDERFUL GIFT FOR SOMEONE!

What gift could be more intriguing than an Around-the-World Shoppers Club membership? Enclose names and addresses of your recipients; a beautiful card will announce your gift.

AROUND-THE-WORLD SHOPPERS CLUB, 71 Concord St., Newark 5, N.J.

READ WHAT MEMBERS SAY ABOUT THE CLUB

"I have enjoyed your 'international treasure hunt' so very, very much. I think a membership would make a wonderful present for someone!"—K.K.H., *Melrose Park, Ill.*

"The whole family gathers round when the latest package arrives. You are doing a wonderful job... Each gift is a real bargain!"—R.R.B., *Montville, Conn.*

"Just anticipating the coming of a 'surprise gift' has been great fun and a real lift!"—S.K.F., *Troy, N. Y.*

Around-the-World Shoppers Club, Dept. 733 FORK
71 Concord St., Newark 5, N. J.

Please enroll me as a Member and send me my LOXLEY Pastry Fork Setting direct from Sheffield, England *without charge*. Also start regular monthly shipments of the Club's selection of foreign merchandise, to be shipped direct to me through the following term of membership:

☐ 3 Months	$ 6.00	I enclose remittance
☐ 6 Months	11.50	
☐ 12 Months	22.00	for

Name

Address

City & Zone State

(Please use additional sheet for gift subscriptions)
Reference: Franklin-Washington Trust Co., Newark 2, N. J.

GIVE GRACE TO YOUR GIVING
GAIETY TO YOUR GREETINGS

Illustrated: Crane's Kid Finish; a man's box, 60 single sheets, 20 cards, matching envelopes; for her gift, 24 mini-notes, 24 letter sheets, matching envelopes. Christmas Notes stamped on Crane's Kid Finish, 10 mini-notes and envelopes in each box.

with Crane's Fine Papers and Crane's Christmas Notes. Crane's for Christmas is the gift that expresses your thoughtfulness in the best of taste . . . for Crane's are papers of exquisite texture . . . smartly styled . . . beautifully boxed. For your own greetings . . . enjoy the gaiety of Crane's Christmas Notes . . . richly stamped in reds, greens, golds, from exclusive designs. Now ready for the pleasure of your choosing at leading stationers and stores.

Crane's FINE PAPERS • MADE IN DALTON, MASSACHUSETTS • SINCE 1801

100% ALL RAG PAPERS FOR SOCIAL AND BUSINESS CORRESPONDENCE • CURRENCY • EXPOSITION • BONDS • TRADING

► THERE ARE three beautiful, *beautiful* books in the portrait on the right. They have been out-of-print for seven years. They are not only beautiful books, they are also *famous* books. They are "fictionized biographies" of three of the greatest painters that ever lived. One is Irving Stone's classic story about Vincent Van Gogh, *Lust for Life*. The second is Hendrik van Loon's classic story about Rembrandt, *R.V.R.: The Life and Times of Rembrandt van Rijn*. The third is Dmitri Merejcovski's classic life of Leonardo, *The Romance of Leonardo da Vinci*.

These famous Heritage editions are profusely illustrated *from the works of the painters themselves!* The illustrations are arranged so that they appear at the proper points in the stories of the painters' lives; and they are wonderfully reproduced, too: by three different processes!

Those many collectors who have been advertising widely to locate copies of these books, will now be happy to learn that we are planning new printings of all three. These will soon be on sale in the shops for $11.85 per set.

But there is a special reason why this news will make *you* happy too. For a copy of each book is going to be given to each new member of The Heritage Club, to inaugurate a new system of Bonus Books—in the bi-monthly distribution of which, even a limited number of Trial Members are going to share!

Yes, we will *give* you a complete set of these three beautiful, *beautiful* books—if you obtain a Trial Membership in The Heritage Club at this time. Why?

► WELL, in the first place, we have persuaded the mills which produce our fine papers to increase their allotment to us—with the result that, of six of our recent publications, we have obtained from the printers about a thousand extra copies. So we have decided to take in one thousand new members—to *try* the Club for just six books.

And, in the second place, we want to enroll this limited number of people with an even more limited expenditure: by offering this irresistible inducement to *you*, to become one of these new members. For if you do, you will not only obtain FREE BONUS copies of the three "fictionized biographies"—but also, during the coming six months, six beautiful, *beautiful* books—at the same price as ordinary rental library fiction.

► YOU WILL OBTAIN a copy of *The Complete Anderson:* all of Hans Christian Andersen's 165 stories in one enormous volume, translated by Jean Hersholt and illustrated in colors by Fritz Kredel; and *The Book of Job* with the wonderful miniature-paintings by Arthur Szyk; and *The Essays of Ralph Waldo Emerson*, the First and Second Series in one volume; and *Nicholas Nickleby* by Charles Dickens, profusely illustrated by Steven Spurrier; and *The Georgics of Virgil* with wood-engravings by Bruno Bramanti; and the great Dutch book, Erasmus' *Praise of Folly*, actually printed in Holland!

Or if any of these books should not interest you, you may choose substitutions out of a long list of other Heritage books-in-print. Then, after the trial period, you can decide whether you want to continue your membership. Obviously, we think you will!

► FOR THE MEMBERS of The Heritage Club obtain those "classics which are our heritage from the past in editions which will be the heritage of the future." Yet each of these books costs each member only $3.65! or *only $3.28* if payment is made in advance!

A Prospectus is now ready. You are invited to send for a copy. One of the remaining Trial Memberships will then be reserved for you—and also a complete set of the three Bonus Books. Never in the history of book publishing has a greater bargain been offered to wise buyers of books. The coupon printed here enables you to put this statement to the test:

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say Maj. and Mrs. FREDERICK J. ROEHS *of College Park Mobile Homes, Orlando, Fla.*

WITH SHUFFLEBOARD COURTS, landscaped walks and even a lake of its own, recently opened College Park Mobile Homes is one of Florida's most attractive trailer parks. Here retired couples enjoy happy days together the year around. Guests also have the use of a golf course, swimming pool and recreation rooms of a nearby country club.

COVERED PATIOS are easily added and make pleasant, shady spots to lounge and entertain friends. Park's large, palm-planted lots are arranged to give each mobile home maximum privacy. Telephone service is available to every lot, park provides water and electricity.

Priced from $2000 to $6000

Including furnishings, the new MHMA trailer coaches offer attractive, mobile and moderately priced homes perfectly suited to the needs of retired couples. An MHMA coach is a mobile home made by a member of the Mobile Homes Manufacturers Association, *the leaders of the industry*, pioneering improved designs, building dependably to high standards.

FREE NEW BOOK

Complete information on the newest MHMA mobile homes. Write MHMA, Dept. N-113, 20 North Wacker Drive, Chicago 6, Illinois.

"Last year," says Mrs. Roehs, "we visited friends in a trailer park, and I saw how easy and comfortable their way of life was, and what interesting, friendly people their trailerist neighbors were. From that day on I wanted a mobile home." And Maj. Roehs says, "I wanted to see more of America after I retired from the Air Force. This way we can go where we like and always be at home with our own things."

More and more couples find that they are able to retire younger because of the economy of mobile living. Modern MHMA mobile homes and well-equipped, landscaped trailer parks around the country give them complete comfort in beautiful surroundings.

THE ROEHS' HANDSOMELY FURNISHED LIVING ROOM also serves as second bedroom. Couch unfolds into double bed, sliding partition separates room from rest of couch. Rear bedroom has permanent double bed, built-in dresser and closet. Couch is insulated throughout, has automatic heat. MHMA mobile homes are designed for easy housekeeping, so that housewives, too, can retire. Park provides trim buildings with washer, driers and enclosed drying yards to simplify laundering.

"MY KITCHEN IS MORE MODERN than any other kitchen I've ever had," says Mrs. Roehs. "And everything is right at my finger tips." Kitchen has streamlined sink with continuous counter space, latest gas stove and electric refrigerator. Bathrooms in MHMA coaches are complete with wash basin, toilet and tub or shower.

Glide by Canadian Pacific train —through glorious CANADA

land of vacations unlimited.

Roll across Canada by Canadian Pacific train. Picture views all the way. *Breathe in* the charm of Québec in a horsedrawn calèche... *relax at* Château Frontenac in fine hospitality. Nearby, *take in* the Laurentian resorts this fall. *Shop in* metropolitan Montreal. *Stop in* Ottawa, stately capital...take color "snaps" of colorful "Mounties."

Scenic! The 3,000 miles of Canadian Pacific rail, from green Atlantic to blue Pacific. Views of flame-colored countryside, green forests, shining snow peaks. Fine service...it's *Canadian Pacific!*

Spin westward by Canadian Pacific through autumn pageantry of lake-and-woods...fertile prairies... oil-rich, booming cities...to nature's scenic spectacle, the Canadian Rockies. Canadian Pacific *Diesels* travel through over 600 miles of world-famous mountain scenery. The Banff and Lake Louise areas offer thrilling sport.

Never-to-be-forgotten train scenes as you coast to Canada's Evergreen Playground—Victoria, British Columbia. Stay at the famous *Empress*, hospitable hotel in a 10-acre garden...swim in the largest sea pool under glass! Enjoy year-round golf.

Ask your agent about White Empress sailings to Europe...fast airliners to the Far East, New Zealand and Australia.

Canadian Pacific

Agents in U. S. and Canada

Canada is news! See it by Canadian Pacific.

EYES PROVE

EYES PROVE

G-E voted best picture 7 to 1

Model 21C225

GE BLACK-DAYLITE TV WITH Ultra-Vision

SEE the leading TV makes side by side and you'll know why G-E Black-Daylite TV with Ultra-Vision is *voted best picture 7 to 1 nation-wide*. G-E is the world's first 21-inch TV with high-contrast Aluminized Picture Tube. You enjoy blacker blacks, whiter whites—TV's brightest, sharpest picture. Let your eyes prove it! See G-E today. G-E gets every station in range—UHF and VHF. *General Electric Co., Syracuse, N. Y.*

G-E TV prices start at $179.95. *Includes Federal Excise Tax, one-year Factory Warranty on picture tube, 90 days on parts. Prices subject to change without notice. All-channel UHF extra.*

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Comedy Theatre presents
RAY MILLAND
in "Meet Mr. McNutley"
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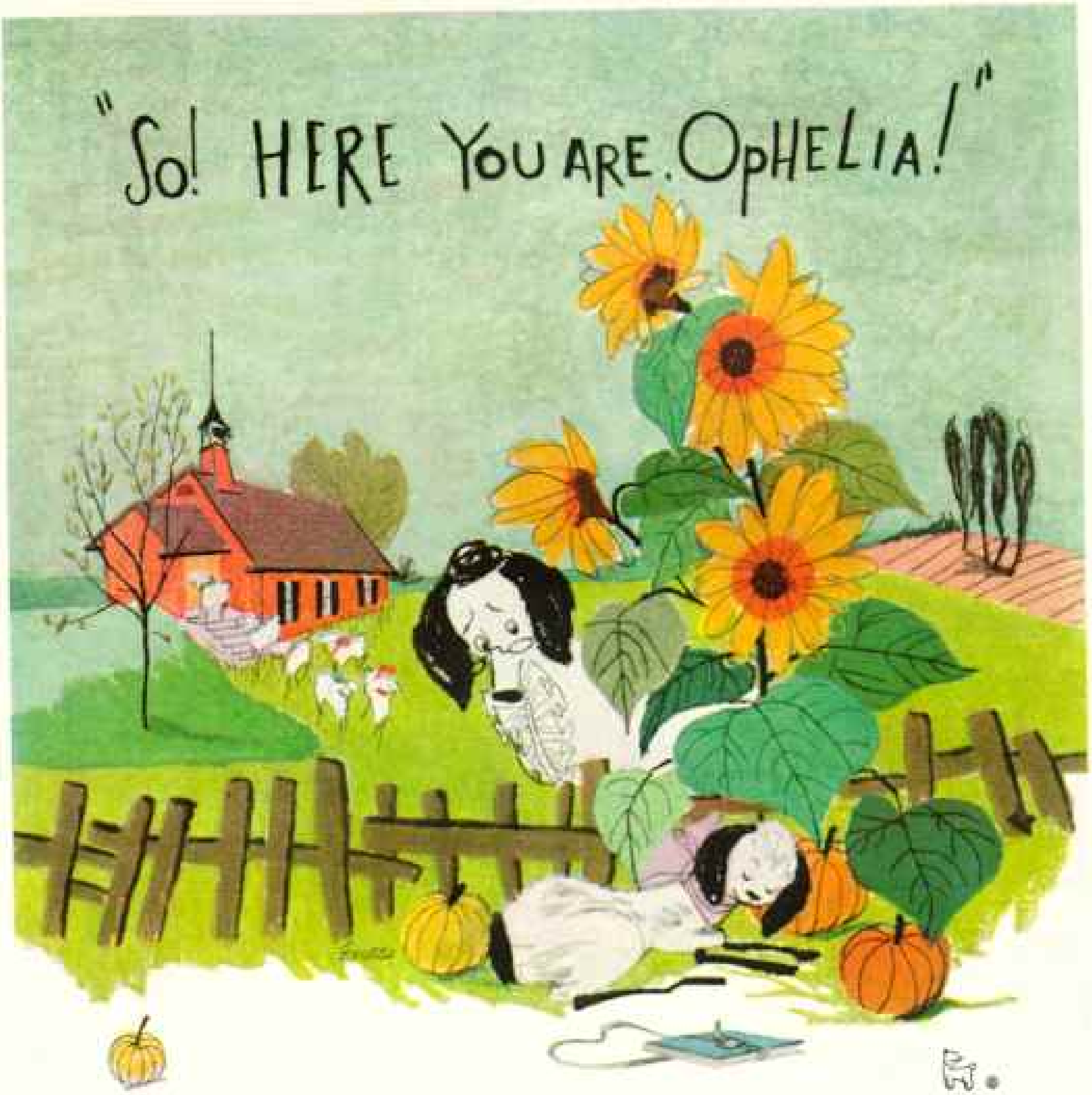

"You're not asleep. You're faking there
among the pumpkins, under the sunflower tree.
I know because once I took a last, sweet taste of free
outdoors, myself. I thought: 'Let the foolish ones learn
how to grow the finest, strongest fleece!'
When the St. Marys man came he took their
fleece and he rejected mine. It was the most terrible
day of my life...and I won't let it
happen to you! Wake up now and come along..."

One irreplaceable part holds the secret of better television

You may find it difficult to name the irreplaceable part in a new 1954 Zenith television receiver.

For it is not among the coils and condensers pictured here. Nor is it one of the tiny, sensitive tubes that govern the beauty of the picture you see and the steady clarity of the tones you hear.

The irreplaceable part is the Zenith crest. You'll find it on every Zenith Television Receiver . . . symbol of the Zenith ideal—to build *every* television receiver to one *standard* of quality—the highest attainable.

Like 14 carat gold the Zenith crest always stands for the same kind of quality. It is the reason you can be sure of better TV whether your Zenith costs $179.95* or $1250*.

ZENITH RADIO CORPORATION, Chicago 39, Illinois

ZENITH

The royalty of radio and TELEVISION

Backed by 35 Years of "Know-How" in Radionics Exclusively
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New 1954 Zenith TV brings you the really new things you want

Brilliant new Zenith Cinébeam picture tubes bring you big, clear pictures—beautifully in focus over every inch of screen. 21, 24 and 27-inch screens.

Zenith's exclusive new Sandshell Speaker. Pops up and beams sound right at you, like consoles do.

Your choice of TV's 2 best ways of tuning. Zenith's famous one-knob UHF-VHF Turret Tuner now teamed with a revolutionary new Zenith Continuous All-Channel Tuner brings you fast, faultless tuning of all 82 channels. (Continuous Tuner, optional and extra.)

Large, lighted channel numbers on Zenith's Spotlite Dial for exclusive Turret Tuner. Lets you see which channel you're tuned to at easy-chair range.

In addition Zenith's "Lazy Bones" Remote Control lets you change channels without leaving your chair. And Zenith "Private Phone" TV earphones give you personal TV volume control. (Both optional at slight extra cost.)

The Zenith Nocturne—$499.95* Model L2267Y, in Ebony finished veneers, solids. 21-inch Zenith Cinébeam picture tube. *Manufacturer's suggested retail prices (subject to change) include Federal Excise Tax and Parts and Tubes Warranty. Slightly higher in South and Far West.

Buy U.S. Savings Bonds

5 out of 5 preferred

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the smartest distance between two points

Every bus traveler questioned in recent surveys preferred Thru Buses with no change enroute. It's so convenient for your holiday travel . . . You board a TRAILWAYS THRU-LINER and ride straight thru to your destination without a change or transfer of baggage . . . You keep the same wide reclining seats and forget the heavy holiday traffic worries.

So do as millions do . . . call your friendly Trailways agent first the next time you decide to take a trip . . . enjoy TRAILWAYS THRU-LINER luxury at no extra cost.

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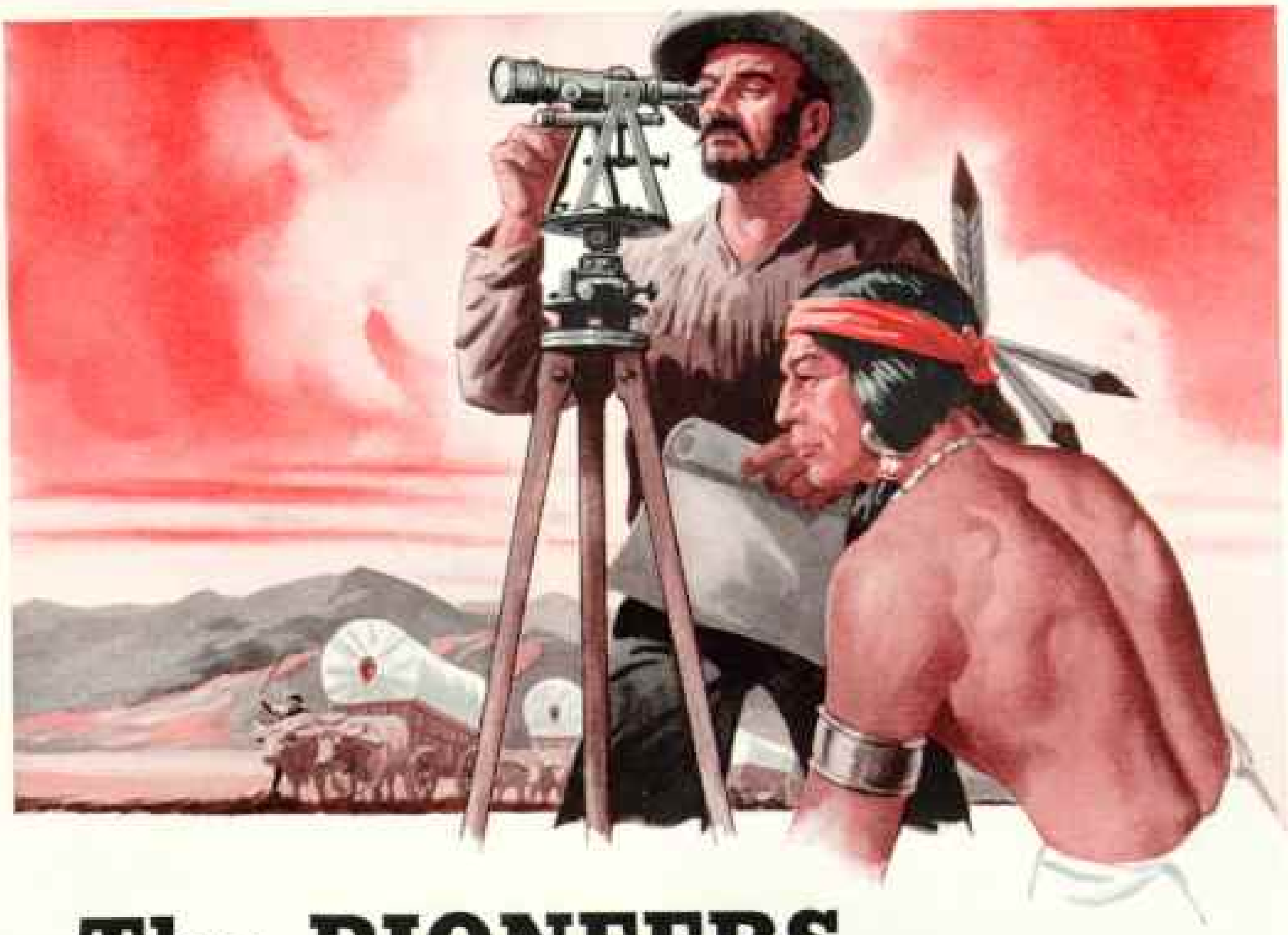

The PIONEERS came forward...

We think of pioneers as those courageous people who despite danger and hardship fought their way through forest, across prairie and desert—ever expanding the frontiers of our nation.

However, in the cities there also were pioneers. They were men whose courage and vision helped expand our economic frontiers.

Among these were the foresighted businessmen who established an industry vitally important to the growth of our nation—INSURANCE!

This year seven American insurance companies, two of which belong to the America Fore Insurance Group, are celebrating their 100th anniversaries.

Their founders had foresight and courage. They, too, were pioneers!

The Continental Insurance Company

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100 YEARS

1953 marks 100 years of proven insurance protection by two America Fore Companies, The Continental and the Fidelity-Phenix.

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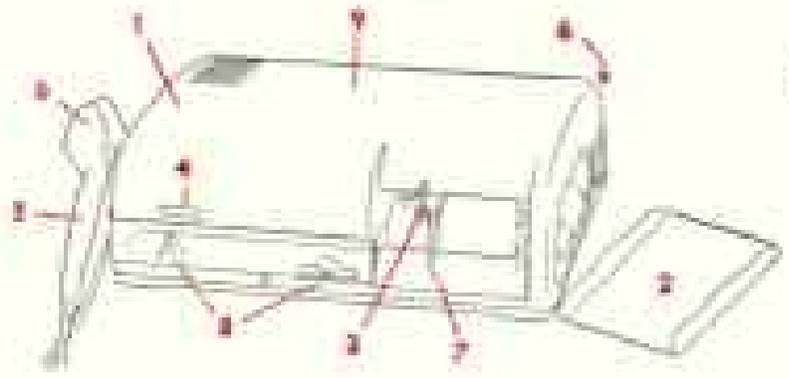

No other dictating machine ever built offers you all these features!

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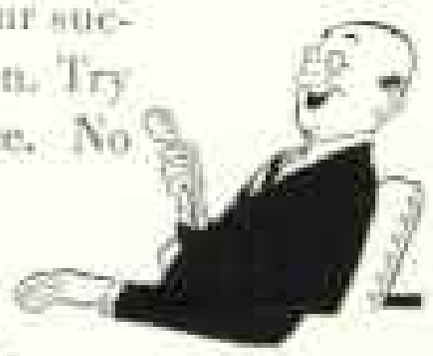
A personal message to every busy man who wants to get the best out of himself

• **If you never** have to get your thoughts on paper at all—you don't need *any* dictating machine.

BUT if it's vital for you to get across the very best that's in your mind, you need this personal electronic partner: the Dictaphone TIME-MASTER "5."

This latest, lightest, finest model of the revolutionary TIME-MASTER can actually help you to *think better, communicate better, get more done in less time.*

Perhaps more than people in business realize, men are measured by what they *communicate.* Your success *depends* on effective communication. Try the TIME-MASTER "5" in your office. No obligation.



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makers of the TIME-MASTER
the #1 dictating machine

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STALKING BIRDS WITH COLOR CAMERA: Many secrets of our avian friends are revealed in this beautiful book. Acclaimed by reviewers and thousands of bird lovers, it presents a new high in wildlife illustration.

Among its 328 pages are 189 pages of NATURAL COLOR (331 photographs, many in full-page size). Most of them were taken within arm's reach of the wild subjects, including 1/5000-second flash pictures of birds in flight.

Edited by Dr. Gilbert Grosvenor, this volume is a result of Dr. Arthur A. Allen's many years of research and expeditions, sponsored in great part by the National Geographic Society. Not just a "bird guide," it is a treasure of "inside information" on habits and behavior.

As first cost was borne by the NATIONAL GEOGRAPHIC, *Stalking Birds with Color Camera* is moderately priced at $7.50 in United States and Poss.; elsewhere, $7.75 in U. S. funds. Postpaid. Rich green covers, 7" x 10¼".

THE BOOK OF FISHES: The new, color-illustrated edition of this famous book adds extra pleasure to the sport of rod-and-reel veterans, and opens a fascinating new world to those who have never wet a fly or cast a plug.

Its 340 pages are an intensely interesting search into life cycles of the countless hosts of creatures living beneath the waves in a savage world of eat and be eaten. It is packed with high adventure and practical fishing hints.

A grand total of 159 FULL-COLOR pages bring 116 COLOR PAINTINGS—with biographies—identifying 236 species of game and food fishes and other aquatic life in United States salt and fresh waters.

A delight to read and to own, *The Book of Fishes*, edited by John Oliver La Gorce, is bound in maroon and gray, 7½ x 10¼". Because first cost was borne by The Magazine, it is modestly priced at $6.50 in United States and Poss.; elsewhere, $6.75 in U. S. funds. Postpaid.

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A comfortable writing Esterbrook Pen and matching Push-Pencil. (Push the top to feed the lead.) Pencil holds 12 sticks of lead. Writes for months without reloading. Choice of regular or thin lead models.

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YOU'LL have fun all the way if you ask for the streamliner *Golden State* when you make your reservations. Choice of luxurious Pullman rooms or low-cost Chair Car accommodations. It's the extra fast, smooth, low-altitude way West, via El Paso, Douglas, Tucson (33 hrs.), Phoenix (35½ hrs.), Palm Springs. Through cars from Minneapolis, St. Louis, also.

COFFEE SHOP on the *Golden State* serves as lounge for Chair Car passengers between meals.

STOPOVER for fun and sunshine in the resort and guest ranch country of Southern Arizona. Returning, try another of S. P.'s great fun routes. Send for folder that tells how.

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AMERICA'S MOST MODERN TRAINS

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Please send me, free, your full-color book, "Wonderful Ways West."

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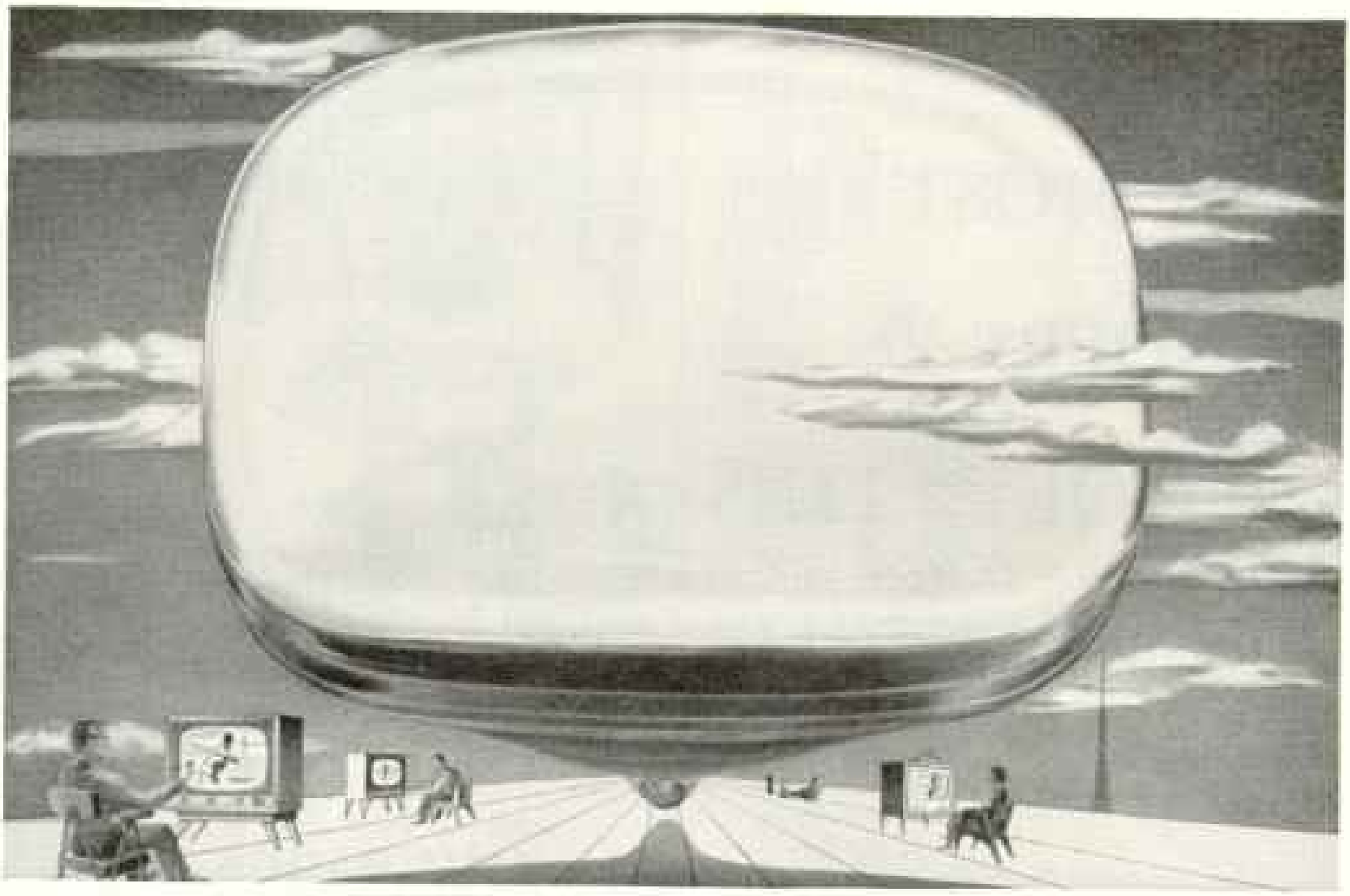


How the World Series got into millions of living rooms

IF YOU are ever faced with a sudden need for *lots* of things for some new product, remember the production miracle behind your TV set.

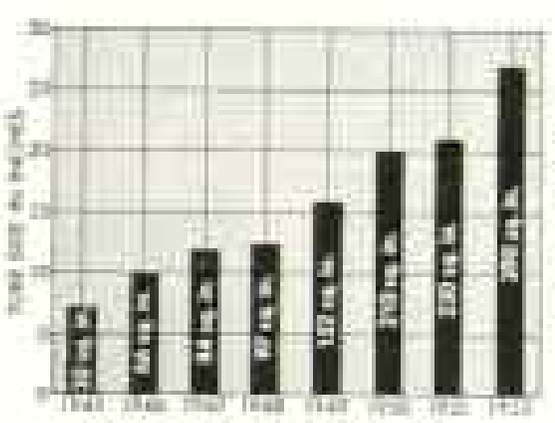
In 1946, the nation was hungry for television. But only nine thousand 7" picture tubes were produced for the entire industry. No one knew how to produce—in volume—glass parts of the required size, shape and quality.

The problem was brought to Corning Glass Works. To find the solution, Corning had to develop a new glass . . . had to improve controls . . . had to build new machines . . . had to invent wholly new manufacturing methods. This included a revolutionary, new spin-casting process which swirls molten glass into odd shapes accurately, fast, and at reasonable cost.

To keep up with mounting demands, Corning built a completely new plant and wholly revamped another. As a result of this program, Corning continues to be a major supplier of the TV industry which this year will require—and get—about eleven million picture tubes, many of them as large as 27".

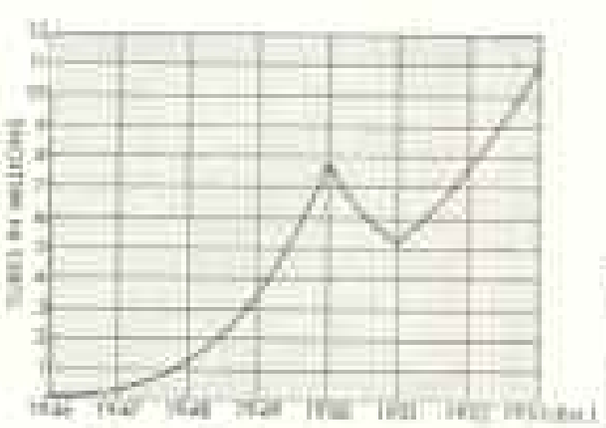
What this means to you is as clear as Corning's optical glass. Corning research and manufacturing are ready to apply to your problem the same skill and effort which speeded the growth of television and many other industries.

To find out how others are using glass by Corning, write for your copy of the illustrated booklet, "Glass and You."



INCREASE IN SIZE OF PICTURE TUBES

Until 1950, most of the TV tubes produced were no larger than 17". Since then, sizes have been increased up to 27"



INCREASE IN VOLUME OF PICTURE TUBES

Since 1946, the sale of TV picture tubes has increased about 1222 times, according to recent industry figures.

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Corning, New York

Corning means research in Glass

CORNING GLASS WORKS, 151 Crystal St., Corning, N. Y.

Please send me a copy of your new brochure, "Glass and You."

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Company _____

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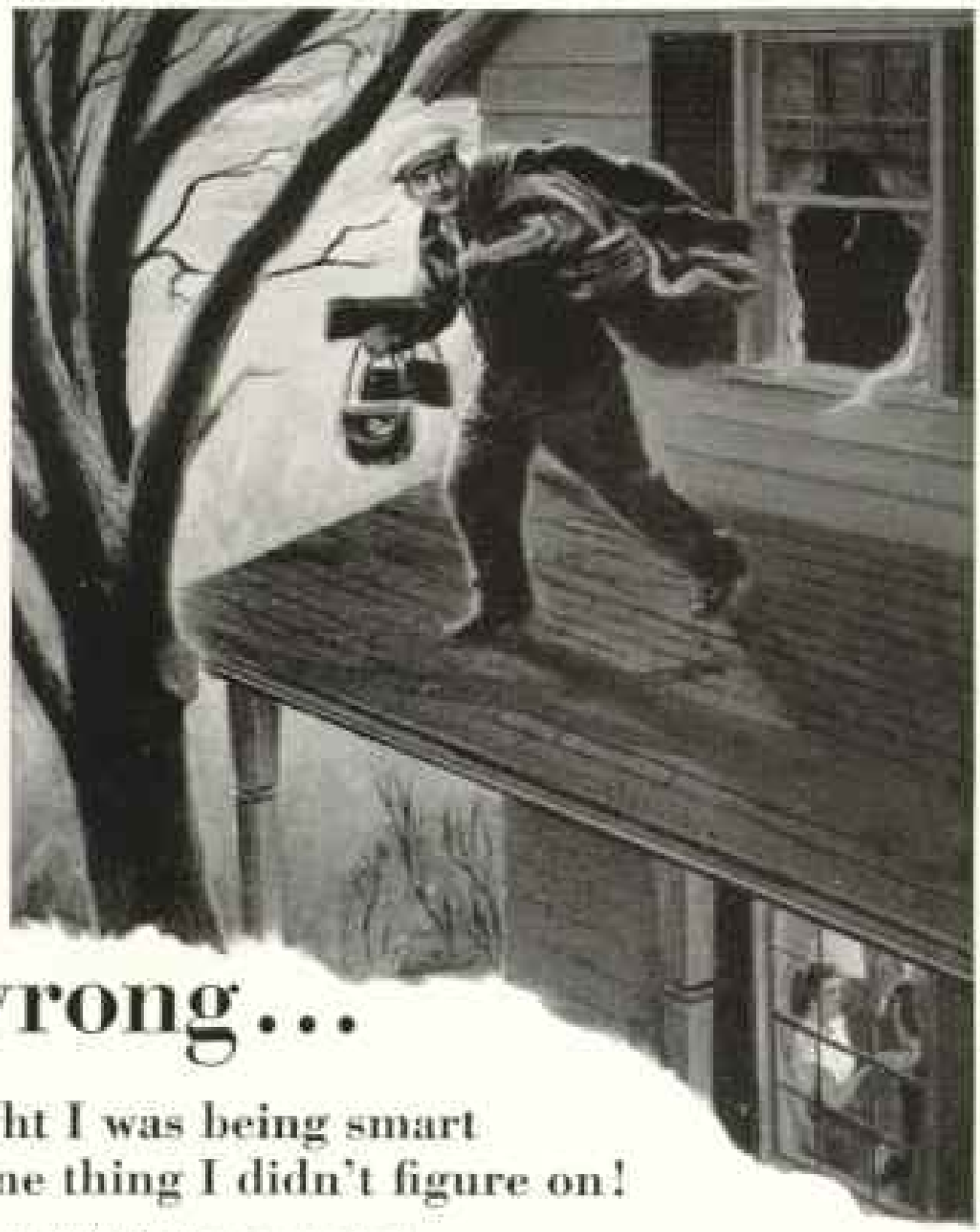


A second-story specialist proved me wrong...

I'd thought I was being smart but there was one thing I didn't figure on!

(A story typical of what happens every day)

Do you think *you're* pretty safe from sneak thieves and burglars? I thought *we* were.

We've double locks on downstairs doors and windows. No matter what the hour, there's always someone home. As for second floor windows, no thief could get into one without being heard.

At night all the upstairs rooms are occupied. And our very alert watchdog guards the hall. So, why spend money for insurance?

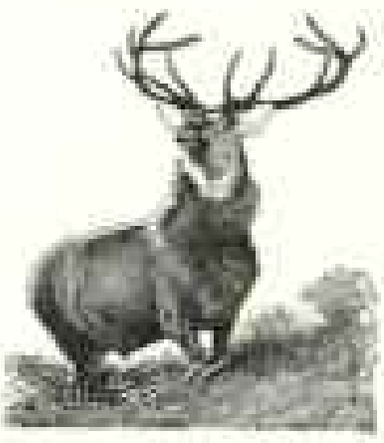
Why? Because of what you can't figure on. That party, for example. Rex was with us . . . downstairs greeting the guests. With so many folks talking and laughing, nobody heard the prowler. Our loss was heavy and all my fault. I never should have decided "It can't happen here."

Don't be guilty of this mistake yourself. You can't make your home *thief-and-burglar*-proof, but you can make it *loss*-proof.

Hartford Residence Theft and Burglary Insurance makes good your losses from burglary, hold-up and other forms of thievery. Expensive? No; it costs only a few cents a day. So, don't put off calling in your Hartford Accident and Indemnity Company Agent or your insurance broker.

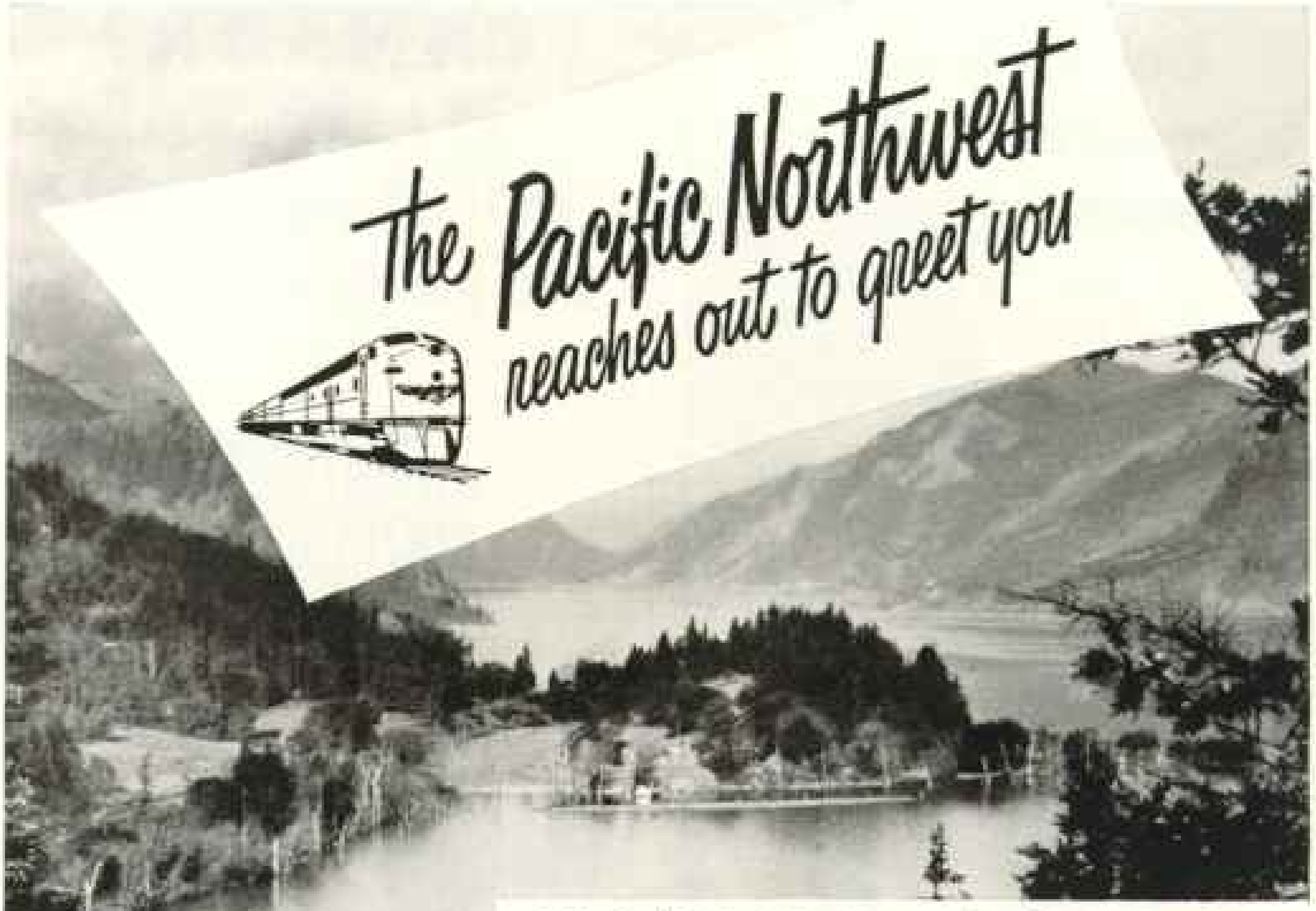
Or, write us direct for a free copy of "Simple Facts About Hartford Residence and Outside Theft Insurance."

Year in and year out you'll do well with the **Hartford**



Hartford Fire Insurance Company • Hartford Accident and Indemnity Company
Hartford Live Stock Insurance Company • *Hartford 15, Connecticut*

The Pacific Northwest reaches out to greet you



Union Pacific trains follow the magnificent Columbia River Gorge.

For 200 miles the Columbia River Gorge stretches out along the Union Pacific route to greet you with scenic splendor; a preview of the breath-taking beauty of the Pacific Northwest.

And going by train—by Union Pacific—there's nothing to distract your attention from the passing panorama. You're completely at ease, relaxed, and *you save money!*

The Streamliner "CITY OF PORTLAND" provides the fastest, through service between Chicago and Portland with through Pullman to Seattle.

Between St. Louis-Kansas City-Denver and the Pacific Coast, there's the Streamliner "CITY OF ST. LOUIS." No *extra fare* on either train. For smooth, safe, enjoyable travel—go Union Pacific.

One of the many pleasures in traveling by Union Pacific is the enjoyment of dining-car meals. The menu offers a choice of fine, fresh foods prepared by an experienced chef and graciously served.

UNION PACIFIC RAILROAD

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I am interested in a train trip to the Pacific Northwest. Please send free booklet.

Name_____

Address_____

City_____ Zone____ State____

If student state age____ and special material will be sent.

Wheels for the Working World

Everywhere you turn, today, you see machines on the move. Machines that lift. Machines that dig. Machines that haul. All multiplying, many times, the power of a man. And every year sees their variety expanding as invention finds new ways to bring power to a job.

The consequences of blending imagination, design and materials cannot be foreseen. But we now know that the development and promotion of the steel wheel by Budd, more than a generation ago, has added immeasurably to human welfare wherever there's a highway and wherever there's work to be done.

The Budd Company, Philadelphia, Detroit, Gary.

BUDD

PIONEERS IN BETTER TRANSPORTATION

Pick a pack of postcards!

(Written aboard the most talked-about train in the country, of course!)

Dear Jack,

Talk about fun! Between sightseeing upstairs in one of the five Vista-Domes and chatting with folks in the lounge cars, I have not even had time to open that book you gave me. This California Zephyr is some train!

Jane

Dear Rachel,

You know how fussy I am about food. Well, tonight we had some roast beef in the Dining Car that was simply wonderful. Cooked just right and served hot. And we could not get over how reasonably priced it was.

Betty

Dear Dan:

These Vista-Domes are perfect for camera nuts like me! And what terrific scenery! This morning we went through the Colorado Rockies and tomorrow we go over the High Sierra via Feather River Canyon!

Jim

THE VISTA-DOME

California Zephyr

Daily between Chicago and San Francisco via Omaha, Denver and Salt Lake City on the Burlington, Rio Grande and Western Pacific Railroads

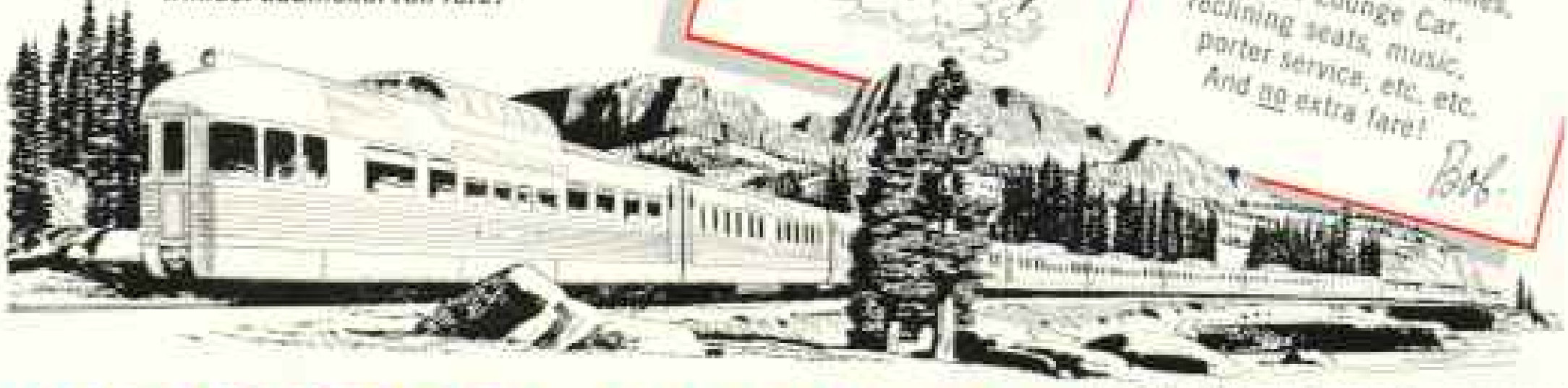
(Chair Cars and choice of Pullman accommodations)

Include Southern California via San Francisco without additional rail fare!

Dear Mac:

What a train! And what a bargain! Chair Car passengers really travel in style aboard this streamliner. Three Vista-Domes, Buffet Lounge Car, reclining seats, music, porter service, etc. etc. And no extra fare!

Bob



WESTERN PACIFIC

For colorful California Zephyr booklet, write Joseph G. Wheeler, Passenger Traffic Manager, Western Pacific, 526 Mission St., San Francisco 5, Calif.

Foreground: Chevrolet's beautiful Two-Ten 4-Door Sedan. Background: The thrilling Bel Air Sport Coupe.

Why so many more people are buying Chevrolets than any other car . . .

It so often happens that new friends and new neighbors like those in our picture find a common meeting ground for conversation in their choice of a Chevrolet.

But that's not at all surprising when you consider that, year after year, more people *buy* Chevrolets than any other car. And this year the preference for Chevrolet is greater than ever. Latest available figures for 1953 show that over 200,000 more people have bought Chevrolets than the second-choice car!

The point is that the things *they* like about Chevrolet are things *you'll* like, too.

For example, they like Chevrolet's thrifty, spirited, high-compression power and beautiful, durable Body by Fisher—and so will you.

They like the extra convenience of Chevrolet's responsive Powerglide automatic transmission* . . . the extra handling ease and driving safety offered by Chevrolet Power Steering*—and you'll agree.

And there's much, much more you'll like about Chevrolet—*the lowest priced line in the low-price field.*

Now's a good time to see your Chevrolet dealer. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

**Optional at extra cost. Combination of 115-h.p. "Blue-Flame" engine and Powerglide available on "Two-Ten" and Bel Air models only. Power Steering available on all models.*

MORE PEOPLE BUY CHEVROLETS THAN ANY OTHER CAR!

CHEVROLET

FALSE TEETH OFTEN HAVE A CERTAIN ODOR!

Keep Teeth Naturally White and Free from Offensive Odor—Without Brushing!

Your dental plate material, 60% softer than natural teeth, is easily scratched by brushing with toothpaste or powder. These scratches allow food particles, other impurities to collect faster, cling tighter, causing denture breath.

So, starting today—and every day, clean your plates the way more dentists recommend—with Polident. A soak—a rinse—a clean, fresh mouth! Your teeth stay naturally white, and odor-free.

No danger from abrasive wear and tear. No danger of Denture Breath! Get Polident today. Guaranteed to satisfy, or money back.

World's Largest Selling
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POLIDENT

Recommended by More Dentists Than Any Other

BALANCE is important in DIABETES, too . . .

IN A WAY, the skillful performer on the tight wire and people with diabetes have certain things in common.

The performer depends principally on proper balance and control to accomplish his difficult act. Likewise, diabetics must be equally concerned with balance and control . . . if they are to live nearly normal, active lives.

The three essential factors which diabetics must keep in proper balance are diet, exercise, and insulin.

1. Diet is a vital part of the treatment of every diabetic. In many mild cases, *especially when diabetes is discovered early*, diet alone can control the disease.

2. Exercise, or active work, is also important in the treatment of diabetes, because it helps to increase the ability of the body to use sugars and starches.

3. Insulin does not cure the disease, but it has often given diabetics a new lease on life. Insulin enables diabetics to utilize food and convert it into energy in a normal way.

New and different types of insulin, which vary in speed and duration of action, now make possible more effective control of diabetes. Many research studies are now under way to learn more about the chemistry of insulin and how it is used by the body. These and other investigations will probably bring an increasingly hopeful outlook for most diabetics.

When diagnosed early, diabetes is easier to control, and serious complications can often be avoided. Fortunately, diabetes can be readily detected by having a urinalysis . . . preferably with your periodic health examination. This usually permits its discovery before the appearance of typical symptoms, such as: *excessive hunger or thirst, frequent urination, loss of weight, or constant fatigue.*

No one should neglect regular medical examinations . . . particularly *overweight people who are past 40 and also those with a family history of diabetes.*

Metropolitan's booklet called "Diabetes" tells how diabetics can usually live long and active lives. It also includes facts about the progress made by medical science in the treatment of diabetes, and information which may be helpful in guarding against this disease.

is not a banker . . .

yet is a specialist who can give you expert advice on your future security?

is not a doctor . . .

yet is a trusted consultant to whom many a family owes its continued well-being?

is not an architect . . .

yet spends his life blue-printing plans to help people build for the future?

He's a useful sort of man to know . . . and you'll find him in thousands of communities across the country.

He's your local Travelers agent or broker—always available to sit down with you, to work out the plan of personal or business insurance that exactly fits your needs.

Why not get in touch with him? If you don't know the name and address of The Travelers man nearest you, just drop us a line.

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new SNORKEL pen

WORLD'S FINEST PEN ~ YET NOT A COSTLY GIFT

World's ONLY clean-filling pen ...from $7.50

Sheaffer's is universally recognized as the *quality* pen. The name is known and respected the world over. Yet Sheaffer's are priced so anyone can give this prestige ...this craftsmanship and flawless performance. For the finest gift of its kind— a gift that speaks deep esteem—give Sheaffer's.

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For the man who wants his movies BIG . . . Give this 16mm. Royal Magazine Camera by Kodak. Makes possible movies up to 10 feet wide or even larger. Advanced movie-camera features, plus the superlative Ektar Lens.

CINE-KODAK ROYAL MAGAZINE CAMERA, $176.25

For those closest to your heart...

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Here for your Christmas giving is a collection of superb movie-taking, movie-showing equipment. It reflects in quality and performance Kodak's many years of experience in all branches of photography. Other fine Kodak movie cameras from $39.75. See them at your dealer's soon!

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For superb showings of his prized movies . . . The finest silent 16mm. projector Kodak has ever built. Brilliantly screens your movies, sharply detailed from corner to corner. Reverse action, too. And it's lubricated for life! Built into its own carrying case with plenty of storage room.

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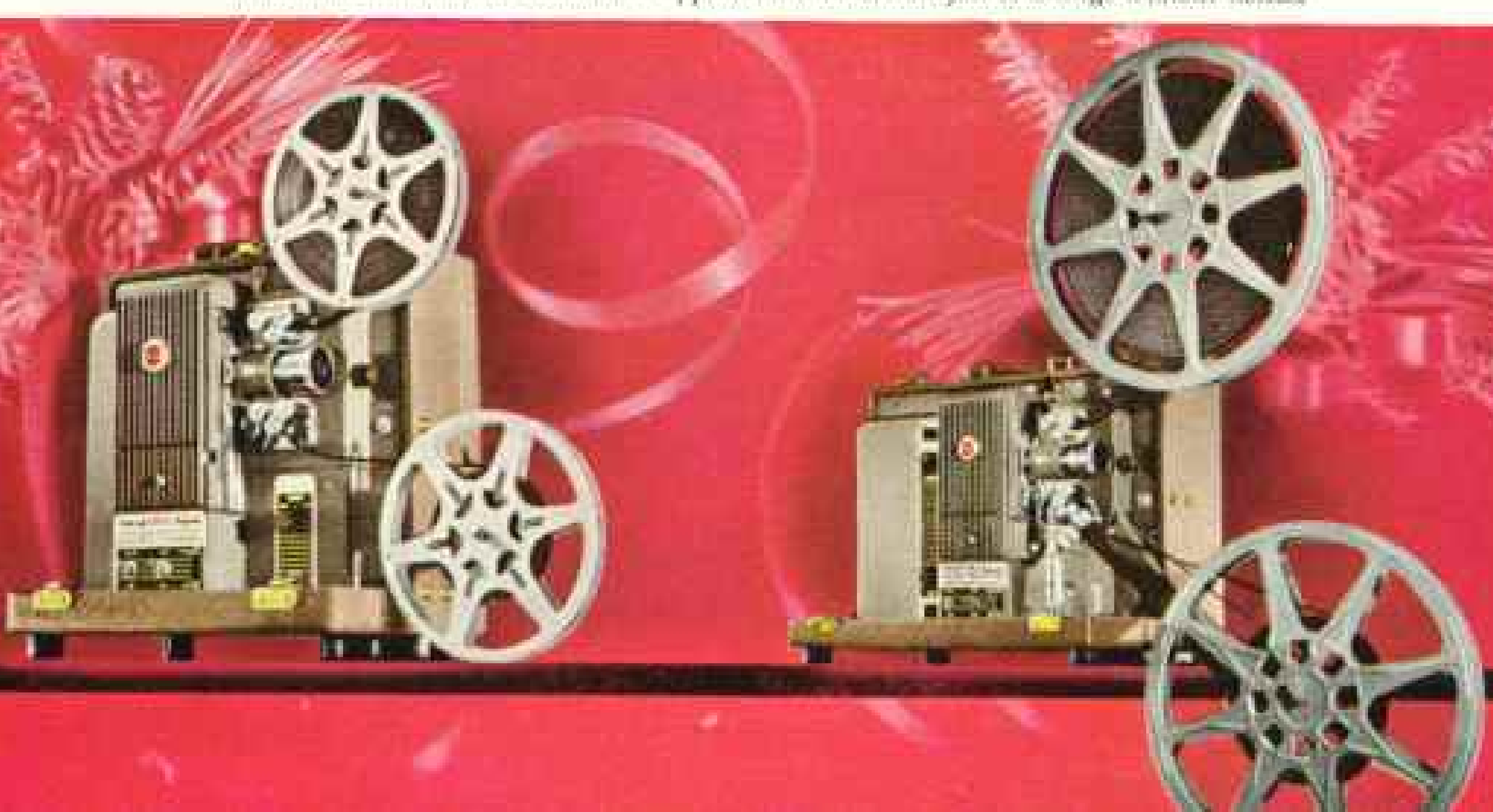
Prices include Federal Tax where applicable and are subject to change without notice.



It's "All-Ways" Better to

Say it with Flowers-By-Wire

No other gift says so much, so gracefully. You're *right*...any time, *every* time...when your greeting carries this warm, personal touch that's always in perfect taste. Thoughtful people always *Say it with Flowers-By-Wire.*

IT'S SO EASY! Just *phone or* drop in at your F.T.D. Florist—and your gift is on its way. No wrapping, no stamps, no wearisome trips to the post office!

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PRICED RIGHT, TOO! In what other way can just a few dollars add such a priceless touch of tenderness . . . or the glamorous romance of an orchid corsage?

AND IT'S FAST. *Even your* last-minute remembrances get there in time. Because your greeting travels *telegraph-fast* . . . when you *Say it with Flowers-By-Wire.*

WORLDWIDE SERVICE. 18,000 members of F.T.D. and INTERFLORA speed your floral greeting anywhere in a matter of hours.

GUARANTEED DELIVERY. When you *Say it with Flowers-By-Wire* through F.T.D., you're sure your greeting gets there. Delivery is guaranteed and *bonded.*

TRADEMARK

When you *Say it with Flowers-By-Wire* ...be sure to look for SERVICE and the FAMOUS MERCURY EMBLEM. They identify the right shops.

FLORISTS' TELEGRAPH DELIVERY ASSOCIATION

Headquarters: Detroit, Michigan

Your First Taste—of Hawaii's Aloha

Flowers and songs greet you as the LURLINE nears port. It's a lovely end to the hours you've spent with new-found friends in a relaxed and luxurious atmosphere! Throughout your cruise a magic mood of Hawaii has been woven: quick friendships . . . keener delight in ship games, parties, movies, dancing . . . heightened appreciation of food and service, of comfortable quarters. Credit Matson know-how . . . and it's yours to be twice enjoyed on a round-trip fare.

See your Travel Agent or any Matson Lines office: New York, Chicago, San Francisco, Seattle, Portland, Los Angeles, San Diego, Honolulu. And book round trip on the **LURLINE!**

THE LURLINE SAILS FROM SAN FRANCISCO AND LOS ANGELES ALTERNATELY

Matson Lines

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Give the World

Give National Geographic

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Brings a Twelve-month
"Passport" for all the Family to
Visit Earth's Peoples and Places

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Give National Geographic Memberships!

TO PRESENT GIFT MEMBERSHIPS IN YOUR SOCIETY, PLEASE PRINT RECIPIENTS' NAMES BELOW, DETACH, AND MAIL WITH APPROPRIATE REMITTANCE

The Secretary, National Geographic Society, Washington 6, D. C.

I nominate the following persons for membership in The Society. These memberships are Christmas gifts from me, for which I enclose $..... ☐ Send gift cards to recipients. ☐ Send gift cards to me.
(*List additional gifts on separate sheet and attach.*)

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Name _____ *Occupation* _____

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11-48

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Right Move

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Get this Special Bargain Today!

Large 60¢ jar of ORA *plus* colored Plastic Denture Bath worth 50¢ } **TOTAL $1.10 VALUE**

BOTH ONLY

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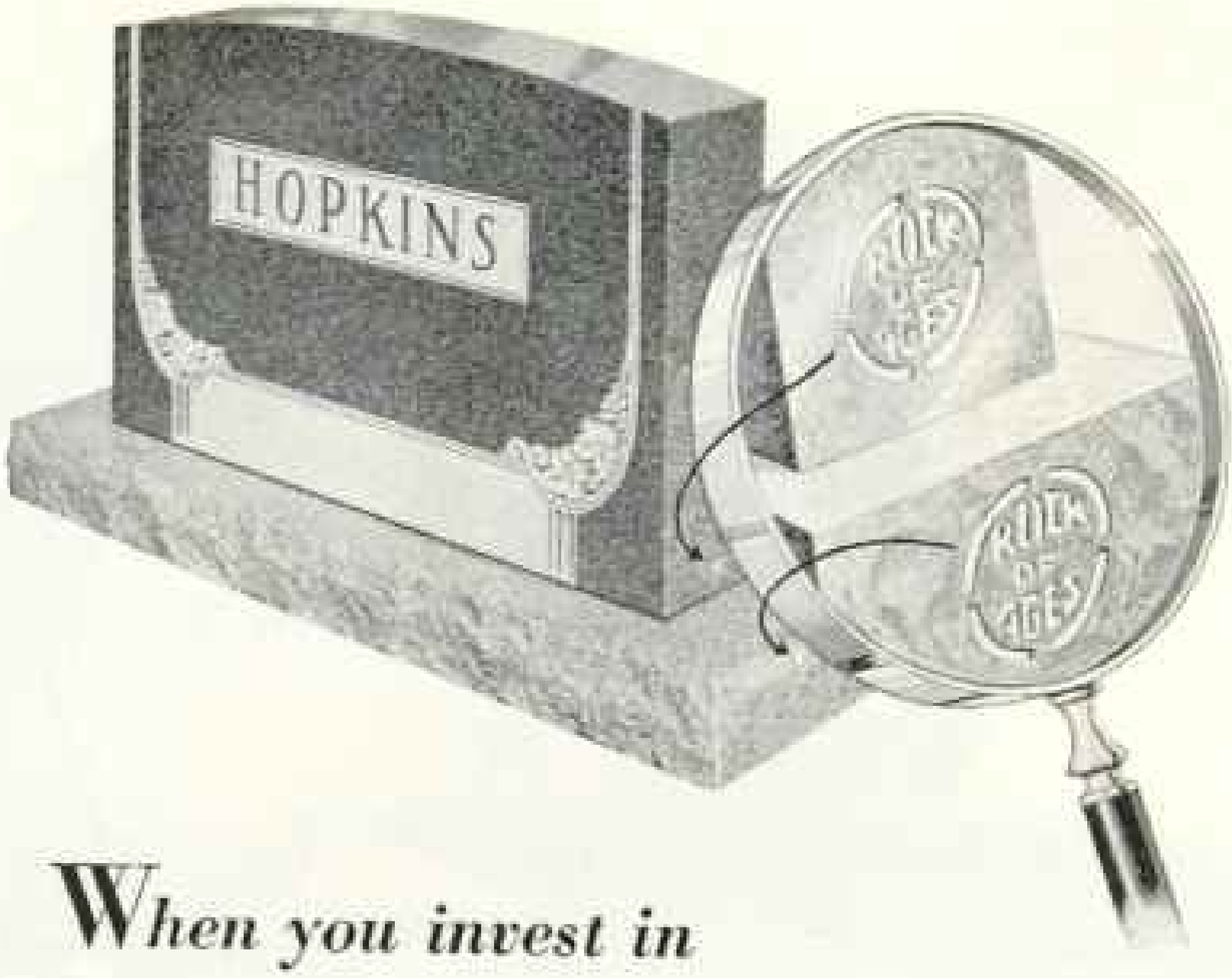
At all leading drug stores. Offer good for limited time only.

A McKesson Product

ORA

DENTURE CLEANSER

Amazing Ora cleans dentures by immersion *without brushing in minutes* —removes tobacco stains, ugly food tarnish like magic—gives false teeth natural sparkle! Protects you from offensive denture breath at all times—or your money back!



When you invest in
a family monument —
as people who care always do,
this tiny seal is your assurance
you have selected the very finest
for those you remember with love.

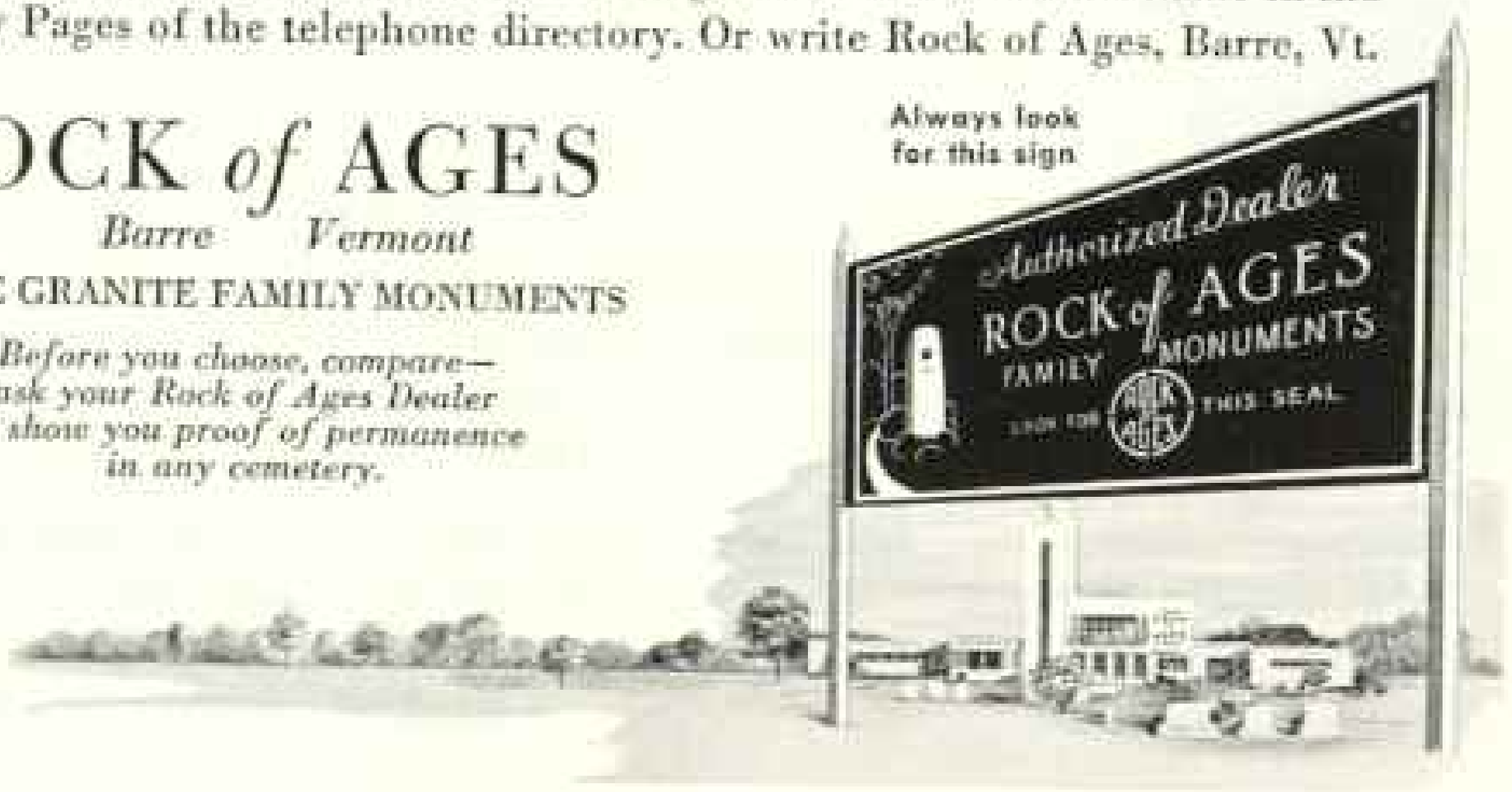
Only an Authorized Rock of Ages Dealer can show you the beautiful blue grey Barre granite monuments that bear this famous seal. Ask your nearest Rock of Ages Dealer for "How To Choose a Family Monument" — a large illustrated booklet available without obligation. You'll find his name in the Yellow Pages of the telephone directory. Or write Rock of Ages, Barre, Vt.

ROCK *of* AGES

Barre Vermont

BARRE GRANITE FAMILY MONUMENTS

Before you choose, compare—
ask your Rock of Ages Dealer
to show you proof of permanence
in any cemetery.



Here's an Attractive Booklet for Your Telephone Numbers

We've just printed a new booklet for listing your personal telephone numbers.

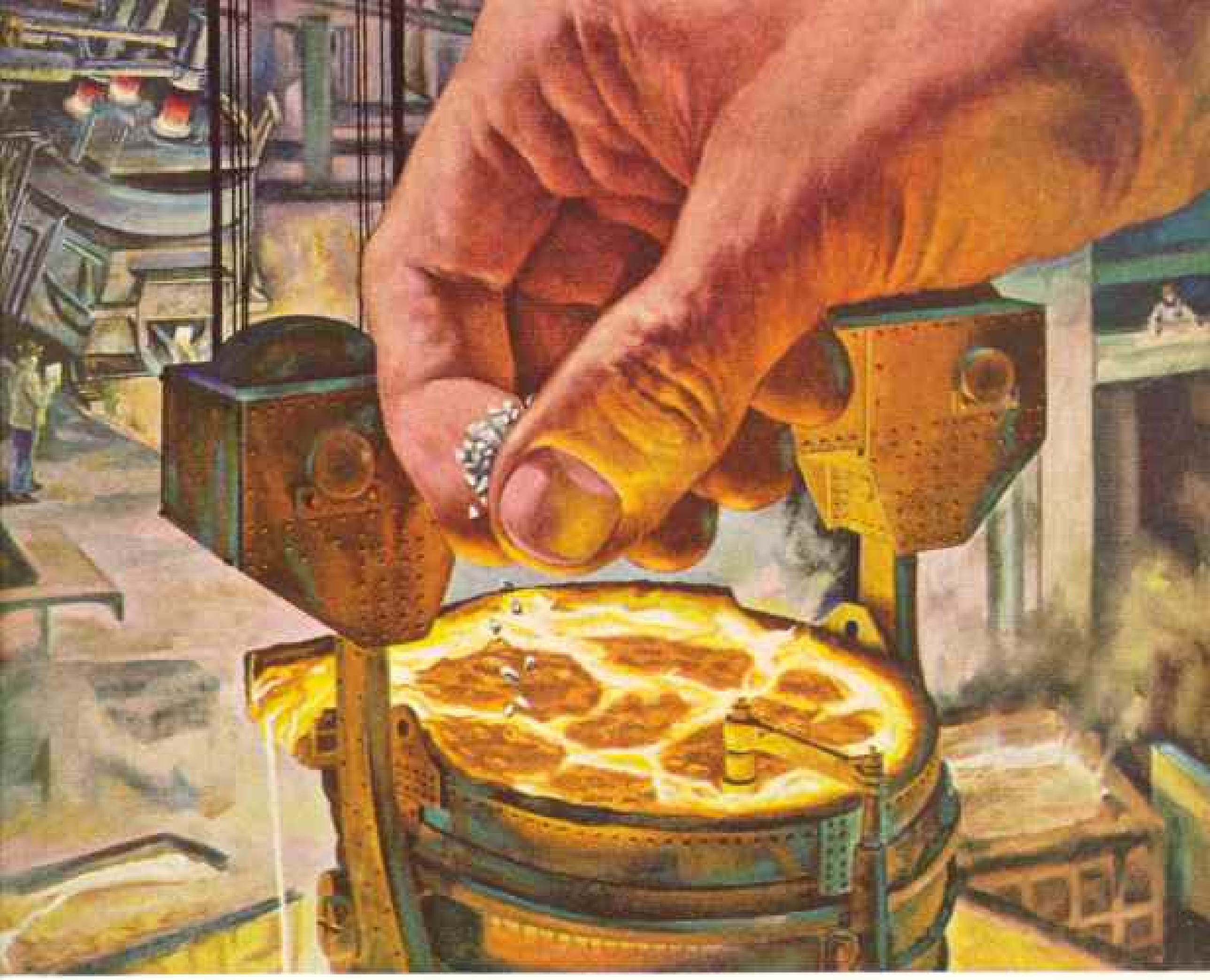
You'll find you save time on Long Distance calls when you give the operator the number you want. This booklet helps you keep the numbers handy.

There's a copy for you at the nearest Bell telephone office.

SAVE TIME . . . CALL BY NUMBER

So use the booklet to write down the numbers you already know. If there's a new number you don't have — or an old one you've forgotten — be sure to add it to the list when the operator gives it to you.

BELL TELEPHONE SYSTEM



Adding youth to steel...for you

Just a "pinch" of vanadium helps steel to serve you better

STEEL IS LIKE PEOPLE. It, too, can become tired with too much shock and strain, or too much exertion. Fortunately for all of us, scientists have learned the secret of imparting the stamina of youth to steel.

SECRET OF YOUTH—It's done by adding small amounts of vanadium—often with other alloying metals—to the molten steel, usually as it comes from the steelmaker's furnace.

Thus, the springs of your car and other hard-working parts of automobiles, locomotives, ships, and aircraft withstand constant shock and strain.

WHAT IS VANADIUM? This special tonic for steel is one of the earth's rarer metals. Most of America's vanadium ore comes from the Colorado Plateau. After being concentrated and smelted, the refined metal is shipped to the steelmakers.

Vanadium is but one of many alloying metals that are used to improve today's steel. Just as vanadium makes steel shock-resistant and enduring, chromium makes it rust-resistant, tungsten makes it strong at high temperatures, manganese makes it tough at low temperatures, and silicon gives it important electrical properties.

UCC AND ALLOYS—The people of Union Carbide produce more than fifty different kinds of alloying metals, in hundreds of varying compositions and sizes. They also work closely with steelmakers in developing and improving the alloy steels that go into nearly everything that serves us today.

FREE: *Learn more about the interesting things you use every day. Write for the illustrated booklet "Products and Processes" which tells how science and industry use the ALLOYS, CARBONS, CHEMICALS, GASES, and PLASTICS made by Union Carbide. Ask for booklet F.*