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## Expedition Uncovers Buried Masterpieces of Carved Jade

BY MATTHEW W. STIRLING

Leader of National Geographic Society-Smithsonian Institution Archeological Expeditions to Veracruz, Mexico

*With Illustrations from Photographs by Staff Photographer Richard H. Stewart*

**D**ARK had fallen with the sudden intense blackout of a starless tropical night. The candle reached feebly into the darkness with wavering fingers of yellow light, revealing a disordered array of shiny, grinning skulls. The silence was complete save for a single sound, coming at us from all directions at once—a shrill, persistent hum which seemed to penetrate our very eardrums.

The dim light of the candle flickered in the humid breeze, and the hollow eye orbits of the skulls seemed to wink above the filed white teeth. A hand reached out. Slowly and with extreme care it cradled the nearest skull and lifted it up. A pair of eyes gazed intently, and suddenly the silence was broken by a voice.

"Dolichocephalic, I'd say, but this deformation makes it hard to tell."

Phil held the skull away from him in a Hamletlike pose and studied it some more.

At the sound of his voice, the angry hum of the frustrated mosquitoes beating against the wire mesh of our screened house seemed to subside.

"I wish Dick would hurry up and get that gasoline lantern fixed," added a feminine voice. "I want to get that pay roll straightened out at least before midnight, and I'd like to get this varnish off my fingers before I turn in."

Our regular evening session in the screened house at our Cerro de las Mesas camp on the Río Blanco in southern Veracruz, Mexico, was drawing to a close. We had completed a somewhat more productive day than usual on the archeological dig and had to sit up late,

cleaning and varnishing the day's haul of fragile skeletal material.

Phil Drucker, Mrs. Stirling, and I were aided by Miguel and Pedro, our Mexican assistants of three years' standing, on the National Geographic Society-Smithsonian Institution Archeological Expedition to Veracruz. We had been wielding our probes and brushes for three hours and were relieved to see the last bones laid down.

### Explorers Work Far into the Night

Dick Stewart—Richard H. Stewart, National Geographic Society staff photographer—too, had a long evening in his palm-thatched darkroom, which kept out the light better than it did the mosquitoes. One of our temperamental gasoline lanterns had failed us again, and he found a new job awaiting him as soon as he had hung up his last negative to dry.

When at last the lanterns were in working order and the Duco, acetone, and brushes put away, it was almost midnight and we each had still a 15-minute task of thoroughly searching ourselves for ticks before we could go to bed.

In thus starting with the end of the day instead of the beginning, I hope I may disillusion those who picture archeological field work as a large-scale picnic outing. After supervising the laboring crew all day, the work of the field staff is but half over, as the evenings must be spent in cataloguing, writing up notes, cleaning, repairing, and packing specimens.

Dick, in addition to his basic task of taking black-and-white and color still pictures, and



#### The "Bird Man" Cuts Palm for Thatching Camp Buildings.

After denuding a tree of its fronds with a machete, Chilango slides across his long pole to the next treetop without descending. So as not to kill the palm, he will leave the central spike which unfolds into a new set of fronds within a couple of months. All trees thus stripped were in leaf again when the expedition left Cerro de las Mesas, Veracruz, Mexico (map, page 283, and page 303).

color movies, was also by common consent appointed camp mechanic. Whether it was building a corn popper of wire screen (Plate V), or repairing the station wagon or surveying instruments, he was commandeered.

#### Skeletal Clues to Lost History

Human skeletal material is one of the most important media with which the archeologist works. In reconstructing the history and ethnology of an archeological site, it is highly important to know the physical type of the occupants themselves.

If new people moved into a site, the change in physical make-up may reveal this fact, and these types may then be related to known types in other areas, hinting at the direction from which the people came. The pathology of bones sometimes reveals diseases with which they were afflicted.

Cultural traits, too, may appear with skeletal material. At Cerro de las Mesas, for example, we found that the custom of artificially de-

forming the head in infancy by applying pressure pads to the skull was practiced by the later occupants of the site, but not by their predecessors (Plate III).

These later Indians also had the custom of ornamentally filing the teeth, and occasionally prominent individuals had their teeth inlaid with semiprecious stones. These practices were not followed by the first inhabitants.

In the lowlands of the American Tropics bones rarely are sufficiently well-preserved to be of use. At Tres Zapotes scarcely any skeletal material remained.\*

\* See "Discovering the New World's Oldest Dated Work of Man," NATIONAL GEOGRAPHIC MAGAZINE, August, 1939, and "Great Stone Faces of the Mexican Jungle," Sept., 1940, both by Matthew W. Stirling. Excavations by the National Geographic Society-Smithsonian Institution Expeditions in this rich archeological region have been conducted with the gracious permission of the Mexican Government's National Institute of Anthropology and History. Special thanks are extended for the co-operation of Dr. Alfonso Caso, Director of the Institute, and Ing. Ignacio Marquina, Director of its Department of Prehistoric Monuments.



#### Time Out for Lunch beneath the Jade Treasure Mound.

Seated around the table at the Cerro de las Mesas camp from right to left are Mr. Stirling, Dr. Drucker, Mrs. Stirling, Miguel, and Pedro. The vacant place is for National Geographic Staff Photographer Stewart. Lunch this day consisted of tamales, enchiladas, rice, black beans, tortillas, and coffee (p. 308).

At Cerro de las Mesas, on the other hand, where the climate is less humid and soil conditions more favorable, we recovered a considerable quantity of skeletal material. The proper care and preservation of it, however, was a tedious and time-consuming task.

During the winter of 1939-40, our second season at Tres Zapotes, we had made a brief reconnaissance trip to the Rio Blanco and had selected the site of Cerro de las Mesas for investigation during the season of 1940-41.

The Rio Blanco, with its sources in the snows of Citlaltepētēl (Orizaba), flows in an easterly direction into the Bay of Alvarado (map, page 283). In its upper courses it is a swift mountain stream plunging through deep gorges until it enters the comparatively level coastal plain. The fertile alluvial plain drained by its lower reaches has been called from earliest times the Mixtequilla, suggesting a former Mixtec occupation of the region.

In pre-Columbian times a large population existed here, as shown by the almost con-

tinuous succession of big mound groups extending from Piedras Negras to beyond Ignacio de la Llave. The Cerro de las Mesas group, almost in the center of the area, is the largest and most imposing of all.

Excepting for a single large and crudely carved stela at Cerro de Gallo, two miles distant, Cerro de las Mesas has the only stone monuments in the region and was probably the ceremonial center for the entire Mixtequilla.

The central feature of the site consists of a rectangular plaza, bordered on the north by two huge pyramidal earth mounds and on the south by two somewhat smaller mounds. Between the latter is a fifth mound. The principal monument plaza lies between this mound and the one forming the southwest corner of the main plaza. Here we made our most interesting discoveries (page 284).

At Tres Zapotes we were comparatively isolated, as it can be reached only by trail. But since a very bad road runs to Cerro de las Mesas, we luxuriated this year in a station



#### Sacrifices and Offerings Were Probably Made on This Frog Altar

Behind the grotesque frog (face in front, legs at sides) stands a fine stela. Depicted on this stone is a warrior god holding a club aloft in his left hand and a plumed serpent (left). Above the snake's open jaws is an object like a canoe with a seated figure. These monuments were uncovered at Izapa, State of Chiapas (pages 287, 227).

wagon. It was only 12 miles from our camp to Piedras Negras, but it took us an hour and a half to drive this distance when conditions were best. Following a rain the road is virtually impassable.

#### Blessings of the Drought

As in previous years, Dr. Drucker had been sent in advance to start construction of the camp. A site was selected in a beautiful tropical setting, in the midst of the principal mound group, and on the edge of what had been a small lake the year before when we had visited the site (Plate VI). This year for the first time in the memory of the oldest inhabitant the lake was dry. The crocodiles had migrated to the river and, we hoped, most of the mosquitoes as well.

The unusual drought proved a blessing to us in other ways, but principally because it enabled us to sink our stratigraphic trenches much deeper than the water table would normally have permitted (page 318).

When Stewart, Mrs. Stirling, and I arrived, the camp was half-finished, and we spent a busy week in the midst of palm thatch, gravel for our cement floors, and hordes of spectators from the near-by village of Paso del Vote.

Our first archeological work was at the near-by monument plaza. Before we could excavate the stones, we had to clear away the dense second-growth jungle which covered most of the area containing the stones.

A crew of ten men with machetes and hooked sticks accomplished this formidable job in two days, and we were ready to begin the heavy but interesting task of upending the fallen stelae and half-buried monuments (page 285).



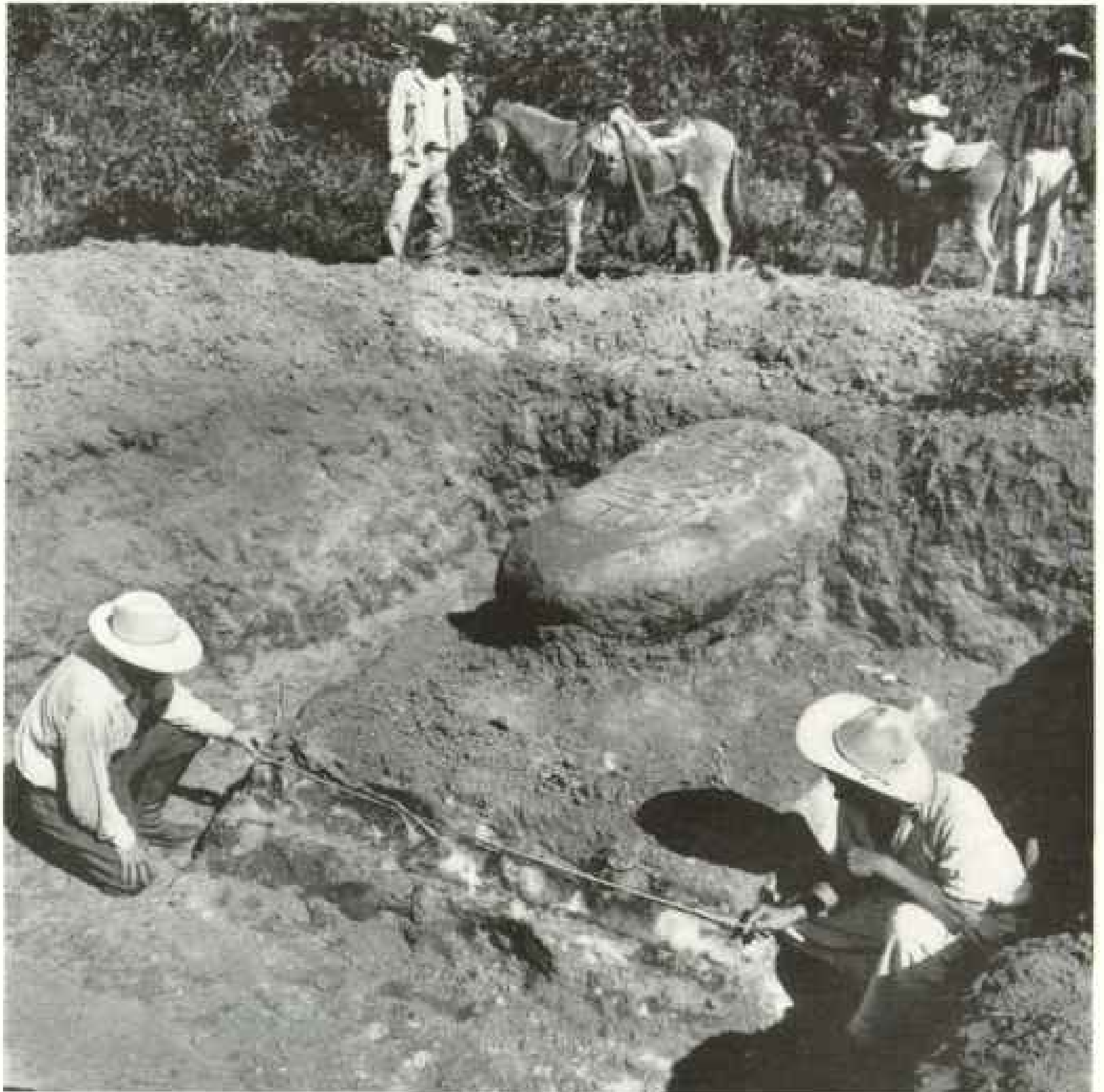
#### Of Particular Interest Because It Resembles the Tuxtla Statuette

This stone carving, found in the monument plaza at Cerro de las Mesas, was done in an early style. It resembles strikingly the small jadeite figure from southern Veracruz, a duck-billed godlet, which bore on its stomach one of the earliest dates from aboriginal America (*NATIONAL GEOGRAPHIC MAGAZINE*, August, 1939, page 188). The likeness suggests ties between the two sites.

At Tres Zapotes the monuments were scattered over a wide area; at Cerro de las Mesas the majority were confined to a space not more than 50 yards square. In all, we found here 15 stelae and eight other monuments.

This season we deciphered a second early Initial Series date at the site and discovered a stone monument bearing a striking resemblance to the Tuxtla Statuette and other interesting monuments. Stylistically, the stones appear to fall into three groups separated by a considerable time period.

In excavating beneath the stones we discovered a rectangular enclosure which had evidently at one time contained several of the



#### Miguel Helps the Expedition Leader Measure the Red Stucco Platform

A few monuments were discovered outside the central plaza. These usually were mounted on rectangular bases. Only the tip of this reclining stela showed above ground when excavation began.

monuments. This consisted of a thick earth wall covered with white stucco, which still retained traces of the red, green, and black paint with which it had once been decorated. Subsequently, we observed that a stairway led from this enclosure to the summit of the mound which lay just to the east of it.

#### Mystery of the Whistling Fat Man

In excavating the interior of this enclosure we encountered numerous intrusive burials of children, usually accompanied by jade beads.

Beneath one of the monuments we found a plumbate whistling jar in the form of a fat man seated, holding a spouted vessel on his lap. This ware, finished with a lead glaze

which gives it a metallic luster, occurs most frequently in El Salvador and Guatemala. This particular example, made with a whistle which blows when water is poured out of the spout, is probably unique in Mexico, although this device was fairly common in ancient Peru and one example has been reported from Honduras.

Near the northeast corner of the main plaza and close to the large mound bordering it was a relatively small flat-topped mound, selected for our first mound excavation. This excavation, Trench 30, turned out to be, except for Trench 34, the richest of the season.

A cross-section trench 15 feet wide and 36 feet long demonstrated that the entire structure was only 8½ feet high. It consisted of



### In This Area Three National Geographic-Smithsonian Expeditions Made Three Famous Finds

In 1941 the latest joint expedition found the finest and largest cache of jade yet discovered in America, at Cerro de las Metas in southern Veracruz. In 1939 the first expedition, also headed by Matthew W. Stirling, discovered at Tres Zapotes the New World's oldest dated work of man, a monument with an inscribed date equivalent to 31 B.C. (Thompson correlation). In 1940 five colossal heads, sculptured by pre-Columbian Indians, were excavated at the rich La Venta site.

a low primary mound two and a half feet high, covered with a floor of baked clay. Over this subsequently had been erected another mound which added six feet to the original height.

In excavating through this upper mound, numerous burials were encountered, many of which had with them rich offerings of jade and fine pottery. Five pottery vessels were buried separately, each of which contained the neatly sawed-off face of a human skull.

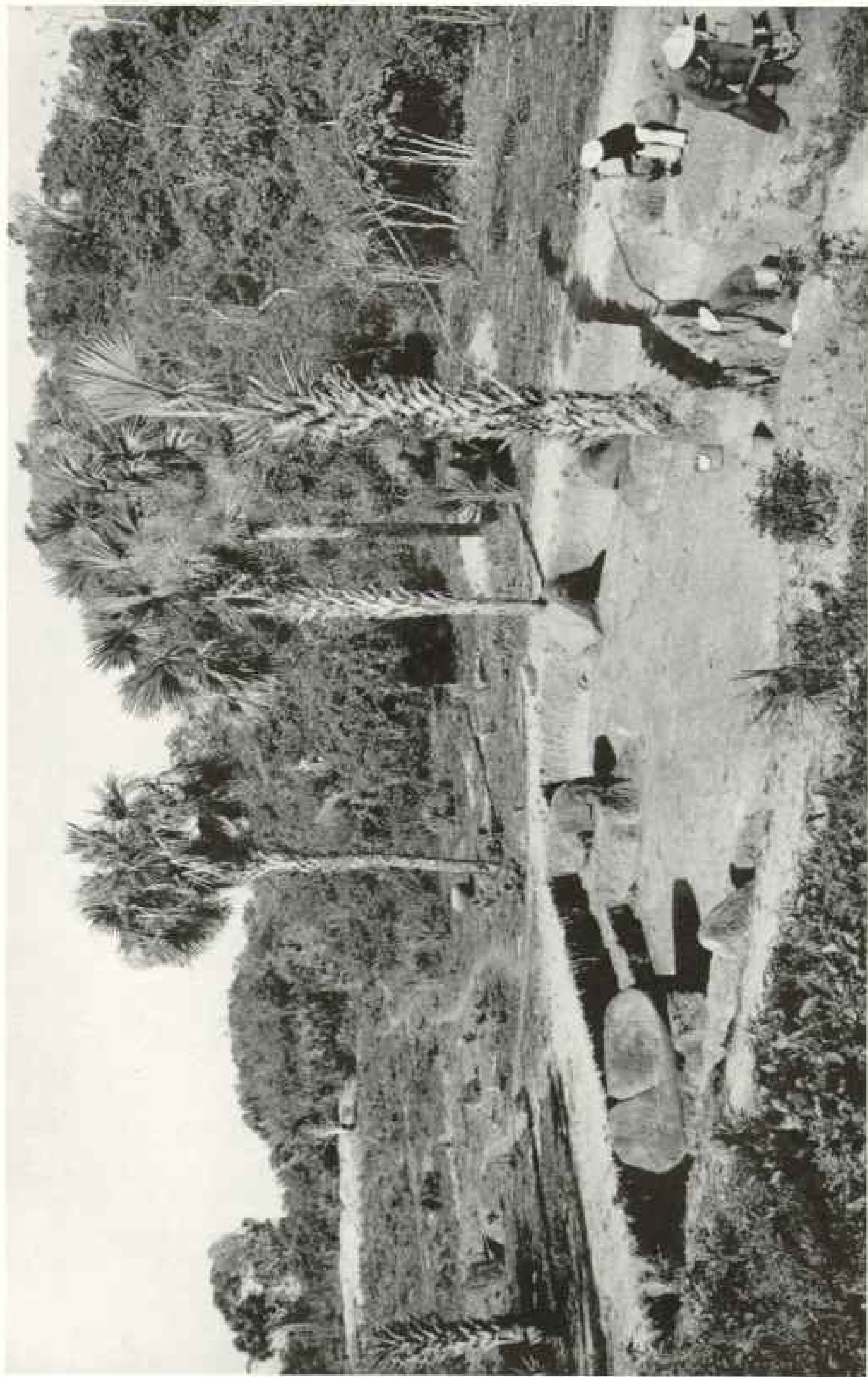
On reaching the lower or primary mound, we found that it had evidently been constructed to contain the remains of a single individual,

a personage of prominence in the community.

The body had been tightly flexed and laid on its side in the exact center of the mound. It had been decapitated and the skull placed face down in a large orange-colored marine shell filled with red paint. The exceptionally wide jaw had been detached and placed alongside the skull. The skull was large and thin, with extreme fronto-occipital flattening, giving it, to our eyes, a grotesque appearance, but one undoubtedly admired as most aristocratic by its possessor's contemporaries.

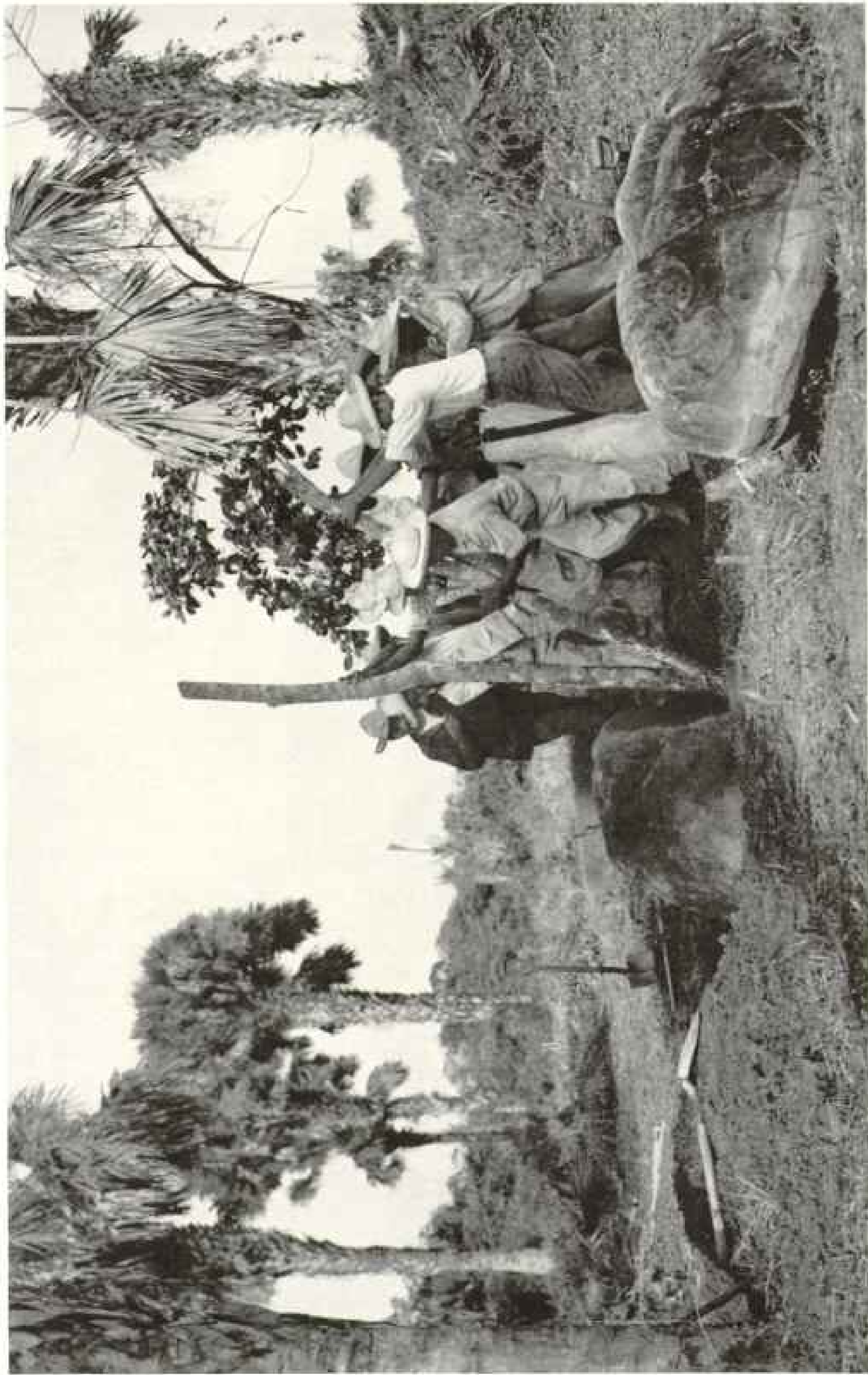
To complete the picture of aboriginal beauty,





**This Monument Plaza Was the Forum or Ceremonial Center for the Entire Region**

At Tres Zapotes the monuments were scattered over a wide area. Here at Cerro de las Mesas the majority were confined to a space not more than 55 yards square. Thick earth walls, coated with stucco, surrounded this court. Traces of painted decorations remain (page 282). Many burials of children were encountered, almost invariably accompanied by jade beads. Beneath the spot from which this photograph was made, the startling jade cache was uncovered (Plate VIII).



**Spurred on as if Looking for Buried Gold, the Explorers Dig and Heave Up a Giant Stone**

Always there is the hope that some new secret will be revealed on the underface of such a monument. Before the stones in the plaza could be excavated, a dense second-growth jungle had to be cleared. A crew of ten men with machetes and hooked sticks accomplished this job in two days. Then came the heavy, but interesting task of turning and upending the fallen stelae and half-buried monuments (page 281).



#### Emilio Shows Off an Early Mexican Masterpiece

While excavating in a small mound near Cerro de las Mesas, a life-size, full-length human figure was found. The hollow clay statue was broken in several places. Here a workman holds its head.

the incisors and canine teeth were carefully and neatly inlaid with circular pieces of pyrite.

Around the skull and shell was a string of 56 massive shell beads an inch in diameter, still lustrous. In each was utilized the natural color of the shell from which it was made, so that half of each bead was colored a rich orange hue and the other half a creamy white.

In the shell under the face and buried in the red paint were a large pearl, two jade beads, and a cleverly carved monkey head of jade. The skull was flanked by a pair of beautifully polished and matched jade tubes, each about six inches long. Resting against the back of the skull were two large disk-shaped shell ornaments with scalloped edges, perforated for suspension. They were made from the same

kind of shell as that containing the skull, as were also the large shell beads.

#### "Refined as a Dentist's Inlay"

One of these disks had several holes in it, made by marine borers. These holes had been neatly filled with carefully fitted shell plugs of the same color and material. The workmanship was as refined as a modern dentist's inlay. Also behind the skull was a turtle shell covered with an elaborately engraved design representing a plumed serpent.

The design had been emphasized by rubbing red paint into the incisions.

This shell is one of the finest art objects which we have discovered during three seasons of work in Mexico. Inside the turtle shell were seven carved Panama shell rattles, all of which still retained their luster and beautiful mahogany-brown color patterns.

By the knees of the burial was a deposit of eleven handsome pottery vessels, all inverted.

Some of these were tall, graceful vessels of polished black ware decorated with tasteful incised designs; others were jars coated with white stucco and painted with designs in rose, green, red, blue, yellow, and black.

A foot to the north of the skull had been placed a highly polished stone yoke, one of those mysterious stones found rather frequently in the State of Veracruz and much more rarely in other parts of Mexico and Central America. These yokes are among the finest examples of the stone carver's art from aboriginal America.

Beside the stone yoke and facing the burial was a beautiful seated female figurine of polished red and buff ware, holding on its lap a small red-painted human figure of archaic type.

The workmen had been joking about our seeking the tomb of *El Rey*, and when this burial was discovered they were certain that we had indeed found "the king."

When we had been in camp about three weeks, we had the pleasure of a visit for several days from Miguel Covarrubias and his charming wife Rose, an artist in her own right (Plate I and page 323). Covarrubias would be known as one of the best-informed men on Mexican archeology and ethnology were it not for his fame as a painter, caricaturist, and writer. He spent a busy time drawing the designs on the stone monuments. His detailed knowledge of aboriginal Mexican art fitted him for his task, and his enthusiasm reinfected all of us.

While in camp, he spoke of a site with stone monuments, well known locally but only casually visited, in the vicinity of Tapachula, State of Chiapas.

This site, located on the "Lands of Izapa" near the Guatemalan border, had been inspected a few years ago by Karl Ruppert and Dr. A. V. Kidder.

Covarrubias said that photographs he had seen reminded him somewhat of the stone sculpture at La Venta. We resolved, therefore, to make a trip to the site. Permission from the Mexican authorities to clear and photograph the monuments was readily granted. Stewart, Mrs. Stirling, and I took the train at Piedras Negras for the long trip, requiring two days and a night, to the extreme southwestern corner of Mexico.

We spent a week at Izapa, which turned out to be an interesting and imposing site with numerous large mounds and curiously



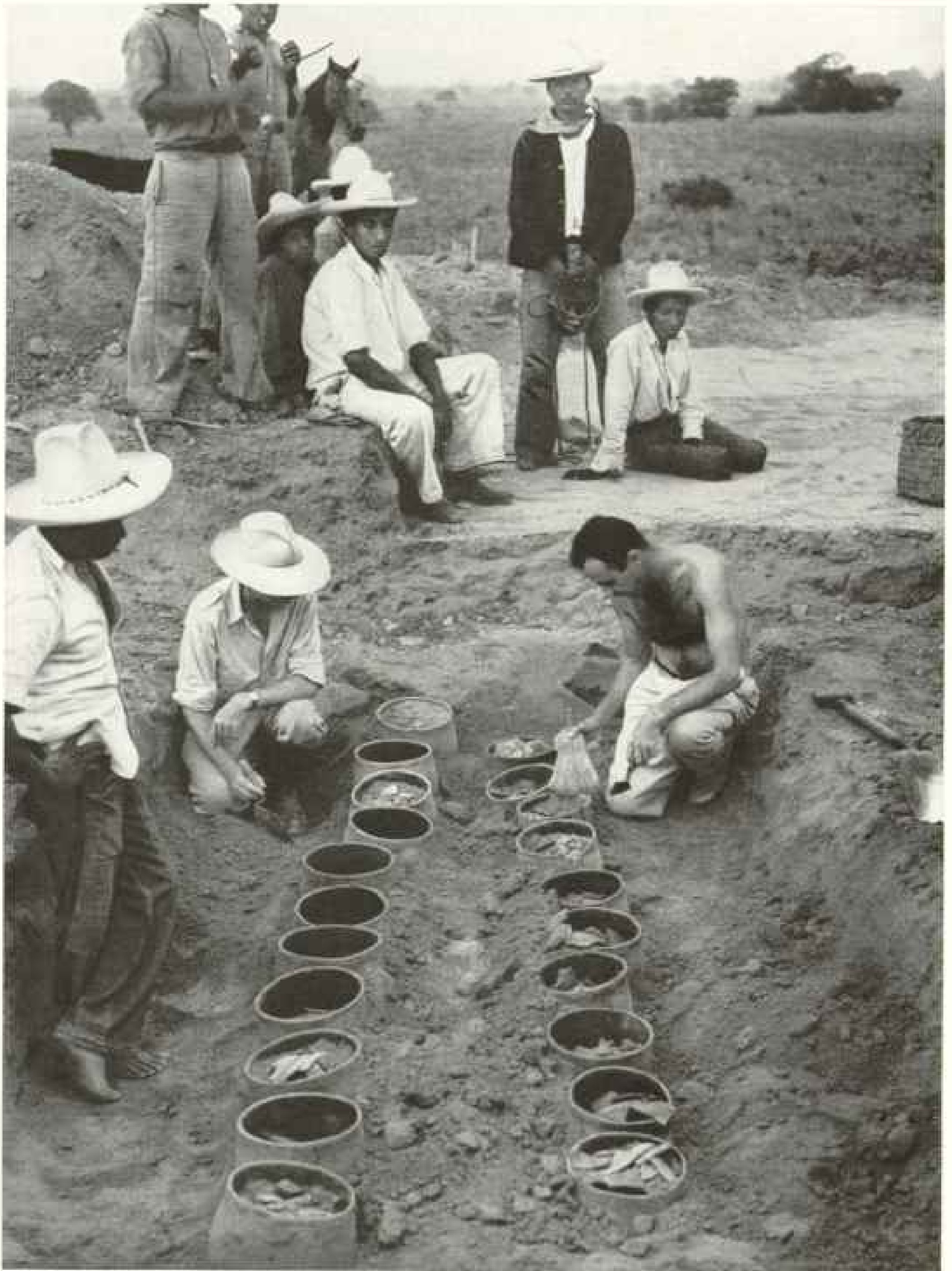
This Fine Stela Found at Cerro de las Mesas Was Dated in the Maya Calendar

Translating the bar and dot numerals in the second vertical column from the left, the date is 513 A. D. (Thompson correlation). The elaborately costumed figure points to the beginning of the date column. It stands on a conventionalized jaguar face.

carved stelae with altars. The heat was intense while we worked during the most strenuous week we spent in the field. However, we located more than 30 stelae and altars and felt well repaid for our efforts (pages 280, 327).

#### Tehuantepec, a Woman's Country

Returning, we stopped over in Tehuantepec and Juchitán on the Isthmus of Tehuantepec. Again following a suggestion from Covarrubias, we located in the village of San Blas, a suburb of Tehuantepec, the last Indian pottery maker of the region who retained the art of modeling pottery figurines. Here we spent three days in photographing the stages of this survival from



**An Archeological Mystery—Do These Urns Hold Sacrificial Victims or War Heroes?**

An exploratory trench dug near the plaza uncovered, between cement floors, two double rows of 32 pottery vessels. Each contained the skull of a young adult. Inverted bowls or lids which covered the pots were crushed by ancients walking on the floor laid above (Plate III and opposite page).



#### Every Urn Was Tailor-made to Fit Its Skull

Removing the fragile bones was a delicate task. Each skull had two or three vertebrae attached, indicating that the heads had been severed and placed in the urns (opposite page). Evidently these heads had been artificially flattened in infancy and many had the front teeth filed with notches (Plate III).

ancient times (page 302, and Plate XIII).

Tehuantepec is indeed a woman's country. Men are not allowed to compete with the women in the markets, and one is scarcely aware that the Indian men exist. The handsome women, with their erect carriage and colorful costumes, are everywhere (Pl. XII).

The town of Juchitán, less famous, is just as vivid as Tehuantepec. Here are manufactured colorful braided palm-leaf hats and mats (Plate XVI). The owners of the principal establishment courteously allowed us to watch all of the manufacturing processes.

Leaving Juchitán, we again took the train across the Isthmus.

Approaching Piedras Negras, we viewed with misgivings the evidence of the recent norther in the mud and pools of water along the roadbed. We wondered if Phil would meet us. As we pulled in we saw the station wagon, plastered with mud from top to bottom, with Phil and Pedro standing by. They had spent five hours making the trip which usually took us one and a half, and had dug themselves out of the mud three times. The ride back to camp was wild and rough.

Our return had been anticipated as an event of social significance. The girls and Miguel,

who had been left in charge, announced that a *huapango*, the sprightly dance popular throughout Veracruz, had been arranged for the next day (Plates IV and XV).

#### The Finding of the Skulls

Three and a half months had elapsed and the time of the expedition was drawing to a close. In our absence Phil had continued excavation of the trench back of the monument plaza, and also had begun excavations in a mound near the northern edge of the site. Deep in the latter was a burial accompanied by a lacquer bowl.

The gourd comprising the bowl had disappeared, but the lacquer design was intact. By patient and careful work it was exposed and photographed. An apron on this mound was then selected as a site for excavation. Three feet beneath the surface a cement floor was encountered. A foot below this was a second cement floor, and another foot below this was still a third.

Between these floors, placed in double rows, were 52 pottery vessels of hard red ware, almost identical in size and appearance. Each contained the skull of a young adult with two or three vertebrae attached, indicating that



#### A Trench Uncovered This Clay Stairway Which Led from the Plaza to a Mound Top

Early steps at Cerro de las Mesas were constructed of baked clay. During the later occupation they were covered with cement. Most mounds were enlarged several times, a new stairway being constructed after each addition. The temples which occupied the level surfaces on the tops of the mounds were built of palm thatch in much the same fashion as present-day houses.

the heads had been severed and placed in the vessels. The skulls had been artificially flattened and in many of them the front teeth were ornamentally filed with notches, giving them a serrated appearance.

Here was a fine archeological mystery.

The way the burial urns were placed showed that all had been interred at one time. The pots had been placed upon one cement floor, covered with shallow inverted dishes, and then the entire floor covered with earth to a depth sufficient to cover the pots.

They were sealed by another cement floor laid immediately above them (Plate III and page 288).

The fact that the vertebrae were attached and the jaws in place indicated the probability that all of the heads were collected at one time. Possibly these heads represented a mass human sacrifice performed upon some important occasion.

Long before the Spaniards came, civilized Indians of Middle America had developed a system of pictorial writing. Artists made books, drawn in color on parchment or paper made from maguey fiber. These books contained their histories—records of war, migrations, and other events. Another group recorded astronomical calculations used for prophesying coming events and for determining lucky dates for undertaking various enterprises.

#### First Pre-Columbian Book Excavated

Because they were intimately connected with the religious life of the natives, zealot Spaniards destroyed all of these books found in the possession of the natives. Thus was lost a record of incalculable value of the civilization of the New World. Nevertheless, a few of these books survived and from time to time have been discovered in archives of Europe



**Formerly Natives Left Offerings of Eggs and Chickens before This "Monkey God"**

It was removed to near-by Cocuite by a family who placed it near their home. They soon became frightened and took it to a field a quarter of a mile away.

and of Mexico. None had ever been found during archeological excavation.

In Trench 34 we found the remains of one of these books, but the ravages of time made it possible to see only small portions of it. The book had apparently consisted of twelve or more pages. The material comprising the sheets had entirely disappeared, but the white sizing with which they had been covered and the painted designs remained bright and fresh. The colors were red, green, blue, and purple.

The different layers of sizing with their colored pictures were virtually welded one against the other. To separate them would be an exceedingly delicate if not impossible task. Finding this document in place with the types of pottery and other artifacts belonging to the same period makes it a discovery of much archeological interest.

To a certain extent archeologists are able to regulate their success in digging by a knowledge of the habits and customs of the ancient peoples whose remains they are seeking.

However, Lady Luck is also a factor, and no archeologist is ever convinced that he did not miss the most important specimens by an inch or two, or stop his dig just a foot before the big discovery which never came to light.

A good illustration of the way such things can happen was afforded us at Trench 34, the big cross section cut through the mound facing the monument plaza. This excavation had been very productive, showing that the mound had been enlarged from time to time and that a stairway had formerly led from the monument plaza to its summit (opposite page).

Numerous cylindrical vessels were each half filled with sea shells, coral, marine fossils—and always a jade bead. We discovered that a deep trench had formerly existed at the rear of the floor on top of the mound, and this was filled with human bones, piled in without order, as if they had been dumped over the rear edge of the mound from the temple floor.

Clearing the earth from the upper part of the buried cement-covered stairway, we found



a pile of hollow arms and legs of pottery figurines. In this odd assortment was a clay figurine of a woman holding a dog under her arm.

Directly under the heap was a circular enclosure two and a half feet in diameter, composed of upended arms and legs of a life-size clay figure. In the middle of this circle was a large pedestal in the form of a short truncated cone. It was decorated with crosses outlined in clay appliqué and painted red.

Under the pedestal and partly inside it was the life-size headless torso of a pregnant female. Around the waist was a bright-red belt with a bow in front. In cleaning the earth from its hollow interior, the bones of an infant were found in the abdomen.

#### Lady Luck, and a Satanic Face

The principal surprise, however, was yet in store for us. In clearing away the earth from below this figure we uncovered as emerging in birth a magnificent life-size head of a bearded figure wearing red-painted ear plugs.

This head, with its curiously striking Satanic leer, reminds one strongly of the similar bearded figure discovered last season near Tres Zapotes (Plate II).

Alongside the large pedestal was a smaller rectangular inverted pedestal. When lifted, this was found to have under it a fine clay mask in the form of an anthropomorphic jaguar face, with a lolling tongue having four spikes projecting from it.

As the wide trench grew deeper, it became necessary to remove the dirt with wheelbarrows. Two narrow ramps were left in the lower corners of the trench, up which the dirt could be wheeled. The season was almost finished, and most of the crew were occupied in filling and leveling the excavations.

We decided to save this excavation, which was our largest, until last, as it was adjacent to our camp and we wished to get as deep as possible through the earth structures in the middle of the mound, which was now exposed to a depth of 18 feet. In one more day the remaining excavations would be filled.

I determined to continue digging in the big trench during this day and then to put the entire crew to the task of filling it.

Miguel was in charge of the digging crew while the rest of us were packing. About the middle of the morning he sent one of the men to bring me to the excavation.

On arriving I saw that Miguel, for some reason best known to himself, had ordered the workmen to remove the wheelbarrow ramp in the lower north corner of the trench. In doing so they had encountered a good-sized chunk of cement and some heavy fragments of an

incense vessel. Sensing that this deposit might be an interesting feature, Miguel had taken over with his trowel and cleared the earth from the top of the pile.

#### Jade, Jade, and More Jade!

On one side a red-painted stone proved to be a large and well-carved anthropomorphic monkey, while on the other side was a similar but smaller red-painted stone in the form of a turtle. Carefully working around the edge of the potsherd deposit, the earth fell away from a thin circular piece of polished jade.

In attempting to clear this, the trowel encountered another, then another, and it could be seen that they were large ear ornaments.

At this point Miguel had sent for me.

It was evident at a glance that this was a discovery of exceptional importance. Apparently the large potsherds, the chunk of cement, and the stone figures formed a protective cover for a huge pile of jade.

Carefully we worked around the deposit until we had revealed its complete extent.

Here and there under the mass of large ear ornaments, beads, and jade tubes which comprised the top of the pile we could get tantalizing glimpses of the corners of carved plaques, curious pointed implements, and sections of human figures.

Apparently the best material had been placed first in the deposit, and then these were covered with the beads and ear ornaments.

Working slowly, it required the rest of the morning to clear the earth completely from around the pile.

With three of us working continuously, it required a half hour to take out all of the jade—782 specimens in all! (Plates VII, VIII.)

Why was this cache—a treasure of inestimable value in the eyes of the Indians—placed where we found it?

One thing is apparent: it did not accompany a burial and therefore in all probability it constituted tribal property rather than the possessions of an individual.

It might have been an offering at the dedication of a temple or an enlargement of the mound. The fact that it was placed in the mound facing the monument plaza, and presumably the ceremonial center of the entire site, would lend weight to this theory.

On the other hand, it is possible that on the approach of a conquering people, possibly the Aztecs themselves, the treasure was buried to conceal it. If so, the secret was well kept.

The variety of material and art styles represented gives special scientific interest to the find. The jade comprising the individual pieces apparently came from widely scattered

## Treasure-trove of Old Mexican Jade



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Contributor by Howard H. Stewart

### Long-buried Masterpieces of Carved Jade Shed New Light on Mexican Culture

Mrs. Miguel Covarrubias, wife of the Mexican artist, displays an ancient necklace and two figurines atop Mexico's National Museum. They are part of a spectacular find unearthed by Matthew W. Stirling while leading the third National Geographic Society-Smithsonian Institution Archeological Expedition in southern Mexico.



Broken before Burial, This Idol's Arms and Legs Were Piled Up on Its Base  
The figure's head is missing. An excavator carefully clears away earth particles.



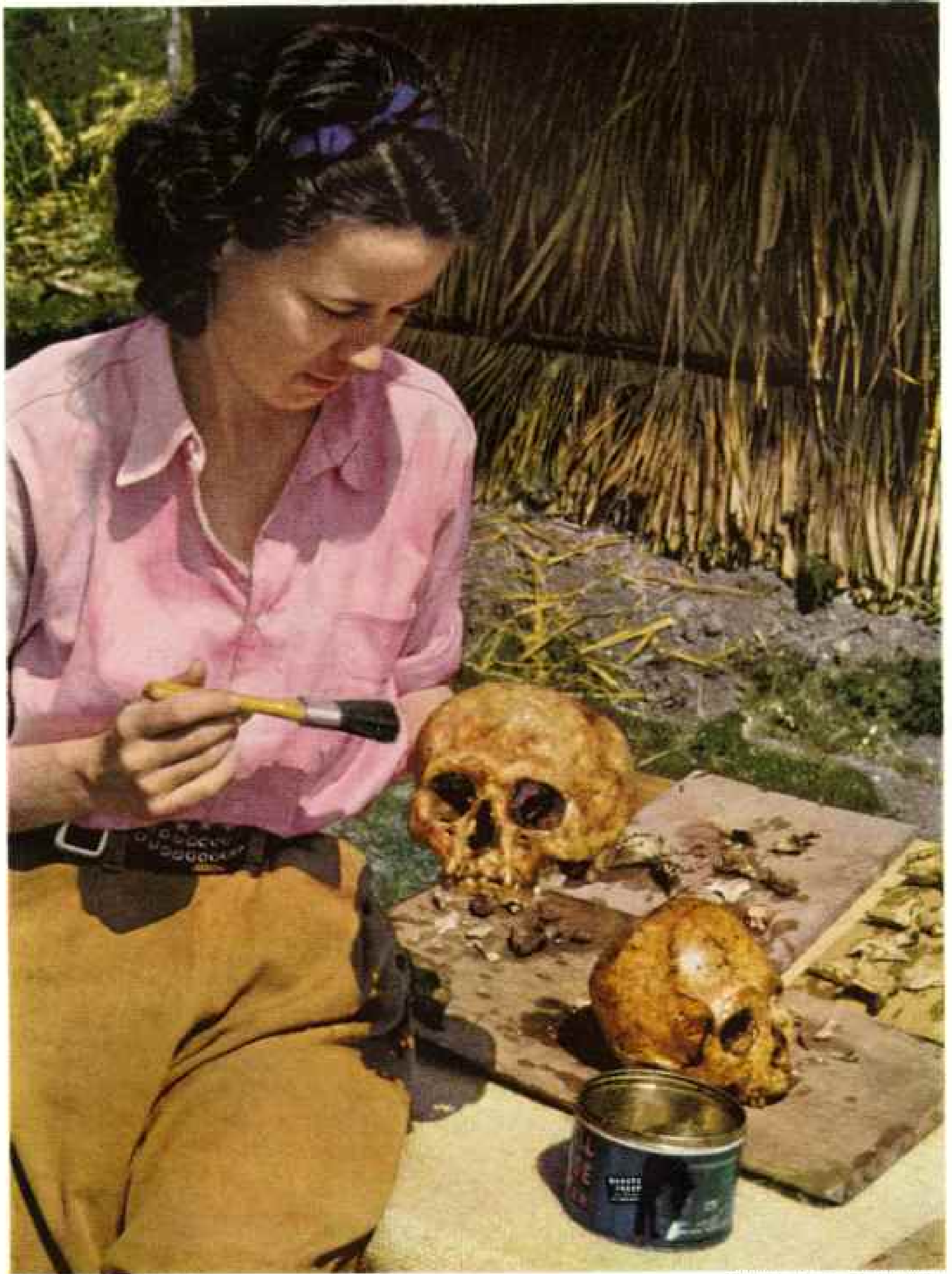
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Photographs by Richard H. Stewart

**Red Ear Plugs Brighten the Grim Features of a Pre-Columbian Graybeard**

The face, modeled from clay, was found beneath the pedestal pictured above, but it is not the missing head of the broken idol. These objects were dug up only a few feet from the collection of jade (Plate VIII).

## Treasure-trove of Old Mexican Jade



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Illustration by Richard H. Stewart

### Varnishing Skulls to Keep Them from Crumbling in the Air

They are part of a collection of 52, found when the explorers removed a cement covering. Beneath were two layers of burial urns, arranged in double rows. Each contained a single skull. Flat foreheads, caused by pressing pads against them in infancy, and filed front teeth reveal ancient Mexican beauty treatments.



© National Geographic Society

Kodachrome by Richard H. Stuart

**Loyal to Tradition, Youthful *Huasteco* Dancers Keep "Poker Faces"**

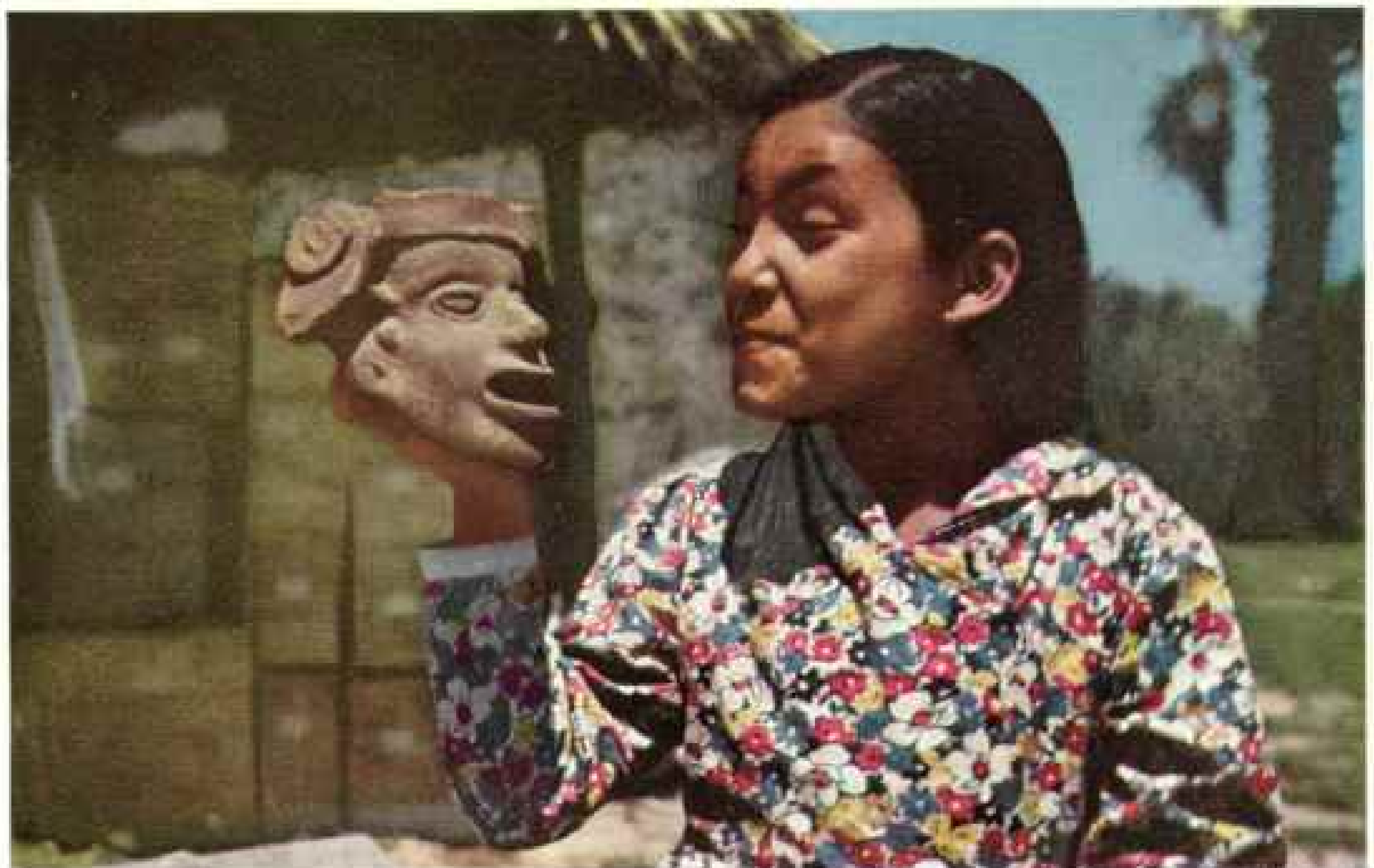
No matter how much fun they are having, expressions remain somber. The dance, staged by the expedition's wash girl (left) and the daughter of the camp cook, is in honor of Staff Photographer Stewart's birthday. The shuffling dance, in which arms and shoulders are motionless, is popular throughout Veracruz (Plates XIV, XV).

## Treasure-trove of Old Mexican Jade



### Popcorn First Scares, Then Delights, Boys and Girls of Cerro de las Mesas

Mrs. Stirling, using a popper improvised from wire screen, performs a miracle for the youngsters. When finally they dared to taste the strange food, they couldn't get enough.



© National Geographic Society

Kulakchunas by Richard H. Stewart

### Dulce Tries to Look as Grim as the Death Goddess Nipe, But She's Too Cheerful

Ancient artists modeled the clay mask to represent the face of a sacrificial victim.



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**In the Jungle at Cerro de las Mesas the Expedition Built a Thatch-roofed Headquarters**

The large building partially obscured by trees housed the dining room and kitchen. In the clearing stands the small shack used by Geographic Staff Photographer Stewart as darkroom and living quarters. At right lies Trench 34, where the notable collection of jade and other important relics were found (Plate VIII).

Exedra from Richard H. Mumart



Reproduction by Richard H. Street

**"More Precious Than Rubies"—Finding the Cache of Jade**  
 The photograph, made just after a protective covering had been removed, shows the heap of precious relics as they were when discovered.



© National Geographic Society

**Released from Age-old Vigil in a Noble's Grave**  
 The clay image, one of many burial offerings, was not the only sign of the occupant's prominence. Jade ornaments were set in the man's teeth.





© National Geographic Society

Collection by Richard H. Howari

**Milestone in Archeological Discovery—782 Pieces of Pre-Columbian Jade**

Held upright is the figure of a priest, with a knife in his hand. The long, dark object below the figurines is a carved canoe, one of the most highly prized items in the set. Beads, found loose, are strung to prevent loss.

sources. The workmanship, too, appears to represent different sections of the country.

One interesting piece is a gorget which had been reworked from an older specimen. When its polished back is held so that a crosslight falls upon it, the delicately etched profile of an elaborately costumed Maya priest is revealed, underlying the present design.

In addition to sectional differences in style, a considerable time period seems to be covered, as both early and late styles here occur together. Apparently many specimens had been treasured for centuries as objects of art.

Notable among the older examples are three magnificent pieces of blue jade worked in the so-called "Olmec" style. One of these is the replica of a canoe with two typical Olmec faces engraved on the flat projecting stem and stern; another is a curious pendant carved in the form of a macaw. This has two lateral perforations and was probably the central piece for a double necklace of beads.

The third is a realistically carved infantile figure, which in workmanship and quality of material is not only the finest piece in the collection, but is undoubtedly one of the finest jades ever found in Mexico.

#### Whence Came the Jade?

The source of the jade used in ancient Mexico has always been a mystery. No mines are known where the material exists *in situ*. Apparently it was found in the form of pebbles or boulders in stream beds. These pieces were then patiently worked into beads and art objects by special craftsmen.

The ancient Mexicans did not classify the different types of stones related to jade according to the chemical constituents, as do modern mineralogists, but all were grouped under the term *chalchihuitl*. Undoubtedly, however, they differentiated between the fine-quality and ordinary-quality stones.

At Cerro de las Mesas the color of the stones ranged from porcelain white through shades of green to deep blue. Two cache specimens were of translucent green alabaster.

The type of jade usually found in the earliest localities is of a rather gray-green color, but capable of taking a high polish. Emerald-green jade probably originating in the mountains of Oaxaca was apparently not used until a few centuries before the Spanish Conquest.

In the early accounts of the conquest are many episodes which indicate the high value which the Indians set upon jade. When Cortés landed near Veracruz in 1519, the native governor sent word of his arrival to Montezuma. The ambassadors of Montezuma later returned bringing a great treas-

ure of gold and other native objects of art.

After elaborate preliminary formalities, the gift was spread out before Cortés and his officers on a mat. The objects comprising the treasure are impressively described by Bernal Díaz del Castillo:

"The first was a round plate, about the size of a wagon wheel, representing the sun, the whole of the finest gold, and of the most beautiful workmanship; a most extraordinary work of art, which, according to the account of those who weighed it, was worth about 20,000 gold pesos.

"The second was a round plate, even larger than the former, of massive silver, representing the moon, with rays and other figures on it, being of great value.

"The third was a helmet, completely filled with pure grains of gold, as they are found in the mines, worth about 3,000 pesos, which was more to us than if it had been ten times the value, as we now knew for certain there were rich gold mines in the country.

"Among other things, there were also thirty golden ducks, exactly resembling the living bird, and of splendid workmanship; further, figures resembling lions, tigers, dogs, and apes; likewise ten chains with lockets, all of gold, and of the most costly workmanship; a bow with the string and twelve arrows, and two staffs five palms in length, like those used by the justices, all cast of the purest gold; further, they brought small cases containing the most beautiful green feathers, blended with gold and silver, and fans similarly worked; every species of game likewise cast in gold.

"There were alone above 30 packages of cotton stuffs, variously manufactured and interworked with variegated feathers. He wished very much to see our great emperor, who was such a powerful monarch, of whom, although residing at such a vast distance, he had already gained some knowledge, and he would send him a present of some valuable stones (jade)."

Cortés sent the messengers back with another present for Montezuma, and they in a few days returned with another royal gift, "consisting in ten packages of mantles, richly worked in feathers; further, four *chalchihuitls*, a species of green stone of uncommon value, which are held in higher estimation with them than the emerald with us; lastly, there were also all kinds of gold trinkets, which I heard valued at 3,000 pesos. Regarding the four *chalchihuitls*, they observed that those were intended as a present to our emperor, as each of them was worth more than a load of gold."

After Cortés reached Mexico City and Montezuma was being held as an honorable prisoner of war, Cortés had required him to



#### The Last of the Totonac Effigy Makers Plies His Trade in San Blas

His figures are modeled by hand from local clay, without aid of a potter's wheel. The whole process, from mixing the clay with the feet to firing, takes about five hours. Tehuantepec is famous for the beauty of its women and their costumes (page 287 and Plate XIII).

order collected from all of the provinces under Mexican control a treasure of gold for the Emperor of Spain. Montezuma complied with this order and turned over to Cortés a golden loot valued at more than 600,000 gold pesos.

#### "Worth Two Loads of Gold"

Upon giving it to Cortés, the Aztec emperor said: "When you transmit this treasure to your emperor, you must say in your letter, this is sent you by your faithful vassal Montezuma. To this I will also add a few jades, of such enormous value that I would not consent to give them to any one save to such a powerful emperor as yours: each of these stones is worth two loads of gold."

Later, when the legions of Montezuma fell upon Cortés and his men, driving them with tremendous loss of life from the capital city of the Aztecs, the gold-hungry Spaniards, in spite of their peril, attempted to carry away with them as much of the gold as possible.

Bernal Díaz, who participated in the famous retreat of the *Noche Triste*, attributes the saving of his life to the fact that, instead

of burdening himself with gold, he brought with him only four jade beads, which treasure later enabled him to be cured of his wounds and to obtain everything he needed because of its negotiability among the Indians.

The conquistadores succeeded pretty well during the 16th century in cleaning up all of the visible wealth of the Indians. Many are the legends of treasure hidden to conceal it from the Spaniards' eager search.

In past years occasional finds of aboriginal wealth have been made, but they are not common. There have been the unsupervised discoveries of gold hoards in Ecuador, Colombia, and Peru, and the scientifically excavated treasures of Coclé in Panama. Most interesting of all was the great find made by Dr. Alfonso Caso in Tomb 7 at Monte Albán, near Oaxaca City, Mexico.\*

The jade cache of Cerro de las Mesas must have represented a tribal ransom to those who buried it. The reason why it was concealed will probably never be certainly known. Esthetically and scientifically, it has added materially to our knowledge of aboriginal Mexico. In any event, it represents the largest find yet made of the most precious substance known to the ancient civilizations of Mexico.

\* See "Monte Albán, Richest Archeological Find in America," by Alfonso Caso, NATIONAL GEOGRAPHIC MAGAZINE, October, 1932.

# Jungle Housekeeping for a Geographic Expedition

BY MARION STIRLING

**B**UT, Señora, you don't eat our kind of food. We don't know how to cook your way." Practically every woman and girl in the village told us that.

For two days we had been canvassing all the communities within ten miles of the National Geographic Society-Smithsonian Expedition camp at Cerro de las Mesas in Veracruz.

In such an out-of-the-way section of Mexico the idea of domestic help was a novelty. Every man had in his household an ample number of children or female relatives to accomplish all the housework needed.

During two preceding years at Tres Zapotes, we had encountered similar difficulties.\* There the question was largely one of propriety. It did not seem respectable that young, unchaperoned women should spend the day at a camp occupied primarily by men.

The lure of the peso, however, finally overcame the scruples of some of the more broad-minded parents, and soon our girls became the envy of other women of the village.

## Gossip Appeal for Domestic Help

Here I had to assure them that we, too, enjoyed rice, black beans, eggs, and tortillas. I also pictured the advantages of hearing the phonograph and radio and the prestige of being the first to know what was happening in camp.

At last, when progress seemed hopeless, Miguel, who has a way of his own with the women, appeared with Florinda, a not unattractive widow with three young children.

Our relief at finally getting a cook was so great that we made no objection to the unsolicited addition of the rest of the family to our camp personnel. Dulce, Florinda's eldest daughter, was eight years old and soon won her way into our hearts (Plate V).

Florinda, once established as head cook, helped me complete our staff with a general handy girl and three potsherd (broken pottery) washers.

As at Tres Zapotes, we planned to eat native fare supplemented with canned luxuries we brought along, such as jam, pickles, sardines, chipped beef, peanut butter, cheese, fruits, and vegetables.

\* Mrs. Stirling, wife of the leader, was housekeeper, bookkeeper, and supervised washing of figurines, varnishing skulls, etc. She was on all three of the National Geographic Society-Smithsonian Archeological Expeditions to Veracruz: 1939, 1940, and 1941.

In the Tropics it is much more practicable to live in the native type of palm house than in tents. To build a house in Cerro de las Mesas, no formality is required other than permission to cut the building material in the neighboring jungle (page 320).

Anyone can obtain as much land as he wishes to plant. Nonresidents are usually required to pay a small fee for palm, but we escaped this charge by telling the local authorities that we were going to present the houses to the village when we left.

## The "Bird Man" Cuts Palms

All the men know how to construct a house, but we hired the town master carpenter as general supervisor. Some of the men cut trees for the posts. Others cut *bejuco*, vines used for tying and binding in place of nails.

Chilango cut all the palm used for thatching. Florinda called him the "bird man" because he stayed in the tops of the trees with his machete, using a long pole as a perch to slide from one to another (page 278).

Those owning burros were paid one peso (about 20 cents) a day extra to haul the thatch to camp. This was a good return on a 15-peso investment, the local value of a burro.

Meanwhile a ground crew cleared and leveled the house site and the carpenter lined up his post holes with a piece of string. The only tools used were the machete, a long heavy knife, and the *tarpala*, a stick with a straight hoe blade on one end.

This all-purpose tool is employed to clear brush as well as for planting and cultivating crops.

Even in mound excavation the crew would not, at first, use our picks and shovels, but insisted on digging with the machete and shoving the dirt aside with the *tarpala*. This was hard on buried pottery and inefficient as well. However, once they learned how to use the picks and shovels, we were continually petitioned by would-be borrowers who wanted them for working their fields.

The builders were careful to orient the houses exactly north, south, east, and west, and to thatch the north and south sides as well as the roof. This afforded protection from the cold northers which brought rain, and from the warm but sometimes violent southers that foretold clear weather.



#### Cristina Makes Delicious Tamales from Fresh Green Corn

Cut from the cob, the corn is ground on a stone metate and flavored with salt, sugar, and lard. Husks are then lined with this mixture and filled with seasoned beef, pork, or chicken. The edges are folded over, the ends lapped, and the whole tied up with a strand of corn husk to make an envelope. Then the tamales are steamed for about 25 minutes.

The east and west sides were midrib palm leaves, spaced for air circulation and entrance of light (Plate VI).

We suffered more from the cold than from the heat. In January and February we occasionally heard the light staccato of norther raindrops drumming on distant palm fronds, rumbling and roaring in approach until they reached us with a flooding crescendo.

Then for two or three days we would shiver with the natives and deplore the loss of working hours in temperatures ranging from 46° to 60°, until a souther swept away the clouds.

The natives use a dirt floor which in time becomes almost as hard as cement.

We had the luxury of real cement floors; in that respect we reverted to the practice of some of the prehistoric inhabitants (page 289).

Beams of native houses have to be replaced every four or five years because of wood-boring insects, but the palm walls and thatching may last as long as 15 years.

Our camp consisted of a long house, two small "family houses," a screened house, and a garage. We lived in one family house.

Richard Stewart occupied the other and had a completely thatched lean-to added to it. This served as his darkroom, as well as a comfortable habitation for numerous bats.

Dr. Drucker occupied one half of the long house, and the other half was a combination storeroom and rainy-weather dining room and lounge. We usually ate on the front porch of this big house; the girls cooked on the back porch.

In Tres Zapotes, if we wanted a bath after a hike, we had to set the all-purpose basin

between our two cots with their mosquito nets in place of screens, and bathe regardless of the curious eyes peeping through the spread of the palm-rib walls.

Since the natives bathe in public in the arroyo, they did not consider this any invasion of privacy. In Cerro de las Mesas we decided to thatch a shower stall.

#### The "Seventh House" a Novelty

Shortly after the installation of this new unit, a visitor remarked to me, "Now you have seven houses." I corrected her, and indicated the six in a cluster. She nodded at this, but then triumphantly pointed over

the hill and said, "You have forgotten the *casita*." This "little house" was also unique in the vicinity and always aroused curiosity when visitors inspected camp.

We dug our own well. The water was pure but hard and remained cloudy regardless of how deep we dug. To clear it the girls used wood ashes or the inner pulp of nopal, a variety of cactus. To compensate for the absence of a near-by arroyo and rocks on which to rub the clothes, Ramona brought to camp a hand-carved wooden washboard.

Our family house cost \$20 American money. Its furnishings consisted of two army cots with mosquito nets, a folding table for a desk with a shelf above for books, a washstand complete with basin and water pitcher, two folding chairs, and two boxes for our suitcases, which served as bureaus.

Under the cots we kept baskets of purchased figurines ready to be packed and choice specimens from the excavations, pending shipments to Mexico City. Every available inch of space was utilized.

Miguel Baltazar, reputedly a descendant of the conquistador of that name, was our general handy man for the third successive year. He is a cheerful, alert, intelligent young Mexican. We brought him from San Andrés Tuxtla to work with us at Tres Zapotes, and he was held in such esteem by the villagers that he soon acquired the title of Don Miguel.

"When will they make my *fagón*?" Florinda inquired two or three times a day. "I can't cook anything on this oil stove," she complained (page 326).



#### Baking Bread Tehuantepec Style

*Totopos* are a local variation of the tortilla, the Mexican version of bread. Corn is ground on a metate and the dough patted into a large flat cake. After holes have been punched with thumb and forefinger, the cake is plastered to the inside of a buried earthenware vessel previously heated with hot coals. When taken from this primitive oven, the tortilla is dry and crisp and will remain so for months. It is especially useful on long journeys.

The *fagón* consists of a wooden box filled with hard-packed earth, on which three or five bricks are set up endwise to cradle one or two fires, as desired. Some cooks prefer to use an iron hoop with three supporting legs, but Florinda maintained that the bricks conserved the heat and restrained the flame.

Later I bought her a portable stove made of a gasoline tin. This burned charcoal and enabled her to get the coffee started while waiting for the wood fire to get hot. All over Mexico women along the streets, in markets, or at carnivals and fiestas, make mysterious concoctions on just such reconstructed gasoline tins.



Children of Isolated Izapa Learn the Three R's from a Traveling Teacher

The Mexican Government in recent years has made an intensive effort to bring education to remote rural communities. Young instructors travel from one township to another, spending about four months a year in each. Night classes for adult men also are conducted by this teacher in the State of Chiapas (page 170).



**Fidencio and His Burro Carried Water to Thirsty Diggers**

Returning, the water boy carried large baskets of potsheeds and other specimens. He also ran camp errands and brought in the daily supply of corn, eggs, chile, and vegetables.



**Milk Is Fed to the Baby Jugastondi from an Eye Dropper**

This member of the cat family was the camp pet until it was stepped on by a visitor. It would follow Mrs. Stirling around and climb up her boots, trousers, and shirt to a perch on her shoulder.



Florinda was happy when her kitchen was complete with a table out of doors for washing dishes. Natives use this arrangement because it keeps the house dry and gives the pigs a chance to clean up scraps.

For every meal we had rice and black beans as a foundation for whatever else there might be. We had eggs for breakfast and supper and sometimes for dinner, and I learned many new combinations of these staples.

#### A "Spoon" for Every Mouthful

Tortillas are the Mexican substitute for bread. The corn is soaked in lime water, brought to a boil to permit removal of the tough husk, and then ground on the *metate* (grinding stone) to the consistency of a fine-grained dough. This dough is patted into flat cakes and baked on a flat earthenware pan, metal sheet, or stone.

A Mexican visitor explained that his people are more fastidious than we, because they use a different spoon for every mouthful—a piece of tortilla.

Rice is served white, yellow, or red. Mexicans fry it in lard and then add water, chicken broth, or metate-ground tomato paste. Each kernel is separate and is never greasy or sticky.

The beans were put on to cook first thing in the morning. By noontime they had achieved a soupy consistency and made a fine gravy for the rice. By evening they were thick and heavy, and ready to be fried alone or mixed with eggs, fried dry, and garnished with bananas. For breakfast Florinda often made  *gordas*, or "fat cakes," by grinding some leftover beans with her corn on the metate and frying the cakes instead of baking them.

Eggs are rarely boiled and never poached. Usually they are scrambled with onion, pepper, and tomato, or made into Spanish omelette.

Mexicans, too, use slang phrases for various ways of serving. "On horseback" means "sunny side up" on rice. "Ranch style" means fried and simmered in a hot sauce with results similar to shirred eggs. This hot sauce consists of red or green chile peppers, tomato, onion, and herbs, ground with a small stone pestle in the same type of rasped-interior earthenware vessel that we frequently encountered in the excavations.

For every meal we had some variation of this highly seasoned sauce. On my return to Washington I had trouble again getting used to the mildness of our flavorings.

Our meat supply depended on the village slaughterer. It was always a red-letter day when a cow was butchered. Without refrigeration, no time could be lost. For two days we could have beef. To our lot fell the

"steaks," the choice cut of the animal. These so-called steaks were like thin cuts of bottom round, with no fat to make them tender and no aging to give them flavor.

Florinda pounded chile and salt into the meat and broiled it over wood coals. When it was served, she garnished it with raw onions and little wild tomatoes. The treatment of the meat and the cooking over the wood coals made it taste like our barbecues.

The strips left over for the next day were salted and hung from a nail over the *fagón*. Now and then swarms of ants would locate the meat during the night, but the girls merely brushed off the black coat nonchalantly before proceeding to cook it.

The second-day beef we had in some form of hash or stew. Florinda boiled it, and then she and Ramona laboriously cut it into small pieces with a machete. Sometimes they pulled it apart with their fingers or ground it fine on a metate. To satisfy me, they dutifully used our meat grinder a few times. When they complained that the flavor was not satisfactory, I permitted them to return to their tedious methods.

My favorite use of the leftover meat was as stuffing for plantains, a variety of large banana. The shredded meat was seasoned with onion and native herbs, and the mixture fried to blend the flavors. The plantains were then stuffed and fried. The result was a dish delicious enough to make a reputation for any restaurant.

This same hash we used as a filling for *empanadas*, little meat turnovers with a crust made of tortilla paste. Sometimes we had *empanadas* with a filling of the typical tropical white curd of cheese or of beans.

For variety Florinda also prepared us stuffed mashed potato balls, meat balls, and stuffed peppers.

Since we were living in the Tropics, pork was more available than beef, but because we were in the Tropics none of us cared to eat much of it. However, we forgot caution now and then to enjoy Florinda's prize tamales. Pork is to a tamale what corned beef is to cabbage. There are substitutes but none so good.

#### Chicken Dinners Arrive "on the Hoof"

Chickens were always plentiful. At home chicken is one of my favorite foods, but I soon learned why my husband didn't care for it after his years of experience in the Tropics. The girls would bring in a scrawny bird on the hoof.

There isn't an ounce of excess fat on these chickens, and at best they should be stewed several hours. But time never permitted.

## Treasure-trove of Old Mexican Jade

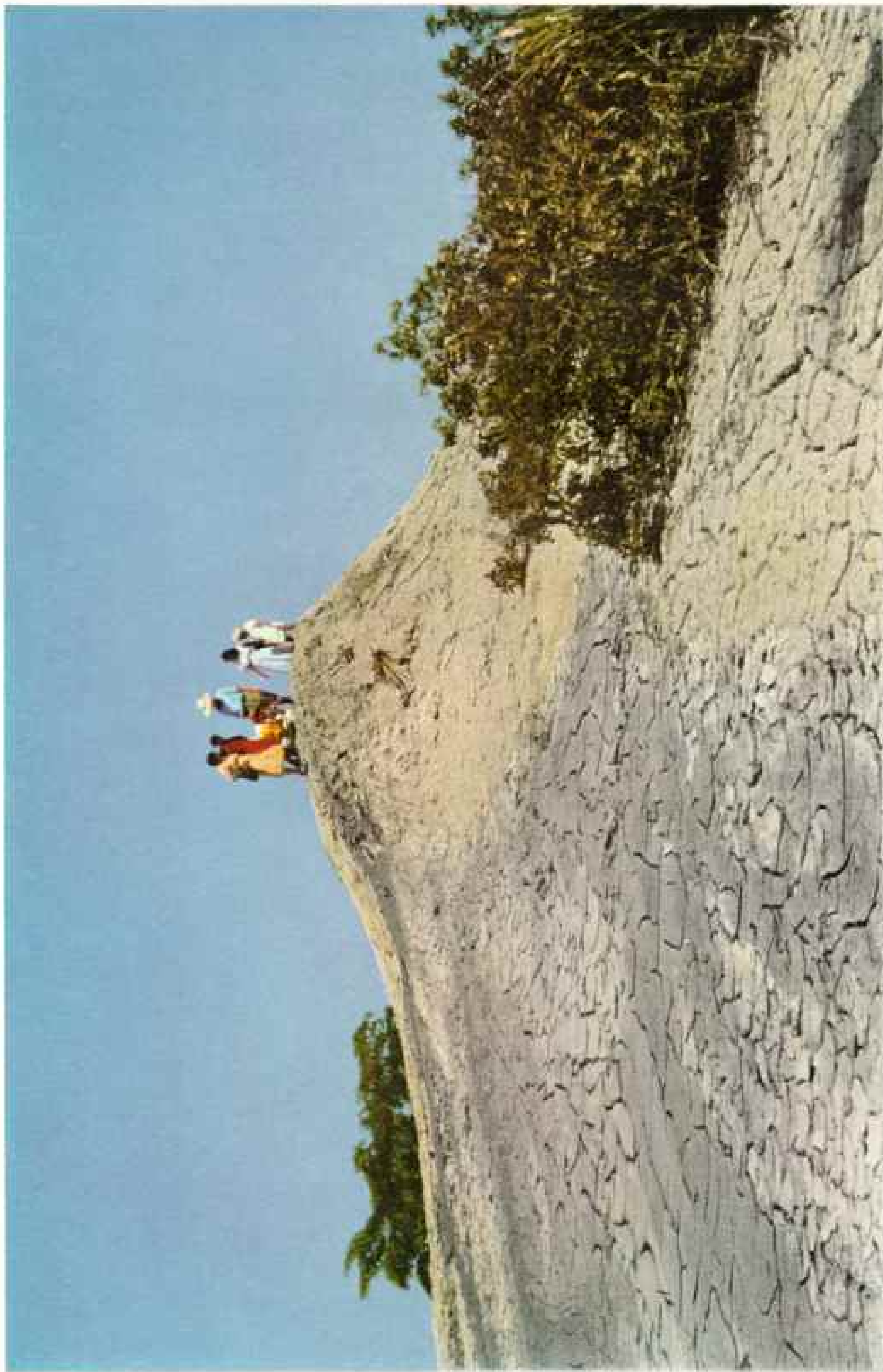


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Excavation by Richard H. Stewart

### **From the Jaws of a Stone Serpent Emerges the Image of a Deity**

Mexican workmen led the expedition to the awesome figure, which was partly above ground. They did not like to excavate in the vicinity, and reported that ghosts often visited the serpent god. Here one, braver than the rest, helps an expedition member clear debris from the base of the figure.

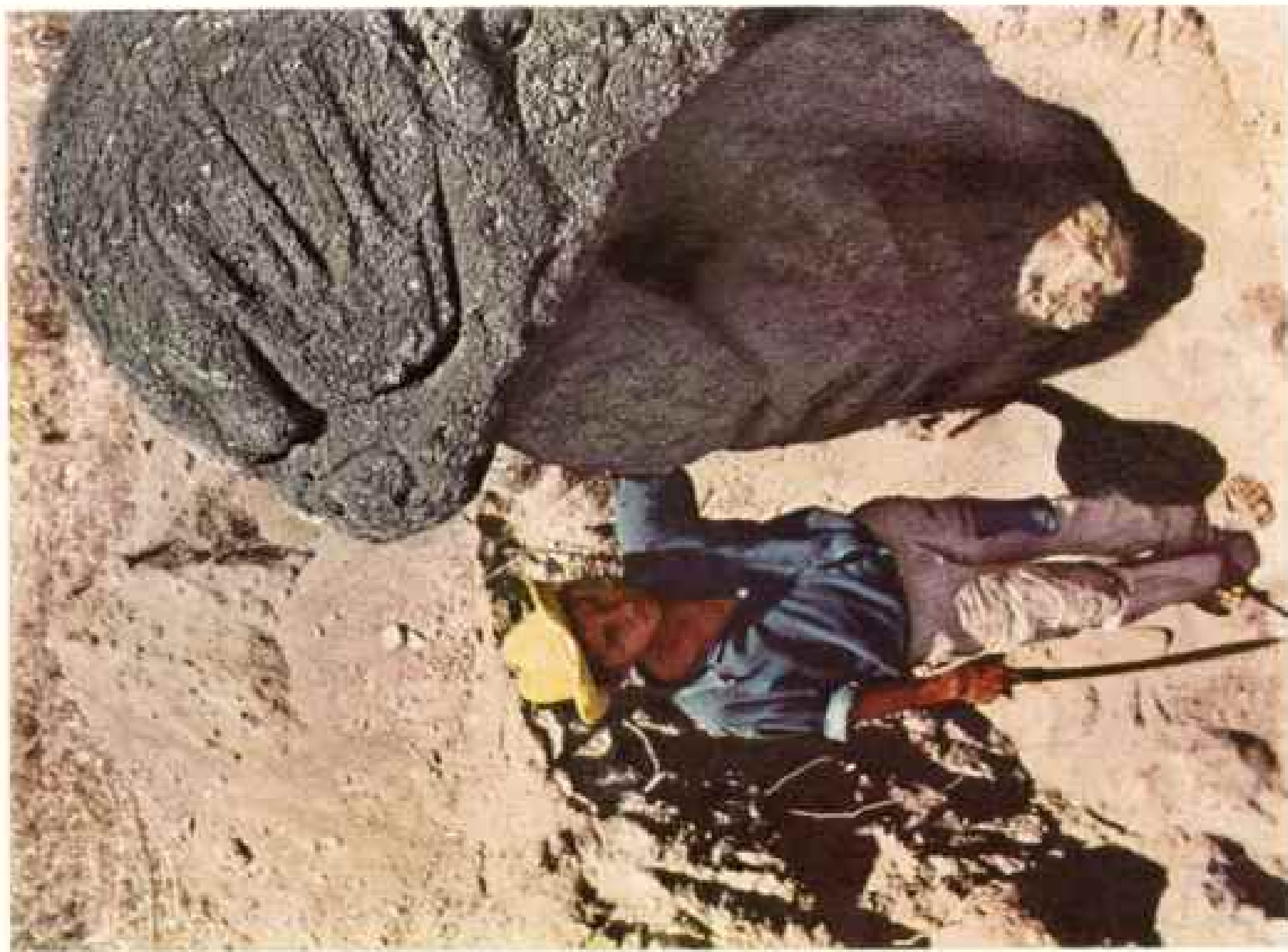


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### **Rising Out of the Flat Plain, a Volcano of Bubbling Mud Builds Up a Sun-cracked Cone**

Illustration by Richard H. Allcott

Fifty years ago the phenomenon did not exist. Now the parched mud, overflowing from the crater, has covered several acres just a short walk from the expedition camp at Cerro de las Mesas (Plate VI). The crater erupts vigorously during the rainy season. Warm mud oozes from seep holes in the sides of the cone.



Reproduction by Richard H. Bennett

**As Much a Riddle as the Sphinx Is the Stone Serpent**

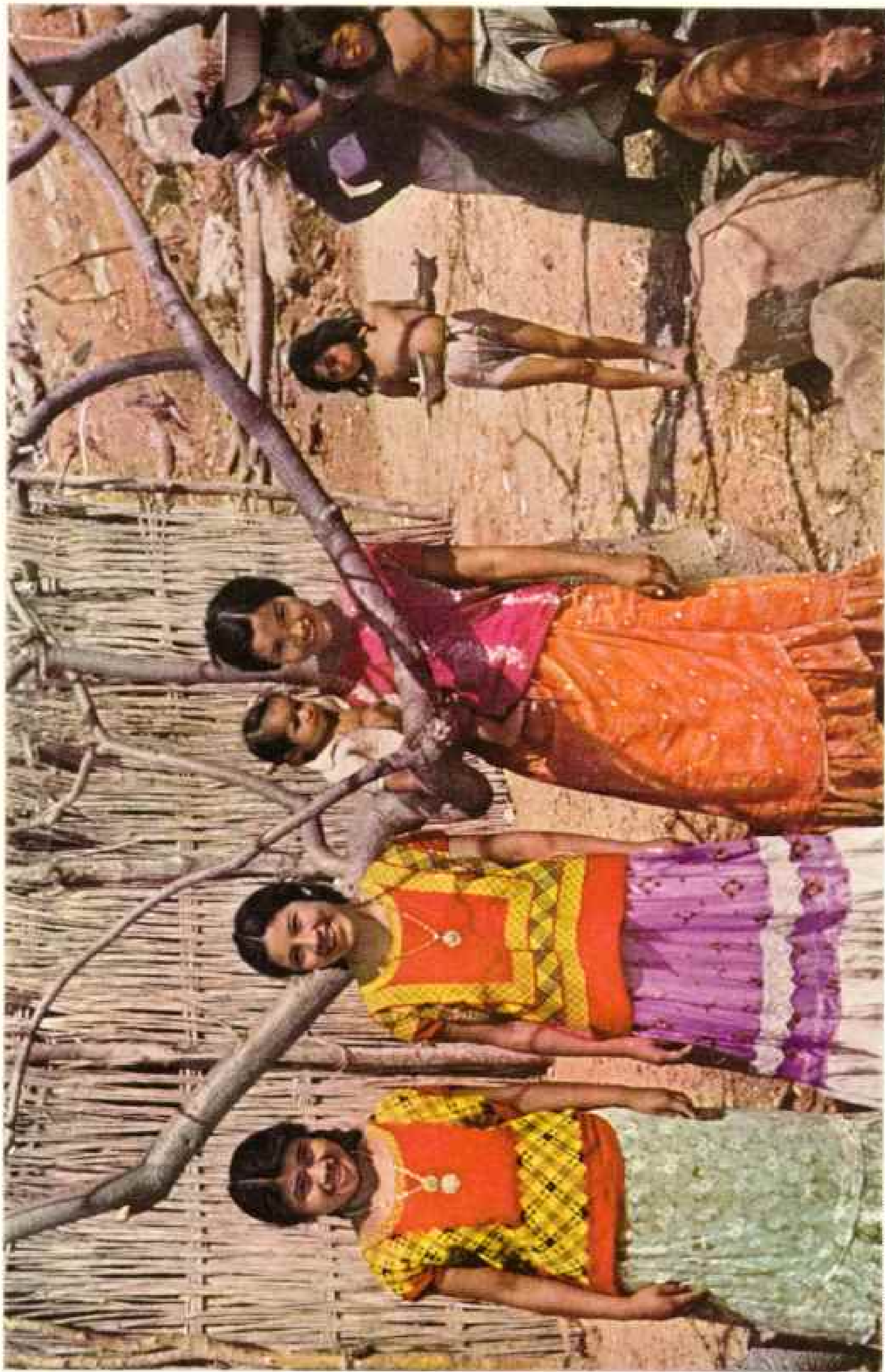
The figure in the mouth of the monster may represent the emergence of man from the earth as pictured in Mexican mythology.



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**Need a Mud Pack? Just Help Yourself**

Feminine members of the expedition found that warm mud from the crater (Plate X) smoothed the skin when they applied it.

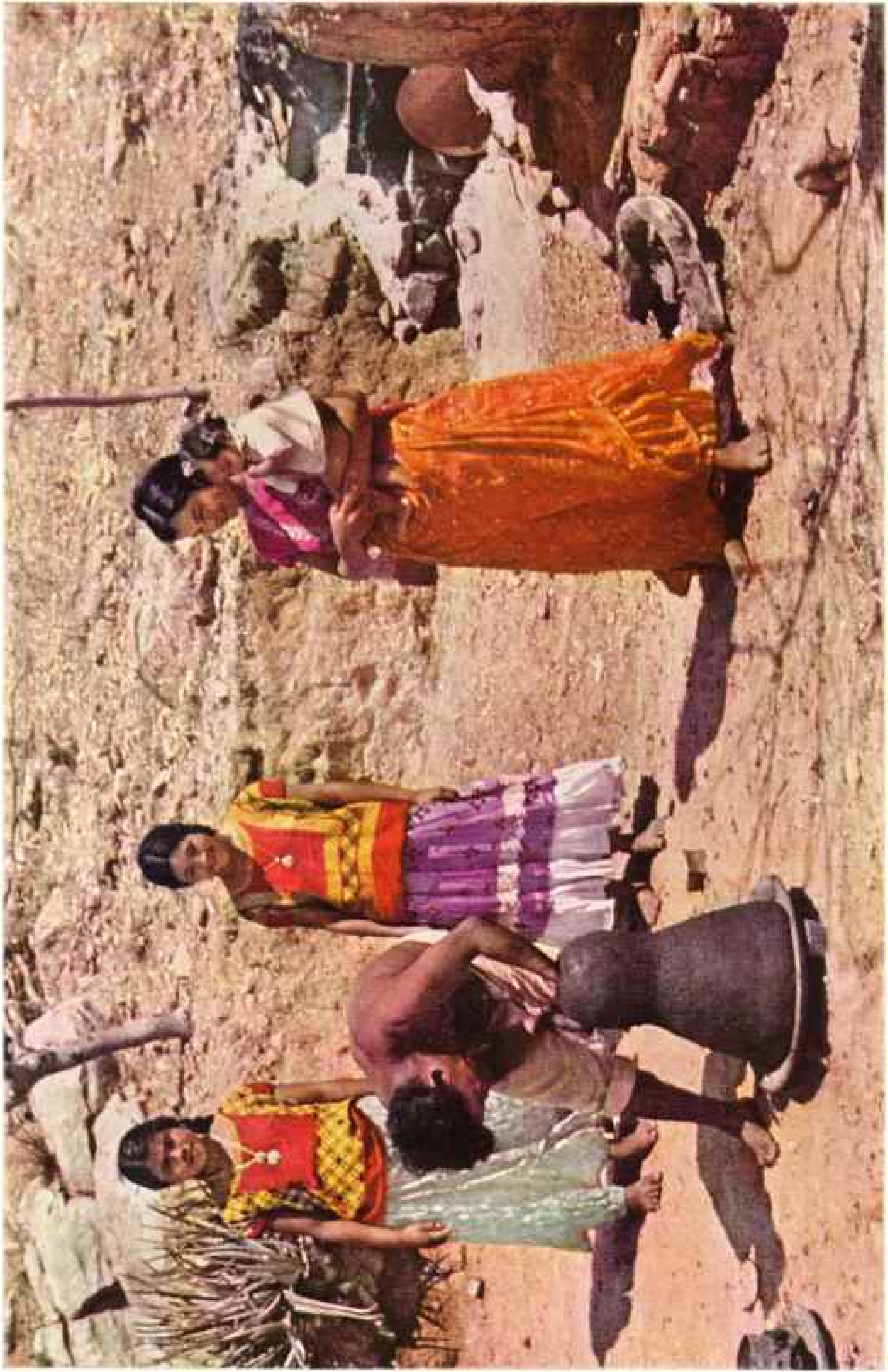


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### Jewelry of the Belles of Tehuantepec Recalls Boom Days Before the Panama Canal Was Built

The town was an important way station on the railroad between Salina Cruz, on the Pacific coast, and Coahuacoalco (Puerto Mexico), on the Atlantic. To avoid the long trip around Cape Horn, many merchants shipped cargoes by rail across Mexico. Small United States gold pieces still are worn as ornaments here.

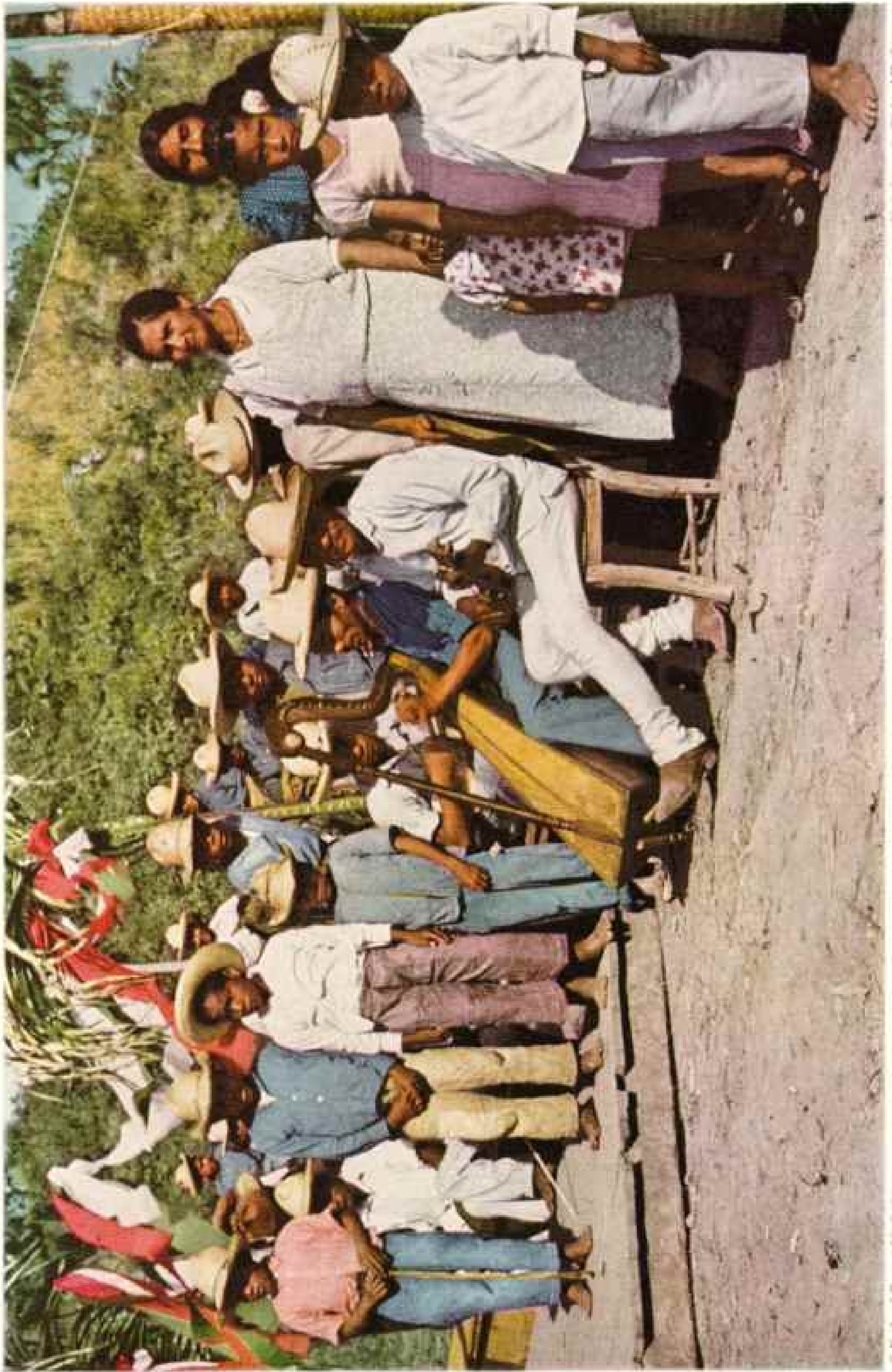


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Continued on Richard H. Bennett

### A Tehuantepec Potter Keeps Alive the Ancient Art of Modeling Clay Figures in Human Form

He is shaping an ornamental stand for a flowerpot. By hand he will mold the features of a man in the upper part of the clay mass, then fire the piece in his kiln. His modeling technique is the same as that of his prehistoric Zapotec ancestors.

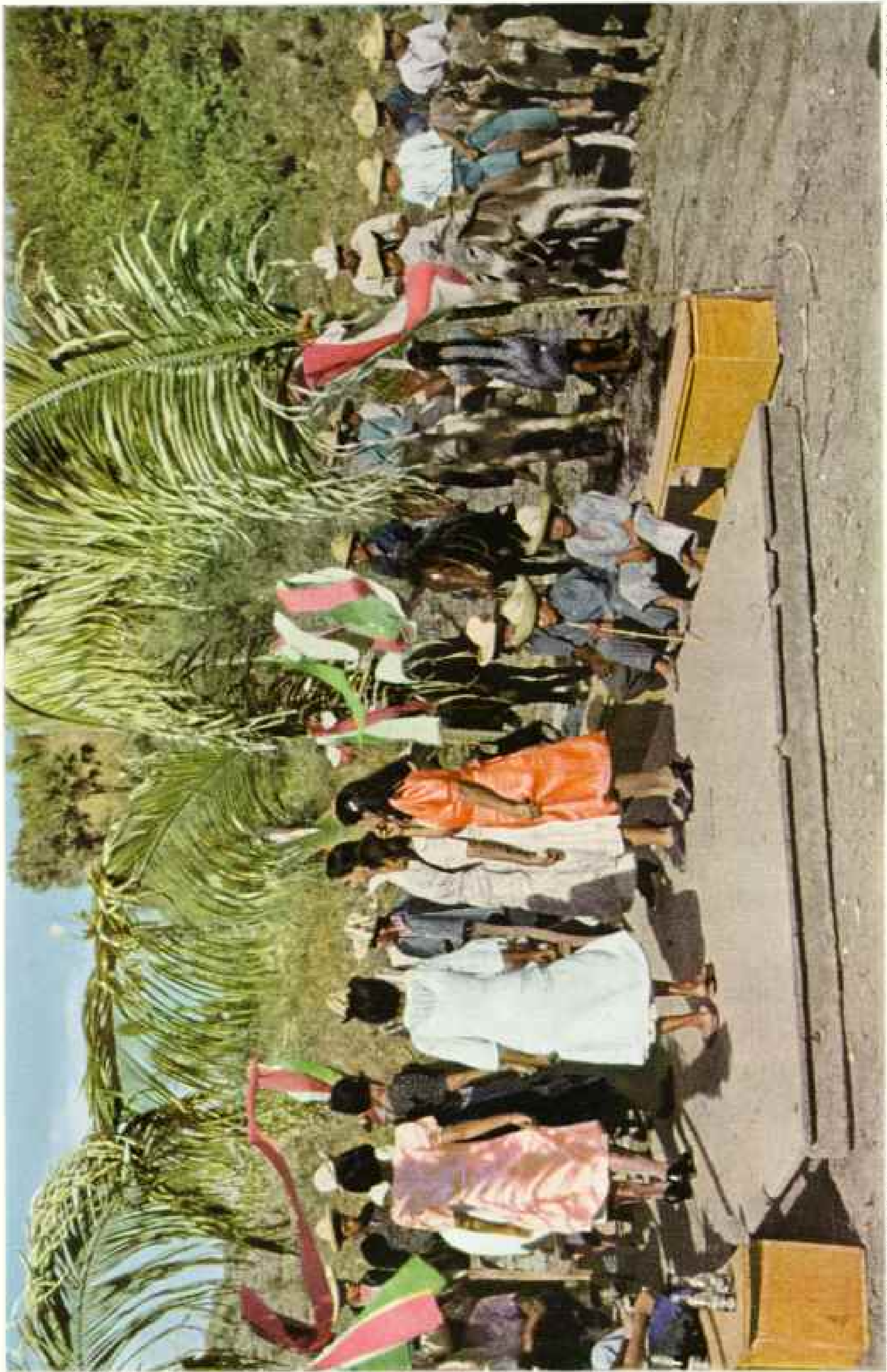


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Photographs by Richard H. Bennett

### The Expedition's Two-piece Orchestra Goes into Action as Soon as the Dancing Platform Is Set Up

Homemade harp and *jirama*, cross between a ukulele and a guitar, sound rhythmic tunes for the performers. The platform, a community possession, is supplied on demand to any village or crossroads. Oxen pull the heavy planking to the scene of the scheduled dance, and then the fun begins.



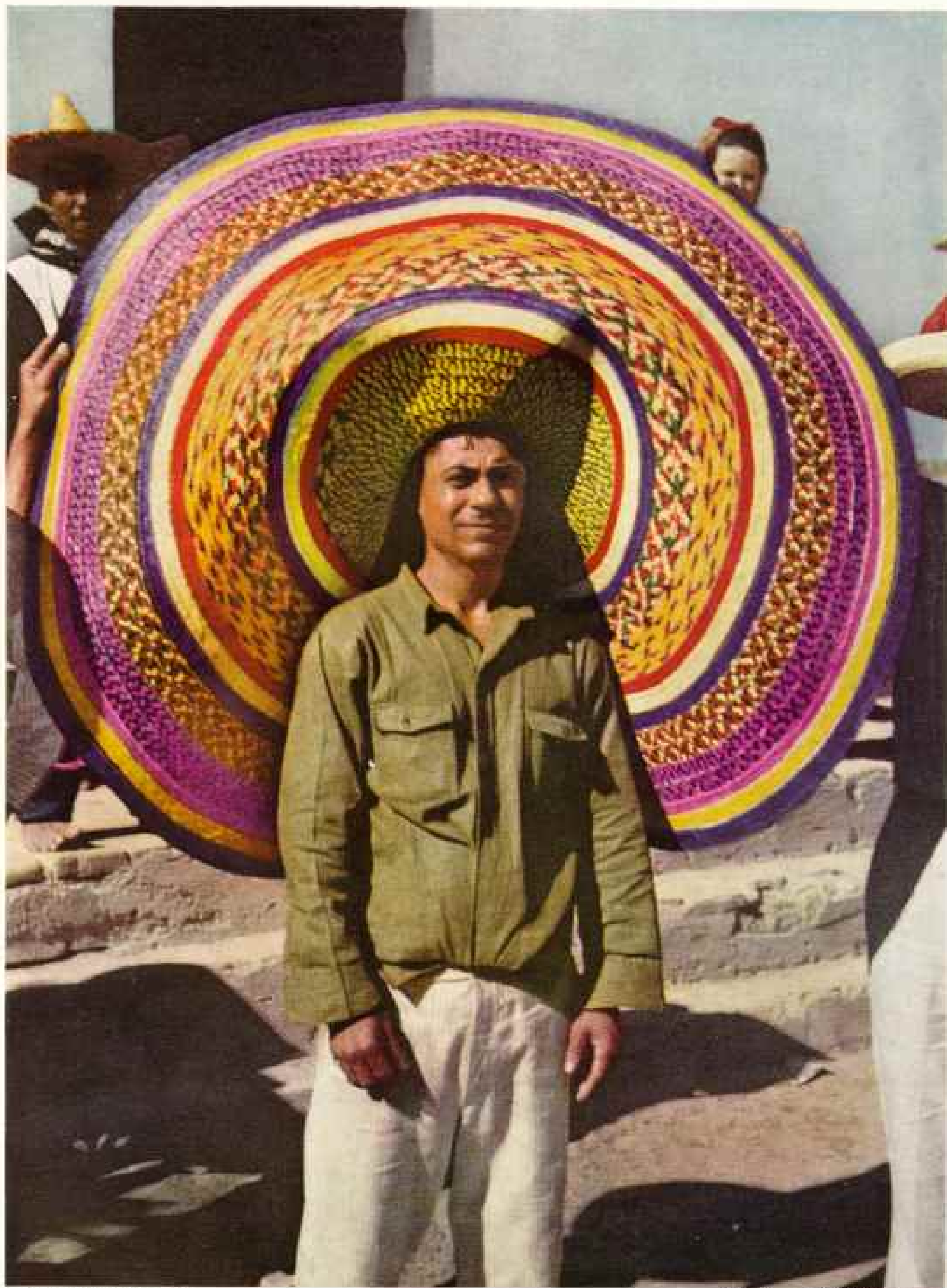
(U. S. National Geographic Society)

**Village Girls Await the Signal to Entertain the Expedition by Dancing the *Huapango*.**

Word of the celebration spread over the countryside and farmers have come by burro to Cerro de las Mesas to watch. Motionless and staring, these onlookers will sit quietly upon their patient mounts for two or three hours at a stretch, enjoying the entertainment (Plate IV).

Collected by Richard H. Sherratt.





© National Geographic Society

Photographs by Richard H. Stewart

**Not a New Fad—Just a Hat Big Enough to Ward Off the Tropical Sun**

This hat maker of Juchitán and his fellow artisans make woven palm-leaf headgear in nearly every imaginable size and shape. Models with extremely wide brims are shipped to other parts of Mexico and to the United States, where many are sold at seashore resorts for beach wear.

Chicken with rice is probably the most famous dish of the Tropics, and it deserves its reputation when there is enough of it.

Another famous dish is the turkey or chicken *mole*. Some 30 ingredients are ground on the metate to make this sauce.

I watched carefully the various proportions and carried home a metate so that I could make it for our friends. The thick, dark-red sauce is poured over the stewed chicken or turkey and imparts a distinctive, rich flavor. In the highlands of Mexico more chocolate and burned tortillas are used, resulting in a blacker and sweeter sauce.

Two or three varieties of fish were caught in the arroyo, but I was the only one in camp who liked fish. Even I rebelled when the fish were cut up, bones and all, and mixed with the rice. I finally convinced Florinda that we did not want fish, river shrimp, tripe, or intestines, but she could not understand why we failed to appreciate such delicacies.

Shortly after arriving in camp, I said I would like to eat an iguana; consequently, we had several presents of iguana to win the favor of the "Señora." The meat is white but strong, and must be boiled for about two hours and the broth thrown away. After this its flavor resembles frogs' legs.

Since Tres Zapotes and Cerro de las Mesas were in the lowlands, we expected to get all the fresh fruit we could eat. Unfortunately, it wasn't the custom to raise fruit or vegetables in quantity. We had squash, chayotes, sweet potatoes, and a few small white potatoes.

We were happy when the "eating corn" was ready. It is sold in "hands," or groups of five ears, as counting was reckoned in aboriginal times, so I had to think in terms of 10, 15, or 20, instead of dozens and half-dozens. There were enough bananas for family use but none for sale. There were no papayas, oranges, lemons, or pineapples, and the mangoes and zapotes were not ripe at the season we were in the field. Thanks to the station wagon, we were able to obtain some fresh fruit and vegetables in Piedras Negras.

#### Too Many Cooks Spoil the Cake

As a special treat, Florinda sometimes made dessert of mashed sweet potatoes, or squash seasoned with sugar and cinnamon, or a sort of cornstarch pudding that resembled cold cream in appearance and tasted like cold cream flavored with toothpaste. However, they did not like my tapioca pudding, so we were even on that score.

Now and then I would make a cake in my oven on the neglected oil stove. I always had an audience, and too many willing help-

ers. It was as much trouble to assemble the ingredients and make a cake in camp as I now find it to grind mole on the metate at home. My vanilla never lasted long because they liked the odor and used it for perfume. The girls called my hot cakes "American tortillas," a much politer phrase than was sometimes applied to them by the more critical American consumers.

The second night we were in camp, we were serenaded by two musicians with guitars, accompanied by about 80 men. This was the first of many such occasions.

The first few Sundays we could be sure of at least 100 visitors; later the novelty wore off, and the number dwindled. A few times we had to eat in the storeroom because the porch was filled.

Some of our visitors walked two days to see the camp. The well, the darkroom, the "casita," and the shower came in for their share of attention. The radio alone would have been sufficient reward for the journey. We could get Veracruz, 40 miles away, any time of day.

#### "The Little Yellow Horse"

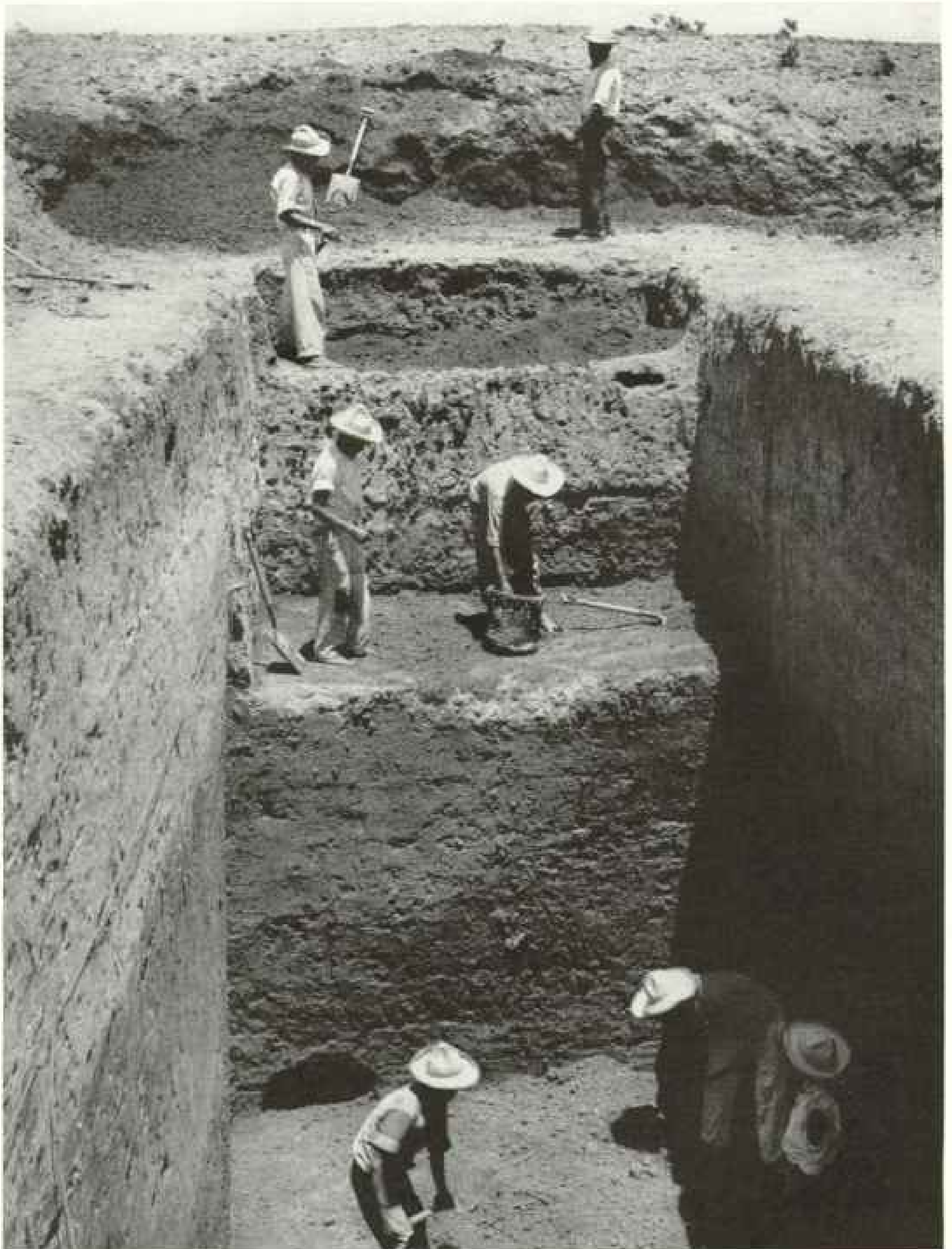
When the station wagon was out of the garage, the children loved to squat and make faces at their reflections in the huge chromium hubcaps. The car was nicknamed the "Little Yellow Horse," because of its yellow woodwork and because it had to be washed, watered, and fed gasoline and oil.

We had our greatest pleasure with Dick's phonograph and the many impromptu *huapango* made possible with the records. The *huapango* is the native dance of the State of Veracruz and is retained in its purest form in the Tres Zapotes region (Plates IV and XV).

There are special pieces for women only; others for one couple, during which either partner may be forced to drop out if another man or woman steps on the floor; and a very few pieces when two couples are permitted to dance. Each has its own set of steps.

Generally speaking, the man is permitted more freedom of movement, but Pedro Cruz, our straw boss, said a good woman dancer may follow her partner in restrained fashion. He did not approve, however, of the "unlady-like" way the women of the Cerro de las Mesas region raised their feet more than four inches above the ground. Nor did he sanction a harp being played with the *jaranas* (Plate XIV).

On our return from a three weeks' trip to southern Chiapas and the Tehuantepec region, a fiesta was held in camp. The natives brought out a wooden dance platform atop



#### Digging into History—a Stratigraphic Trench Sheds Light on pre-Columbian Lore

The explorers first select a site not far from a mound where it is believed ancient inhabitants lived. Then, as the trench is sunk into the earth, the various layers of refuse reveal changes over the centuries. The material at the bottom, of course, represents the oldest period; that near the top, the most recent (page 281). A burial has just been removed from the dark hole in the lower corner.



Staff Photographer Stewart Mixes Chemicals to Develop These Photographs

Laboratory work in a hot, palm-thatched darkroom had its difficulties, but this equipment and special developer and fixing powder simplified the process. Water for washing had to be filtered. No ice was available, so films were dipped in an extra alum hardening solution to prevent the emulsion from softening. Bats, lizards, tarantulas, mosquitoes, ants, and other insects crawled over the photographer and drying film. Some 400 black-and-white photographs were developed at Cerro de las Mesas.

an oxcart and wanted to build a small arbor of palm to protect the dancers from the sun. Dick had to get pictures, so we compromised by having palms set up at each of the corners.

We decorated with red, white, and green crepe paper and, in accord with local ritual, shot off homemade skyrockets for announcing a fiesta, three in the morning, three at noon, and six about one hour before the fiesta was to start.

I had brought along some canned popcorn, and Dick made me a popper out of some wire left over from the screened house. Everyone was impressed with the magic of the little kernels of corn swelling and bursting into fluffy, dove-white shapes. As is our custom, I sprinkled butter and salt on the first batch. Many of our guests asked me if it were sweet, so I quickly took my cue and substituted sugar for salt. Then the demand was greater than could be supplied (Plate V).

Several men asked me for kernels to plant, and I hope they are now growing.

Weekday visitors would bring us a present: some flowers, an egg, a few sweet potatoes, or chile peppers, sometimes a wee, half-starved

chick. It was my place to present a gift in return with similar expression of friendship.

I soon learned the value of tin cans, boxes, bottles, magazines, illustrated pages from newspapers, bits of colored ribbon, tin foil, and postcards. We saved them all and apportioned them.

The natives never wasted anything. When we left, one man asked permission to cut down the palm tree to which our pistol target was nailed so he might extract the lead bullets imbedded in the trunk. For a long time after we arrived home, I had a guilty feeling every time I threw away a tin can, especially a valuable one with a lid.

#### Tablecloths and "Dolls"

Many women tried to sell us hand-embroidered tablecloths. Several asked me if we did not use tablecloths in our land. We considered our oilcloth more sanitary than a tablecloth, but they could not understand why we should be deprived of this touch of elegance.

Some visitors brought in archeological figurines. We established a set price of 5 centavos (one cent) for each ordinary figurine and increased the sum according to the condition of



#### Zebu Oxen Hauled Gravel in Big-wheeled Carts for Floor Making

The expedition staff lived simply in these huts of thatch and palm frames, admirably suited to the climate. Such a native home costs about \$20 to build. Insects devour the frames in about four years, but the thatch may last fifteen. The huts are cool and well ventilated in hot weather, but when cold northers blow in winter they are uncomfortable.

the specimen. All animal or human figures in pottery or stone they called "dolls." Even large monuments were dolls to them.

"Are the cows in your country larger than ours?" they would ask.

Because we were so much taller, they assumed the animals were in proportion.

"Is it this cold in your country?"

When I assured them it was even colder, they would shrink farther into their shawls, burlap bags, or towels, and say, "We would die there." I apologized for having so many blankets by telling them about the snow in our country. Any native family is lucky to own one blanket for the use of the entire household.

After explaining to them our quaint customs on certain days, such as February 14 and April 1, they would feel free to tell me of their beliefs. They entered into the spirit of April Fool because it is similar to their "Day of the Innocents." However, they add a touch by giving presents to any person whom they succeed in fooling.

When they admired some personal or household possession, the polite acknowledgment was to give the cost of the article. When I had the bad manners not to respond with this information, they asked directly. This put

me in a predicament, as I did not wish to transfer the real value of many items into pesos, and thereby either be branded a liar or give the impression of great wealth. Neither did I wish to make the prices too low and be asked to sell at the figure quoted or be commissioned to buy at such a rate.

Elodia bought a pair of earrings out of her first month's wages. I admired them, and she told me how much they had cost and said I should persuade my husband to buy some for me. She wondered why I wore only a wedding ring, because jewelry signifies wealth and position. She was sympathetic because my mother had not pierced my ears when I was young.

#### Mouth Washed after Eating

The correct thing to do after eating is to rinse one's mouth with water and spit in the corner of the room. Several times we were forced to follow suit when visiting in their homes or be considered crude. These people are very cleanly, but ideas of cleanliness differ in different parts of the world.

A teacher is supposed to be sent to each small town for a few months each year. He or she is paid by the Government, but nominal taxes are collected locally for incidentals. As



**A Homemade Bus, Packed with Zapotec Indians, Stops to Fix a Flat**

Between Tehuantepec and Salina Cruz, the party rode in this antiquated car loaded with Indians and their market produce of fish, flowers, fruit, brown sugar, *totopos* (page 305), and pottery.

yet there are more deserving villages than teachers, but these traveling professors are true pioneers (page 306).

Nobody ever quite understood the purpose of our work. Their most logical explanation was that we were looking for buried treasure, and they were sympathetic when we merely found bones and broken pottery. They advised us that a green light was frequently seen over one of the mounds. Wherever this green light appears, we were assured, gold is buried, but if the proper person does not dig it up, the treasure turns to bones.

When we later worked this mound and found bones, they were sure the gold was being reserved for someone else.

Sickness in the neighborhood was for a time blamed on our disturbing the bones of the aborigines. However, since nonworkers as well as those on the pay roll were affected by the same flu epidemic which swept the entire country, the loss of labor due to such superstition was negligible.

At first the potsherd washers were afraid of the bones. I pointed out what good luck it was for them to get a long trip to a museum and convinced them it was for the best. They marveled at the excellent condition of the teeth of the former inhabitants, and Cleophus

advanced the theory that it was because in those days the soil contained more nourishment which was transmitted to the crops.

The washers kept me informed about local interpretations of our finds. One day we were supposed to have found a silver-plated king, that being a plumbate-ware whistling jar, which might have fooled anyone with its lead surface (page 282).

Another time it was a queen with a body filled with jewels instead of bones.

Cleophus thought the jade beads very impractical and too heavy to wear.

From the stratigraphic trenches we saved all the potsherds. From other excavations we sorted the sherds and in the undecorated ware saved only rim and bottom sherds and those showing definite vessel shapes.

Naturally, we kept all the decorated and painted ones.

When our helpers finally realized we intended to take these sherds to Mexico City, they decided the broken pieces of pottery must contain gold. The explanation that we wanted to study the pottery was regarded as altogether too naïve to be credible.

One of the most frequent questions asked me since returning home is, "How about bugs and snakes?"

When the houses were new, we were annoyed by fat juicy worms dropping out of the green thatching. They seemed able to squeeze in any place, and we found them between our sheets, in the pockets of our clothes, in books, and, in general, everywhere.

One night I took my washcloth off the side of the stand, dropped it in a basin of water, and when I picked it up to soap it, out fell a big black scorpion. Fortunately I did not squeeze him when I picked up the cloth, or he would have showed me how he uses his tail! The straw baskets of freshly washed sherds were also havens for scorpions, as they liked damp spots.

We saw several tarantulas, some of good size, and one little coral snake made his home under the floor of our big house. After we had lived in our houses five or six weeks, some lizards moved in with us and took over the job of cleaning up the spiders, worms, and small insects.

The last weeks in camp, we still folded over the tops of our boots and put them under a chair when we went to bed, but we didn't always shake them out before putting them on.

The *pinolillos* were the source of our greatest personal annoyance, and made boots and pants the only practical wearing apparel. These pests, a tiny variety of tick, gather in clusters on sticks or grass stems projecting over the trails. Here they detach themselves in a brown cloud on the first passer-by who contacts them. Let alone, they soon disperse themselves over the entire body, burrow under the skin, and there set up housekeeping.

If these "little brothers under the skin" are not removed the day they attach themselves, a festering sore develops that lasts about six weeks, accompanied by an itching worse than that of a mosquito bite.

The mosquitoes could have been worse. In our "bug house," we smiled at them in comfort.

#### A Strip of "Purple Carpet"

There were all sizes of ants, from the tiny sugar ants to the giant leaf cutters.

In seemingly endless parade the leaf cutters passed our front doorstep, carrying their burdens vertically, like ships with green or white sails, depending on whether they had stripped a tree or were salvaging bits of chewed sugar cane.

Once, while walking through a dark section of jungle, we saw what appeared to be an endless undulating strip of purple carpet. Looking closer, we saw that it was a wide parade of leaf cutters, each bearing a purple blossom detached from a near-by flowering tree.

One day, when we were sitting indoors working, we suddenly heard a sound like rain beating on the thatch of the north end of our house. Lizards and spiders scurried hastily across the floor, pursued by the advance guard of an army of ants. We rushed out with our Flit guns, and after a long and vigorous chemical-warfare engagement managed to turn the tide of battle.

We set all our table legs in tins of creosote, but now and then ants would manage to crawl up. This was one reason why the natives prized tins. We hoarded them ourselves, after discovering we needed their double protection for our butter, sugar, jam, and precious leftover tidbits of canned goods.

The flora and fauna changed continually during the four months we spent in camp. Several of our cultivated flowers grew wild. *Ageratum* and *lantana* grew seven and eight feet high. *Zinnias*, *salvia*, and *marigolds* were like weeds.

There were several varieties of orchids, the most spectacular being the yellow butterfly kind, tiny sweetpealike flowers on sprays three to five feet long, which encircle a tree trunk and hang down from it like ferns.

In the village the women cultivated roses, dahlias, jasmine, gardenias, tuberoses, petunias, and tiger lilies. Every morning one or more of the girls would bring me a flower. They insisted I wear it in my hair, and I very willingly adopted this flattering habit.

There were not so many animals at Cerro de las Mesas as at Tres Zapotes, where most kinds represented by the ancient figurines still live in the vicinity.

Jaguars roamed in the jungle adjoining camp, and one was shot less than two miles away. Kinkajou, iguana, and turtle are still eaten. Monkeys were to be seen in the Tuxtla mountains not far distant.

The *coati-mondi*, a raccoonlike animal, which can use its forefeet like hands, caused us considerable annoyance by depredations in our kitchen. They must have made an impression on the makers of our archeological figurines, too, because we found many representing this animal, shown in characteristic pose with the front paws over the nose and carrying a young one on the back.

We saw several snakes, but usually had to look for them. The coral snakes and *fer-de-lance* are the poisonous varieties of the vicinity.

#### The Bird That "Walks on Water"

In Tres Zapotes Dr. Alexander Wetmore spent six weeks with us collecting birds and brought in many that we would never have seen otherwise. Among the more colorful were



#### Miguel Covarrubias, Mexican Artist, Made Drawings of All Uncovered Monuments

The woolen jacket worn by Mrs. Covarrubias was almost devoured one night by the cockroaches of Cerro de las Mesas. Mr. Stirling (center) explains the significance of the carved stone to the distinguished visitors (page 287).

parrots, parakeets, trogons, the clumsy toucan, jaçanas (which they call the "Jesus bird" because it "walks on the water"), and several varieties of hummingbirds. The bird life was similar in Cerro de las Mesas.

Among the most lasting memories of a jungle camp are the noises. In the morning we were generally awakened by the raucous calls of jays and the hoots of human scarecrows out to protect their corn.

The pauraque, a type of whippoorwill, talked us to sleep at night, monotonously inquiring, "Who are you? Who are you?" We felt like answering, "Who, indeed?"

When we arrived home, our friends would ask, "What did you do with your leisure time?"

We had no leisure time. I washed the choice figurines from the dig, while supervising the girls.

There was always some packing to be done and correspondence and bookkeeping to be kept up to date, not to mention cleaning and shellacking the skulls in our spare moments (Plate III).

About once a week we set out on explora-

tory excursions, horseback or on foot, to visit the numerous mound groups in the region. Many of these trips were strenuous all-day affairs which involved swimming deep streams with our horses and wallowing through dark and miry swamps.

More than once we returned to camp soaking wet and almost too exhausted to eat.

#### Serenade in the Night

One of the nicest things that happened to us was the serenade arranged by our cooks the night of Dick Stewart's birthday. They came in two oxcarts about midnight singing the *Mañanitas*, the Mexican version of "Happy Birthday."

They shot skyrockets to announce the arrival of the big day and crowned Dick with a crepe-paper crown.

I enjoyed the mystery and magic of the tropical evenings. On clear nights, every constellation is as visible as if one were looking at the sky in a planetarium.

On starless nights the light of our gasoline lantern filtering through the cane and thatching of our camp houses made them look





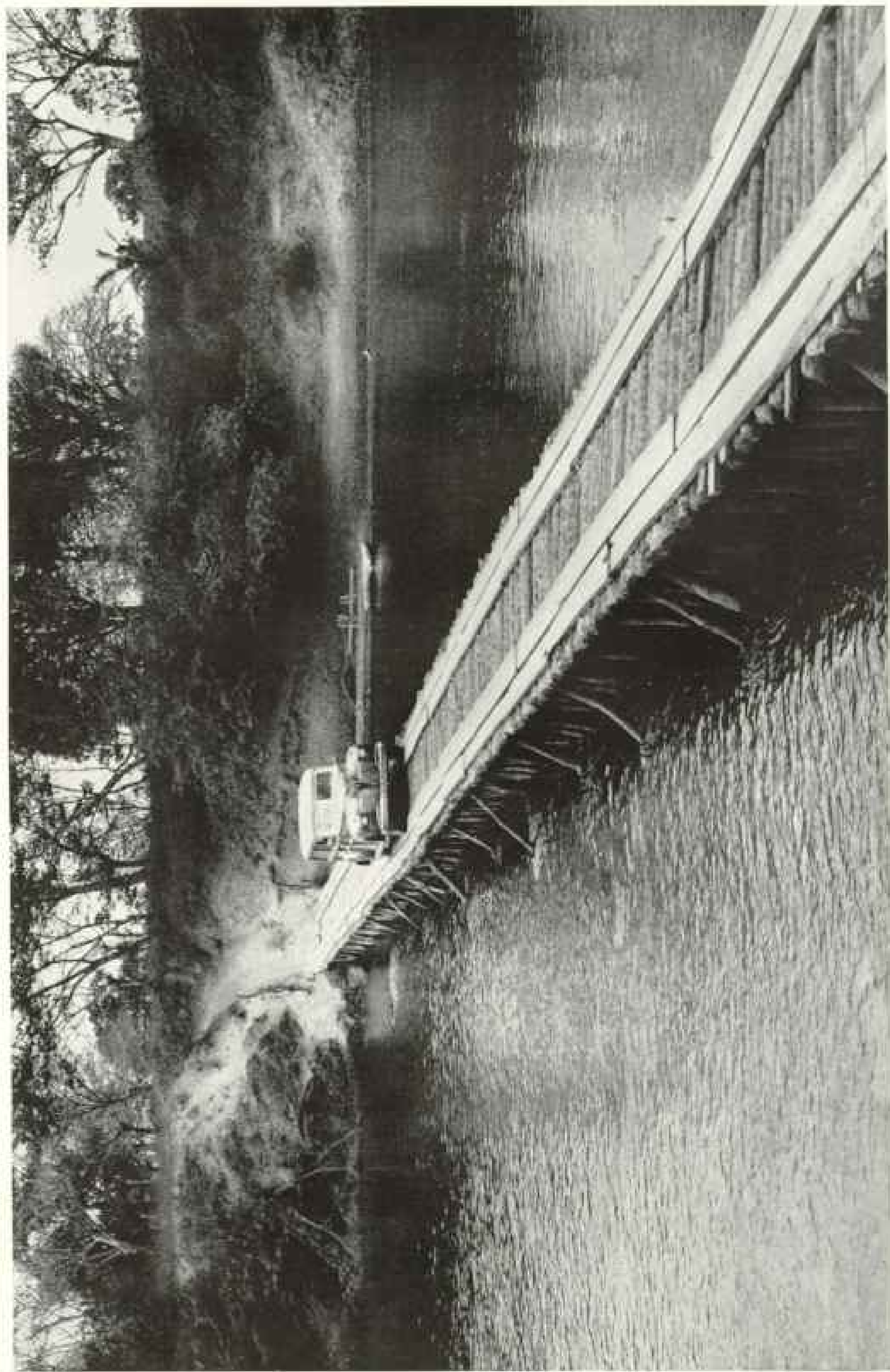
**In This Little Screened Hut, Situated on a Mound, the Expedition Worked Evenings and Entertained Visitors with the Radio.**

Both American and Mexican programs were enjoyed. Even speeches and news reports in English intrigued the natives, though they could not understand a word.



**The Expedition Crosses the "Enchanted River" while Exploring for Monuments in the Swamps around Ignacio de la Llave**

Natives bathe in this stream when they wish to fall out of love, which they look upon as an uncomfortable affliction! On this day six other rivers were crossed, riders often placing their feet between the horses' ears in a futile effort to keep dry.



**"The Little Yellow Horse" Bumps across the Cotaxtla River on a Narrow Bridge Which Washes Out Annually in the Rainy Season**

Natives of Cerro de las Mesas gave the station wagon its nickname because it, too, had to be washed, watered, and "fed" (page 117). Roads herabouts can be used only in the dry season. Even then, to get through the deep ruts oversized wheels were put on the car.



**Florinda Complained until the Oil Stove Was Replaced with a Wood-burning *Fagón***

"I can't cook anything on this," she said. "My rice burns. When the beans boil over, the fire goes out completely instead of just enough to let them simmer. There is no place to keep the food warm. I can't broil the meat. Nothing has the right flavor." Her favorite stove consisted of a wooden box filled with earth on which bricks were set endwise to cradle the fires (page 305).

like bizarre Japanese lanterns clustered in a clearing.

We checked the calendar for the time of the full moon and settled ourselves early to await its superb performance. We watched it peek over the shoulder of the ancient mound and slowly rise and slide into full view. Clouds along the horizon were tinted pink by the waning sunset.

**No Wonder Ancients Revered the Moon!**

As the golden globe rose in the sky with the last vestiges of sunlight gone, the palms, bushes, and trees massed themselves with the mound and all were tinged with its mellow light. No wonder the ancients were impressed and ordered their lives around the moon, and with it conceived their calendar!

Most of all, I enjoyed talking to the local people and learning their points of view.

It is surprising how intimately one becomes acquainted in a few months of camp life. When the day of leaving came at Cerro de las Mesas, as it had twice before at Tres Zapotes, it was impossible not to feel a sense of loss.

No more would I listen from my cot at night to distant huapango music nor be awakened mornings by the grinding of corn on the metate. No more rockets would announce a fiesta near by. I was leaving many simple, sincere friends.

I gathered together my farewell presents: a little chicken, a bunch of green bananas, some homemade cheese wrapped in banana leaves, a rosebush, a bouquet of petunias.

"Don't cry," Florinda warned the girls. "It will bring bad luck to the Señora."

So I, too, struggled to keep back the tears as they each embraced me and said, "Good-bye, until God wills we meet again."



A Deity Walks on Water, and a Jaguar Crouches, on These pre-Columbian Shrines:

Leaning over a carved bowl on the vertical stela is a grotesque god, whose feet are serpents standing on wavy water in which fish are swimming. On his back he carries a large jar. The altar in foreground portrays a crouching jaguar, with head in front and legs at the sides. Mrs. Stirling stands by the monuments, at Izapa.

# Ships That Guard Our Ocean Ramparts

By F. BARROWS COLTON

**F**IGHTING ships of the United States Navy, from the majestic, ponderous battleship to the deadly, far-ranging patrol bomber, come to life with dramatic action in the paintings by Arthur Beaumont on the following pages.

Even to Americans who never have seen the sea, these dynamic water colors will bring a tang of salt and a flick of spray, and something of the thrill of watching sleek destroyers knifing through tumbling seas, or squadrons of fighter planes roaring up from rolling aircraft-carrier decks.

Paintings of naval vessels by Mr. Beaumont hang in the White House and the Navy Department in Washington, and many naval officers have his work in their private collections.

All the major types of combat ships in the Navy, plus long-range patrol bombers and the less romantic but essential supply ships of the fleet, are depicted in this series of eight paintings. They show the ships of the Navy as they appear in action on the high seas, units of sea power guarding the far-flung wastes of surging waters that form the Nation's ramparts against a world in flames.\*

Battleships (Plate I) are the core and mainstay of the fleet. Their main batteries of great 14- or 16-inch guns have frightful striking power, and they are armored with thick slabs of steel against the fire of enemy ships. Battleships are designed "to fight any vessel anywhere."

Besides its heavy guns, the battleship has secondary batteries of lighter guns for use against smaller ships and planes. Modern "battle wagons" have thickly armored decks to withstand aerial bombing.

## Battleship a Floating Fortress

The battleship is essentially a powerful floating fortress, designed to slug it out with other battleships of an enemy fleet. Except for the new ones now coming into service, battleships of the United States Fleet are comparatively slow, but offset this handicap with heavy armor and gun power. Their large fuel capacity enables them to cruise far over the surrounding oceans and challenge an enemy at a distance from our shores. They carry crews of about 1,300 men.

Most versatile of all naval vessels are the heavy and light cruisers (Plate II), which are long, narrow, and fast, and carry only light armor to permit greater speed. Heavy cruisers

have main batteries of 8-inch guns, while light cruisers have 6-inch, and both are equipped with plentiful anti-aircraft guns.

Cruisers are intended to perform a wide variety of tasks. When the fleet is cruising in formation, they act as a protective screen on the flanks of the line of battleships and also serve as scouts. If enemy destroyers attack the fleet with torpedoes, it is the job of the cruisers to beat them off with rapid, devastating fire.

A cruiser also may be assigned to accompany an aircraft carrier on some special mission, to protect the vulnerable "floating airport" from attack by enemy ships. Cruisers may prey upon enemy commerce, patrol vast areas of ocean, or escort our own merchant ships.

Crews of a cruiser total from 450 to 900 men, depending upon the size of the ship. Cruisers of the United States Navy, like its battleships, have large fuel capacity, so that they can operate far from bases.

Aircraft carriers (Plate III) are traveling landing fields of the ocean. They make it possible for planes to be used against enemy ships anywhere on the seven seas, at long distances from shore. The top deck of the carrier is a smooth and level expanse where planes can take off and land as on an airport runway.

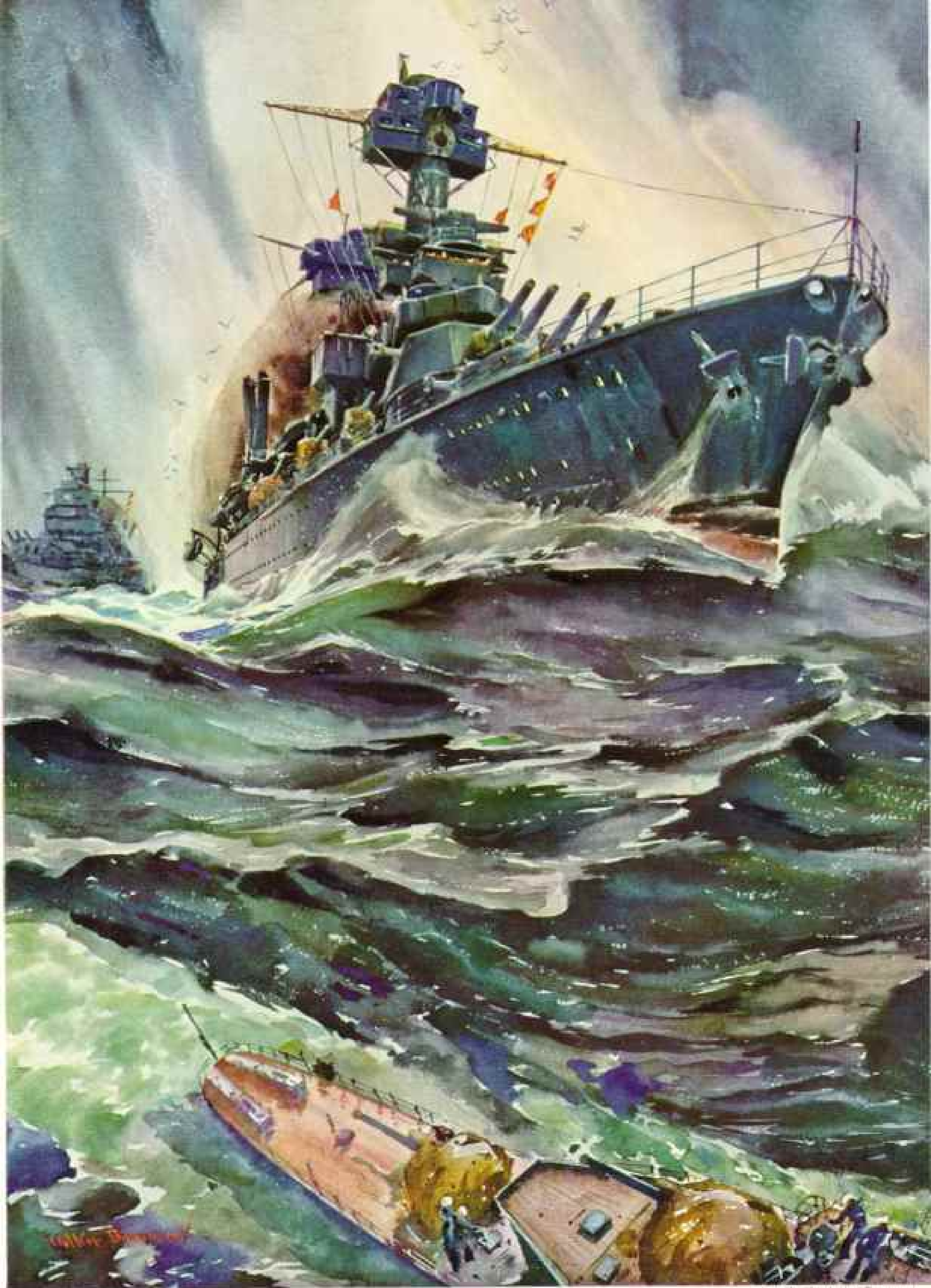
A carrier's planes include fighters, to ward off enemy bombers attacking the fleet; bombers and torpedo planes, to attack enemy ships; and scouting planes. Stored in hangars below decks and brought up for action by fast elevators, all of her 75 or more aircraft can be launched in a very few minutes. When a plane lands on a carrier, a hook on its under side catches on one of several cables stretched a few inches above the deck, bringing it quickly to a stop.

Its huge flight deck and lack of armor make a carrier vulnerable to bombing and shellfire; therefore in a battle between fleets it stays many miles away from the scene of action while its planes attack the enemy.

Airplane carriers, accompanied by a few cruisers and destroyers, can strike independently against enemy commerce, coastal bases, or small enemy fleet units. They can also protect merchant convoys against enemy bombers. Carrier crews include from 1,400 to 1,900 men.

Destroyers (Plate IV) are the Navy's "ships of all work." Lean and fast, constantly rolling but highly seaworthy, they consist of little more than powerful engines encased in a thin steel hull. On their narrow decks are guns,

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



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Painting by Arthur Bannister

Backbone of Sea Power: U. S. Battleships *Maryland* and *New Mexico*









Fast, Hard-riding Destroyers Dash from a Smoke Screen to the Attack



Swift "Mosquito Boats" Launch Torpedoes at Close Range, then Speed Away



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Tankers Fuel the Fleet on Cruises Far from Home: U.S.S. Kaskaskia and U.S.S. Ramapo

Painting by Arthur Beaman



Painting by Arthur Eastman

# Cruisers with Wings: Patrol Bombers Can Scout Vast Areas of Ocean



© National Geographic Society

Painting by Arthur Bousquet

## Prowlers of the Depths: U. S. Submarines *Nautilus* and *Sculpin*

torpedo tubes, and depth charges. Their crews of 100 to 200 men live a cramped, hard-bitten existence, with few frills.

When the fleet is moving in formation, destroyers form an outer ring of defense, scouting ahead and on the flanks, watching for enemy submarines. In a battle between fleets, destroyers may dash in to let loose a swarm of torpedoes against enemy battleships or cruisers. Modern destroyers have double-purpose guns, for use against both surface craft and planes.

Destroyers escort convoys, attacking raiding submarines with their depth charges, which explode under water and smash in the submersible's plates. They can range far over the sea lanes on scouting and patrol duty, or attack enemy commerce.

Patrol torpedo boats (Plate V), popularly styled "mosquito boats," are the newest and fastest types of Navy craft. Packing terrific power, drawing only a few feet of water, they can skim over the waves at tremendous speed. A squadron of 12 such boats could dash in close to an enemy fleet, fire 48 torpedoes in a few seconds, turn and be off, almost before hostile guns could be brought to bear upon them.

The "PT" boats are useful also for coastal patrol and convoy work. They are built of mahogany, and interior structures are padded to protect their crews against the terrific pounding when the boats travel fast in a heavy sea. Each is manned by an officer and eight men, especially picked for their daring and physical ability to withstand the "bucking bronco" characteristics of the boats.

#### Make-up of the "Fleet Train"

Because the United States Fleet is designed to cruise and fight thousands of miles from home if necessary, it must have its own oil tankers (Plate VI) and other auxiliary ships to supply fuel, ammunition, food, and spare parts, to make repairs and keep the combat ships in fighting trim.

These unromantic but necessary vessels, known as the "Fleet Train," are as much a part of the Navy as the fighting ships.

Tankers fast enough to keep up with the fleet on a long cruise are especially important, for though ships expend no ammunition until they meet the enemy, they are consuming fuel all the time.

In recent years many new tankers and other cargo ships have been built under supervision of the U. S. Maritime Commission. Especially designed for quick conversion to naval use, several already have been taken over by the Navy. One of them, the *Kaskaskia*, is shown

in the foreground in Plate VI. The other, the *Ramapo*, is an older type.

Naval auxiliaries include hospital ships with female nurses (only women in the Navy who go to sea!); transports for the Fleet Marine Force; tenders for destroyers, submarines, and aircraft; submarine rescue ships, mine layers, mine sweepers, tugs, and many others.

Besides its powerful surface fleet, our modern Navy also has a mighty fighting fleet of the air, composed of patrol bombers (Plate VII).

Several squadrons of these great flying boats, carrying many tons of bombs and assisted by fighter and torpedo planes from an aircraft carrier, could deliver a devastating attack on an enemy fleet without help from surface vessels.

These big planes are truly fighting ships that fly, for they can land and take off in the open sea, and can be refueled far from land by tenders. They carry crews of 6 to 16 men, and, although slow, are heavily armed to resist attacks by enemy planes. Since the ocean is their landing field, patrol bombers can go anywhere with the fleet, do scout and patrol work for it, and assist it in attacking the enemy.

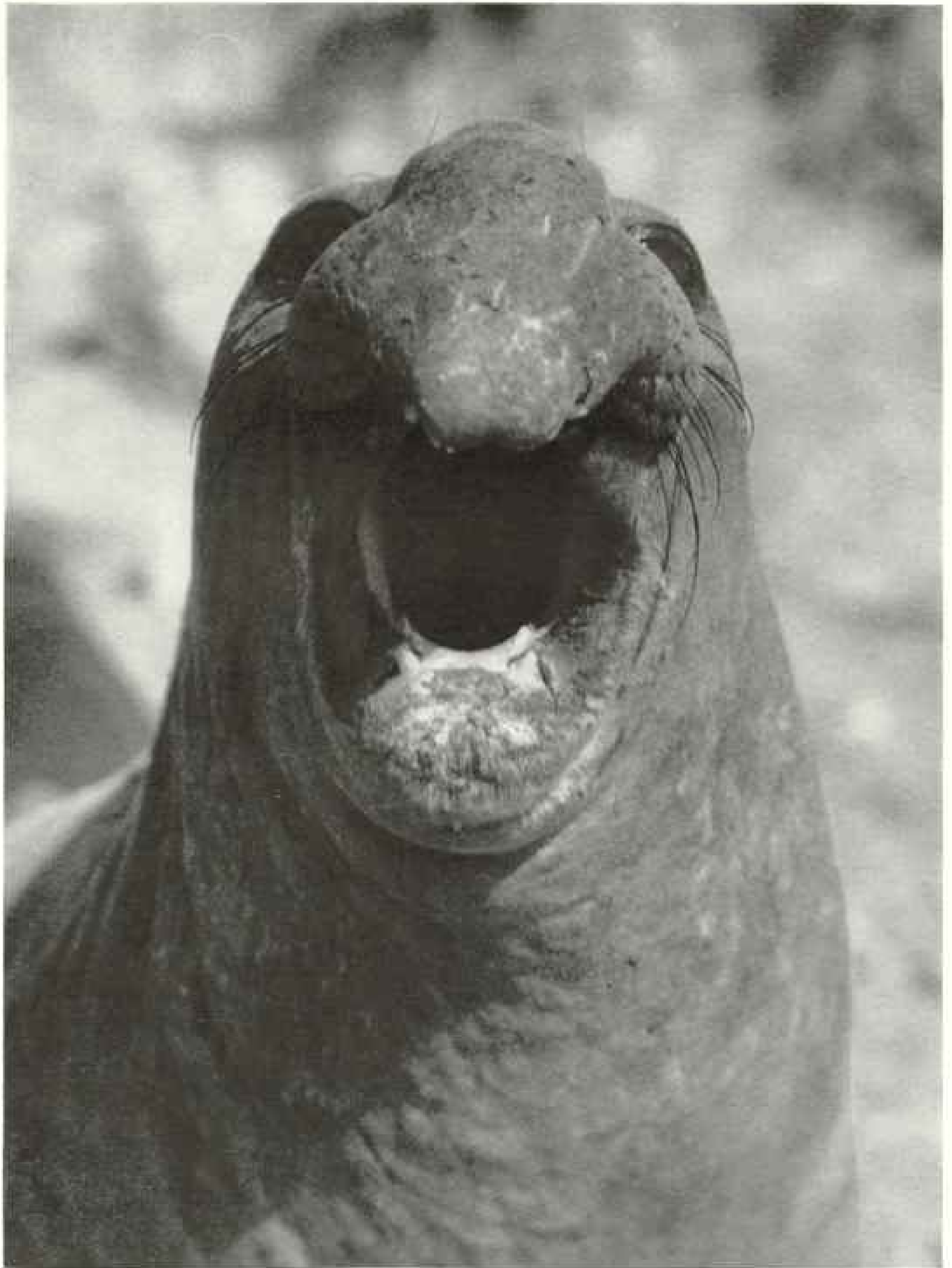
Bombers like these are constantly on patrol over the wide reaches of the Atlantic and Pacific. A single patrol bomber can stay in the air for 30 hours or more and can scout 50,000 square miles of sea in a single day.

Submarines (Plate VIII) are stealthy prowlers of the ocean depths, stalking their unsuspecting prey or lying in wait at some unexpected place for the kill. Their job is to deliver surprise attacks with their torpedoes, either against enemy warships or merchant vessels. Submarines also can act as long-distance scouts, lurking near enemy ports to watch and report on movements of an enemy fleet. Some also are equipped to lay mines secretly in hostile waters.

Modern United States submarines, like other vessels of the fleet, have a long cruising range. They can make 19 or 20 knots on the surface, enough to keep up with the fleet, but only half as much while submerged. The crew includes about 55 men.

Submarines are driven by Diesel engines on the surface, but use power from electric batteries while submerged; therefore they must come to the surface at intervals, usually at night, to recharge batteries.

Submarines carry from 4 to 8 torpedo tubes, one or two medium-sized deck guns, and antiaircraft machine guns. Torpedoes usually are fired while the vessel is submerged with only its periscope above water. Submarine personnel receives extra pay because of the hazards of the work.



An Elephant Seal Yawns on a Beach in the San Benitos

"But my face—I don't mind it because I'm behind it;  
It's the folks out in front that I jar"—ANTHONY EUWER

# Cruise of the *Kinkajou*

Among Desert Islands of Mexico Voyagers Find Outdoor  
Laboratories for the Naturalist and Ideal Fishing  
Grounds for the Sportsman

BY ALFRED M. BAILEY

*The Colorado Museum of Natural History*

*With Illustrations from Photographs by the Author and Robert J. Niedrach*

WITH a storm pounding the *Kinkajou* astern, we started from Los Angeles the last day of March and headed southward toward the gale-whipped desert islands which dot the Pacific off the coast of Baja (Lower) California, Mexico.

We ran before the storm with sail set so that miles were logged at a great rate. Accompanying us offshore were white sea gulls which poised above the masts, headed into the wind, but drifted backward on the gale as fast as the boat traveled ahead.

The second day out the gulls' places were taken by slender-winged black-footed albatrosses, which barely skimmed above the waves, their dark colors making them inconspicuous against the blue of the ocean.

They would alight upon the water in our wake, seemingly feeding upon animals disturbed by the passing boat; then, when nearly out of sight, they would rise and come sailing along, wings motionless, like glider planes riding the wind currents.

Occasionally albatrosses would receive a surprise, as they would circle the ship and get into the lee of our sail. The birds would fall a few feet as the wind was spilled from under wing, and several times we saw them plunge into the ocean.

Porpoises appeared like streaks of silvery light as they followed alongside, came to the surface and dived into the white-capped waves breaking against the bow with a gleam of phosphorescent organisms.

Our host, good-natured Bill Pemberton, owner of the schooner, was accustomed to carrying naturalists and sportsmen to out-of-the-way places. The mammalogists might hang skeletons all over the rigging, the fishermen string sharks' jaws and fins on places not occupied by trophies of the mammal men, and ornithologists—despite the distress of Archie, the cook—skin birds on the dining-room table and keep their defunct victims in the icebox.

To me, as to my companions, Robert J. Niedrach of the Colorado Museum of Natural History, and Ed N. Harrison, naturalist-pho-

tographer of California, the arrangement was perfect.

Since Pemberton's 78-foot, two-masted schooner is not large enough to carry a full crew and a group of naturalists as well, we landlubbers had to lend a hand. We worked in shifts, four hours on duty and eight hours off for each of us. We had a crew of only four: Captain Bob Walsh, one sailor, a cook, and a cook's helper.

## Freezing Winds in the Tropics

The first time I had to take a turn at the wheel during midnight watch, I solved the problem of what to do with the tape from packages of film packed for use in the Tropics. The tape proved ideal for hermetically sealing trouser legs to ankles and thus preventing icy ocean breezes from getting under my three pairs of trousers and all the sweaters and slickers available.

We were still running before the wind on the gray, gusty morning of the third day out when suddenly the clouds broke. Hurriedly Pemberton got out an assortment of instruments and peered at the distant horizon and the bashful sun peeping from a moving curtain of mist. He judged after some pencil figuring that we must be off the San Benitos. Surely enough, those sterile island haunts of elephant seals soon appeared off our port bow.

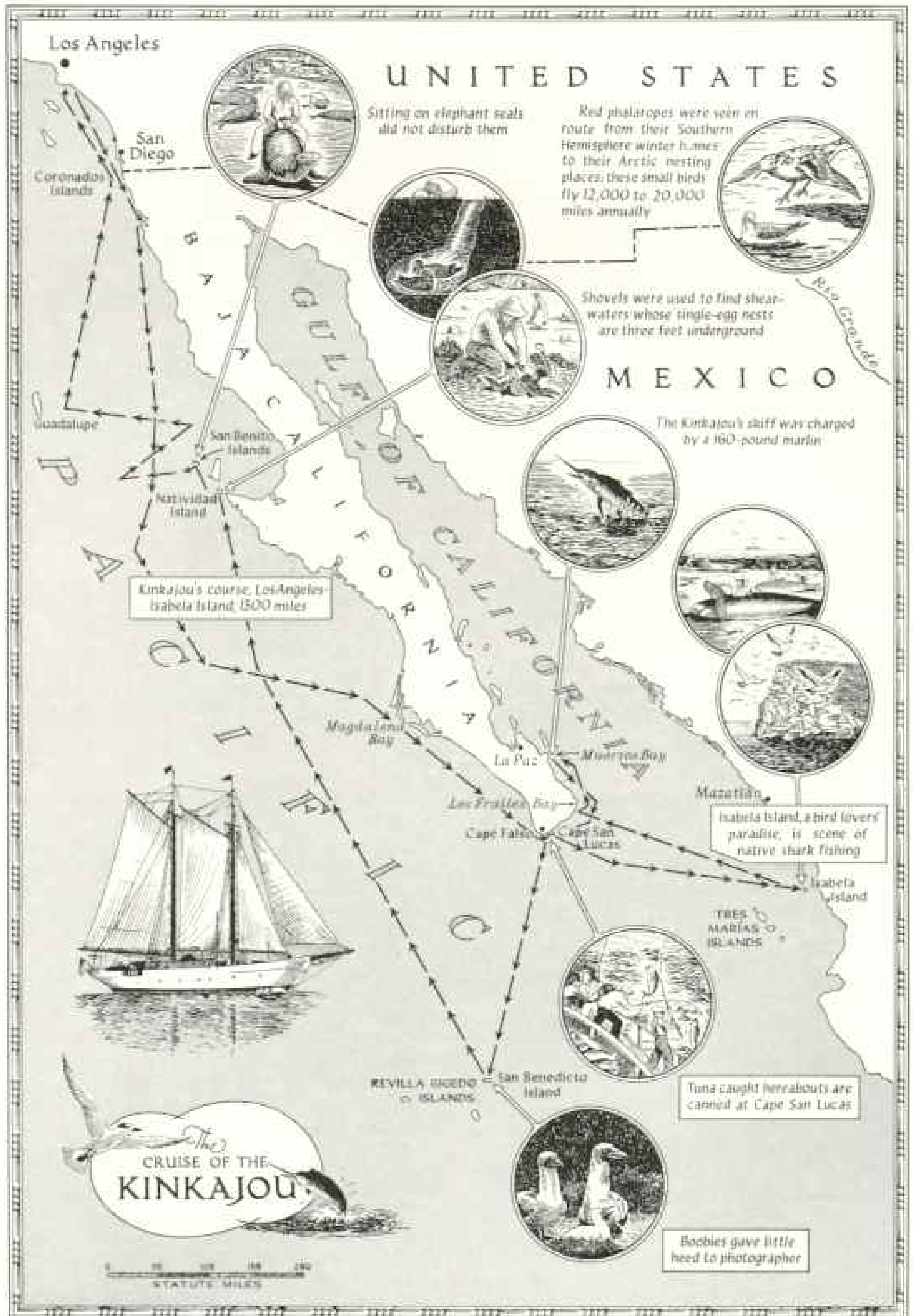
A big oil tanker had crashed on the rocky shore of one of the islands just before a newly installed light had begun to function.

Oil from the wreck had covered the waters and coated the feeding birds with a heavy film which caused them to become helplessly waterlogged. Soon the rocky beaches had been lined with windrows of the dead.

Clearing the San Benitos, the *Kinkajou* headed toward the tip of Baja California (map, page 340). A red-billed tropic-bird circled the boat, its plumage white against a sky of startling blue. In midafternoon a group of black fish passed to the northward, curving through the wave crests like porpoises.

Toward evening, when the wind dropped,





Drawn by Harry A. Gardner, Jr.

we were able to start the engine and proceed under power. The lack of wind seemed to have little effect on the long-winged black-footed albatrosses. They simply sailed along with scarcely a flap of wing, riding close to the surface, their great pinions almost as motionless as the wings of a plane.

As we approached the peninsula, a welcome warmth greeted us. The *Kinkajou* chugged among feeding flocks of red phalaropes, small sandpiper-like birds, still in their white plumage of winter. On their northward migration, they were leisurely working toward Siberian and Alaskan tundras, where they nest during June and early July. These fragile-appearing birds journey 12,000 to 20,000 miles each spring and fall between their wintering grounds and their nesting places.\*

Late the fourth day we skirted the peninsula and cut across the mouth of Magdalena Bay. Great-winged man-o-war-birds came cruising offshore from inland mangrove nesting places and inspected us from high in the air, like so many airplanes on a reconnoitering flight.

Evidently the gulf abounds in fish desired by birds, for a congregation of many species was assembled. Clumsy brown pelicans, floating buoyantly upon the waves, flapped reluctantly into the air when our course was too close; strings of cormorants, black against the dark water, winged toward the barren shores; and occasional small, white-breasted shear-

\* For further descriptions and color plates of many kinds of birds mentioned in this article, see the two-volume *Book of Birds*, edited by Gilbert Grosvenor and Alexander Wetmore, published by the National Geographic Society.



Dick Smith, Able Seaman, at the Wheel of the *Kinkajou*

William Pemberton, owner of the schooner, accompanied the four scientists on their cruise among the islands off the coast of Baja (Lower) California, Mexico. In addition to Smith, a cook and cook's helper made up the crew. Everyone aboard the little vessel lent a hand with the anchor and sails, stood regular watches, and took his trick at the wheel.

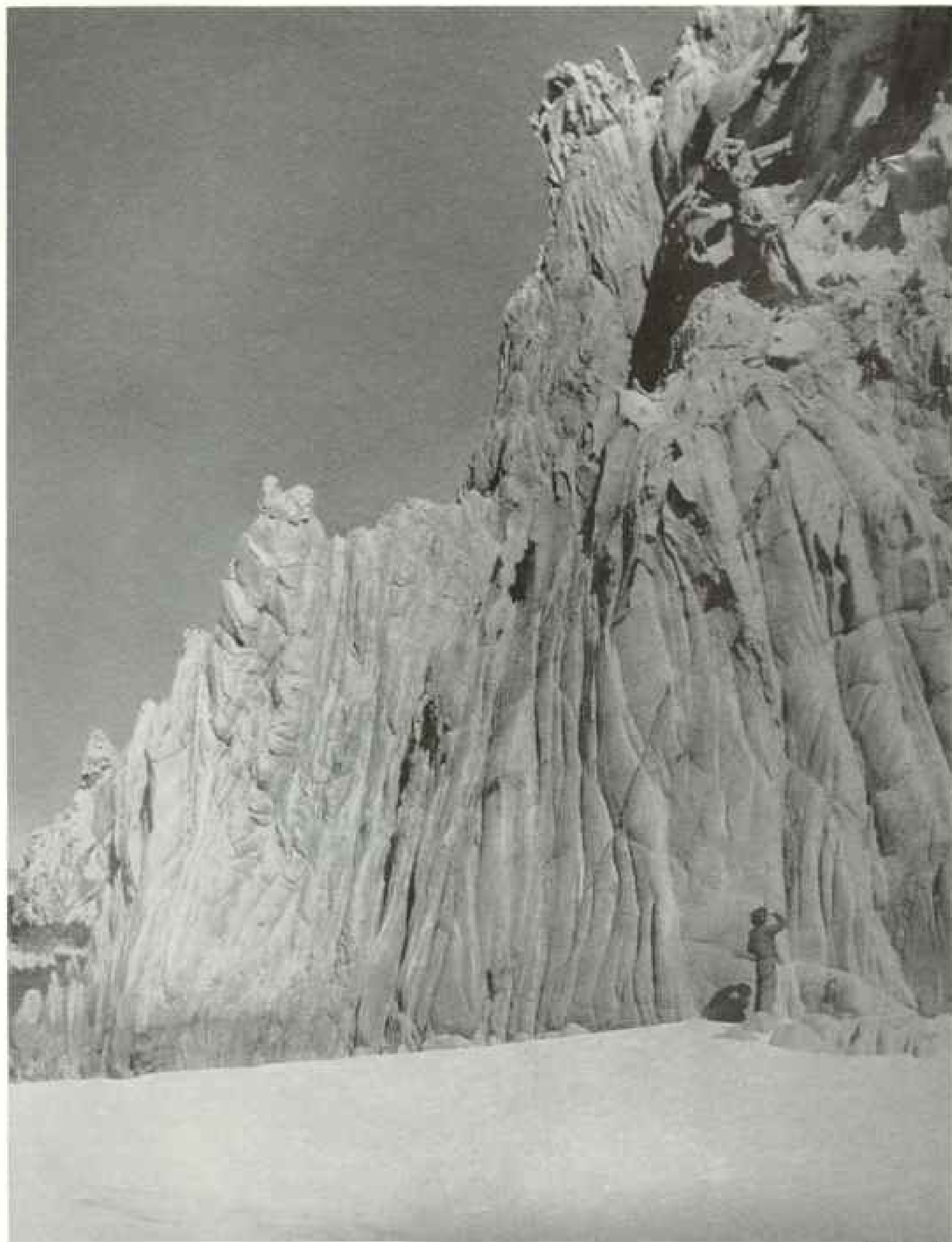
waters, which we found to be the rare Townsend's, flashed close to the surface of the waves.

#### Not a Ship in Sight

The peninsula is sparsely populated. Although direct steamship lines are not far offshore, we had sighted neither smoke nor sail during our voyage.

At night we all liked to lie on our backs about the steering wheel and gaze at pinheads of light in the velvet darkness. We had agreed, unanimously, that the radio should be silent, except to get the necessary time signals for navigation.

The only jarring note between dinner and



John S. Gentry

### Wind and Wave Carve Fantastic Formations in the Cape San Lucas Cliffs

Here the sea has cut through one section of massive granite, leaving a narrow sandspit through which wind constantly rushes. The cape itself is a precipitous, water-worn wall, in which the ocean has cut a vast arch (opposite page). The huge batteries of rocks extend far out to sea from the tip of Baja (Lower) California. This long, narrow peninsula separating the Gulf of California from the Pacific Ocean should not be confused with the State of California, U. S. A. Actually, this arid Mexican territory was the first to be called California by the Spaniards, who believed it to be an island.



#### Six Days out of Los Angeles, the *Kinkajou* Skirts Cape San Lucas

Once this jagged range was a solid barrier at the tip of Lower California, but in many places the granite has been eroded almost to sea level. Rounding the line of rocks, the schooner heads southeast across the mouth of the Gulf of California. Isabela Island, near the Mexican mainland, is her destination.

turning-in time was that owner Bill had the habit of lining up a star and a bit of rigging and advising the man at the wheel that he was right angles to his course. However, as long as no rocks were near, a circular course seemed to us just as good as any other.

We crossed the Tropic of Cancer and cruised for hours close inshore along a sun-baked mountain range of rock and sand. On a high bench of this desert range is the important Cabo Falso light, which serves mariners well.

Cape San Lucas, on the southern end of Baja California, is a precipitous, water-worn wall through which waves have carved a great arch, terminated by outlying rocks white with the droppings of sea birds.

As we cruised near, a sudden northerly squall came up from nowhere and forced us to change our course.

Strong winds are not conducive to good fishing, and we had to abandon plans for angling in the waters off the cape. However, the half gale was excellent for sailing. Up went the sails—not too rapidly, for bungling amateurs do not learn in five days—and we ran before combers which threatened to climb aboard.

Our destination was Isabela Island, off the mainland of Mexico about 250 miles across the

mouth of the Gulf of California (map, page 340). There we hoped to obtain photographs and specimens for a sea bird group for the Colorado Museum of Natural History.

#### Isabela, Famous Bird Island

Bill Pemberton had assured us before the start of our voyage that we should find on Isabela most of the species we sought; and ornithologists had confirmed his statement.

Long before we sighted Isabel, as the island is sometimes called, numbers of great-winged frigate-birds (another name for the man-o'-war-bird), cruising overhead, indicated that land was near. As we approached, solemn brown pelicans stood motionless on spray-spattered rocks. They did not take wing until the boat whistle sent an ear-splitting blast echoing among the white-topped cliffs.

On subsequent investigation we found the island a solid mass of volcanic rock and ash with comparatively fresh flows of black and reddish lava all along the shores. The white areas of the upper reaches were merely lava and ash slopes stained from the droppings of generations of nesting birds.

We made an exploratory cruise around Isabela before heading into the harbor on the

sheltered side. Man-o'-wars with great stretch of wings and forked tails were conspicuous; but red-billed tropic-birds with their shiny white plumage and filament tail feathers trailing after were more spectacular.

Dozens of the latter, also known as "bosun birds," uttering raucous notes, flew close to the cliffs, and occasionally we could see one entering its nest in a high rock cranny.

In the cove, which serves as an ideal anchorage when mild weather prevails, we were greeted by some Mexican fishermen, who paddled out to us from their beach camp in a fine dugout canoe carved from a single tree. They were catching sharks and drying the meat and fins for the Mexican and Chinese trade. Coming alongside, they directed Bill in Spanish to the best anchorage.

#### Faith in Sharks Strong—on Land

Our new friends had been obtaining a fine daily catch of sharks, ranging in species from hammerheads to gigantic tigers, by anchoring setlines far out at sea, with barrels for floats.

One look at the 13-footer which the natives still had in their canoe spoiled our anticipation of a swim. Of course, as naturalists, we all knew that sharks rarely attack humans, but we were not too sure that the sharks knew it. We took our daily plunge close to shore thereafter, keeping watch for triangular fins.

Our own fishermen began overhauling tackle the moment the anchor was dropped. Lowering the launch from the davits, three of them set out on an excursion intended to deplete the countless numbers of marlin said to infest the sea at the south end of the island.\* They took along some defunct flying fish to tow as bait through the tepid water for hours on end.

Hoping to harpoon some of the denizens of the deep under the eye of our motion-picture camera, Captain Bob and Sailor Dick stayed behind. They sensed a golden opportunity when some manta rays, or devilfish, came cruising by the *Kinkajou*, all submerged but the tips of their gigantic wings.

The rowboat was dropped overboard and the portable motor mounted in the stern; then, clad in swimming suits, the adventurers climbed aboard. In the depths of the clear, still water could be seen myriad green, red, and gold fish such as are found only in the Tropics.

A half-dozen mantas were idling near. Some were so close to the surface that they looked like animated barn doors, but a fellow of moderate size, the tips of his wings only 9 or 10 feet apart, seemed the likeliest victim.

\* See also "Fighting Giants of the Humboldt," by David D. Duncan, NATIONAL GEOGRAPHIC MAGAZINE, March, 1941.

Bob fitted the harpoon head to the shaft and arranged a coil of rope nicely in a bucket, while Dick handled the tiller. The boat headed directly for the manta, and Bob stood up in the bow and lunged the harpoon downward with all the power of his 6-foot body.

#### Harpooning a Giant Manta Ray

There was immediate action, but not what was expected. With a side flop of a huge wing the giant ray splashed the boat nearly full of water, then disappeared into the depths. Not a foot of line was taken from the bucket. Instead of lodging in the manta's body, the harpoon head had come off the shaft and the pole had struck into the creature's wing. Bob with obvious chagrin pulled in the dangling harpoon head.

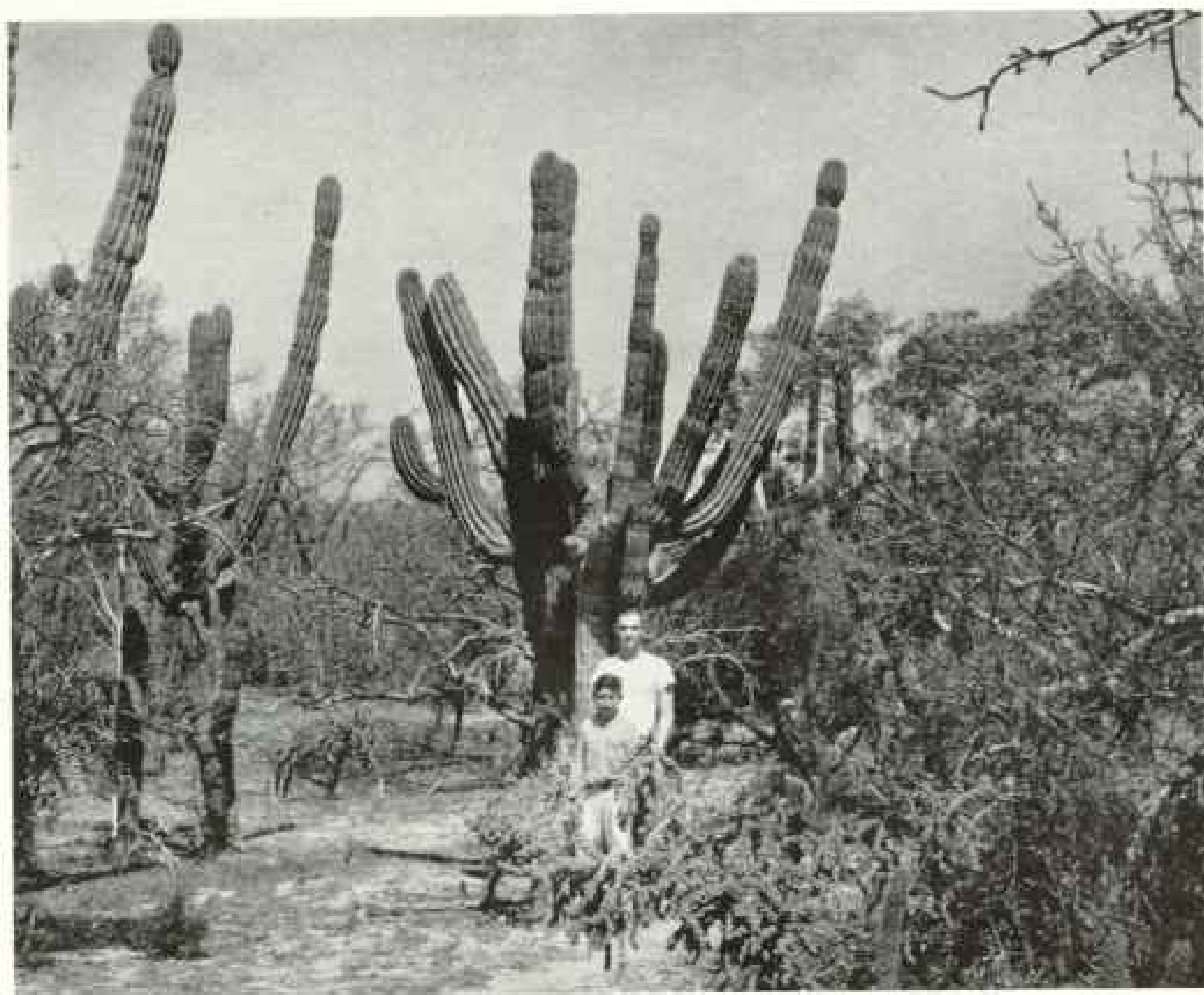
The manta seemed little perturbed, for it soon came to the surface and swam along, with the pole sticking up from its wing like a rakish periscope. When last seen, the intended victim was headed seaward.

Our fishermen came in at dusk, sunburned and disgusted. Their flying-fish bait had lured several kinds of fish, but they had not even sighted a marlin. Except for Archie the cook, no one was interested in the several 60-pounders of unwanted species they tossed on the deck.

Isabela proved ideal for our museum project. There was coral sand stretching to dark lava reefs exposed at low tide, and points of the island extended on either side, enclosing a crescent-shaped bay which made a perfect picture to reproduce in our panoramic background. The rock formed by ash and the excretions of generations of birds has been honey-combed by time, and large iguanas scurried to safety in the crannies or in burrows under the wiry bunch grass.

Hundreds of pairs of blue-footed boobies, quaint heavy-billed sea birds, had scooped shallow nests in the coral sand, and pairs of eggs or white, downy young were scattered throughout the colony (Plate I and page 346). Like many other sea fowl, the several species of boobies have not learned to fear man. They stood about shuffling their feet self-consciously, and occasionally one would run across the ground and rise awkwardly into the air.

For some time man-o'-war-birds had been nesting in large colonies in the 15-foot bushes (*Crataeva tapia*), and their white, downy, piratical-looking young snapped rubbery beaks when we came under the nesting trees (Plate VI). White-breasted females were incubating eggs, and black, red-pouched males were holding down empty nests to prevent others from stealing the nesting material.



### Cardon Cacti Stretch Long Arms Skyward in an Arid Stretch near Cape San Lucas

The tall plants, some 50 feet high, tower over the tangle of scrub desert growth. Cardon and San Lucas woodpeckers nest in holes in the thick stems. Early in the morning, before heat rising from the sand becomes unpleasant, vultures like to perch, with wings outstretched, on the tips of the cardons to take sun baths. In the rainy season the cactus bursts into bloom.

Throughout the Tropics these great-winged sea bandits prey upon the boobies and terns. They float in the air on outstretched wings, like a flock of airplanes waylaying a passing boat, while the boobies are diving for fish, and then swoop down for the spoils. As a squawking booby tries to dodge shoreward, a sea hawk glides swiftly after it, grabs it by the tail, and gives it a flip in the air sufficient to cause it to disgorge its cargo. The man-o'-war catches the food before it has fallen many feet.

### Isabela Island, a Tapestry Woven in Red

On this little desert island artist Nature has made red the predominant color. The dark volcanic rock has a ruby undertone, as if to remind one of fires long dead; the dried fruit and leaves of the *Crataeva* bushes are green and reddish brown; small lizards give a flash of red; thick-clawed land crabs, which

scuttle to places of security in their burrows or among rocks, are a bright maroon.

Among the dark boulders which line the steep, breaker-beaten shores are thousands of crabs of scarlet brilliance. They scurry over the rocks in unbelievable numbers, anchoring themselves with ease against the ceaseless efforts of the surging water.

On the reefs flocks of Heermann's gulls, slate gray, with light heads and reddish beaks, cry plaintively, "Help-help," as they take to the air. The satiny-plumaged, red-billed tropicbirds, so evident against the clear blue sky, and the male man-o'-war-birds are others that carry out the same color scheme. The bright gular pouches of the latter are inflated until they resemble the toy balloons of circus day.

Many of the swimming fish are also touched with red.

Climbing all over the island with cameras on our backs, we found that each species of



#### "Keep Your Distance, Sir"

A blue-footed booby, most pugnacious of all the gannet birds, refuses to abandon its chick despite the close approach of the author, on San Benedicto Island. The bird has incredibly blue legs and feet. Both mother and chick produce resonant, ear-splitting calls (page 344).

bird had its favorite habitat. The blue-footed boobies liked open places, where they would have little difficulty in taking wing; the man-o'-wars nested in colonies on the tall bushes; the noddy terns preferred the high walls of the offshore islands for their nests; and the tropic-birds used crannies in the rocks or holes under boulders of steep slopes along the sea.

It was difficult to get pictures of the tropic-birds, because they nested in dark places. However, we found one sitting on its egg, in a place where we could remove a few rocks and get light for photographs.

Once a pair was located sitting dovelike, breast to breast, with their long tail feathers dangling. They always protested rancorously and were ready to use their sharp, serrated beaks at the least provocation.

Our stay on Isabela was made more interesting because of the presence of the shark fishermen. They were dark-skinned Mexicans of Mazatlán and points southward, with only a few words of English at their command. Except for Bill, who was so busy trying to catch fish he was of no help to us, our Spanish was confined to *adiós* and *hasta luego*, yet with gestures and facial grimaces we were able to carry on extended conversations.

A brightly colored king snake, with red the dominant color, had been reported from the island. We asked the Mexicans about it by drawing a wavy line in the sand and making writhing motions with our hands. Grinning, they all nodded their understanding.

#### Snakes of Many Colors

We held up a peso. As a result, three of the boys brought in a beautiful specimen, banded with black, red, and yellow. It was the first large one collected on the island, and may prove new to science.

The Mexicans greatly feared this snake, saying it was poisonous, and we ourselves were none too sure of its harmlessness. Unfortunately the king snake and the poisonous coral snakes of the south look alike, except for the arrangement of the conspicuous colored bands. The Mexicans told us that snakes were exceedingly abundant during the rains, which would come in six weeks. Apparently the beautiful reptiles remain inactive during the dry season.

The natives said the snakes could be seen in numbers after dark. Eager for more specimens, we got out flashlights for ourselves and kerosene flares for the Mexicans and put in part of a night combing every cranny of the



**Pert and Wary on Land, the Marine Iguana Much Prefers the Water**

In the sea the lizard keeps its legs tight against its sides and propels itself by snakelike wriggles of tail and body. Here it is sunning itself on the beach at Isabela Island.

area adjacent to the harbor. We annoyed a lot of man-o'-war-birds and threw boobies into panic flight, but found no snakes.

After the fruitless search we sat on the beach, watching a late-rising moon which threw a band of light across the harbor entrance. Flocks of sooty terns swarmed overhead, telling the whole world in strident voices that they were "Wide awake, wide awake."

"Gringos" and Mexicans taught one another English and Spanish until nearly dawn. The natives told how they made setlines with hooks every fathom or so apart, and put them 10 miles from the island where sharks congregated on a shallow bench. They used fish for bait, they said, since only the old monster sharks were cannibalistic enough to eat shark meat. In the mornings they fished and after midday took care of their catch, drying fins and tails and salting meat. The skins of even the largest sharks were not saved.

**Off Again—and Hope for Marlin**

Our work on Isabela completed, we bade reluctant farewell to our Mexican friends and headed the *Kinkajou* back across the mouth of the Gulf of California, to the southern end of Baja California.

Our fishermen, who had been feeling for

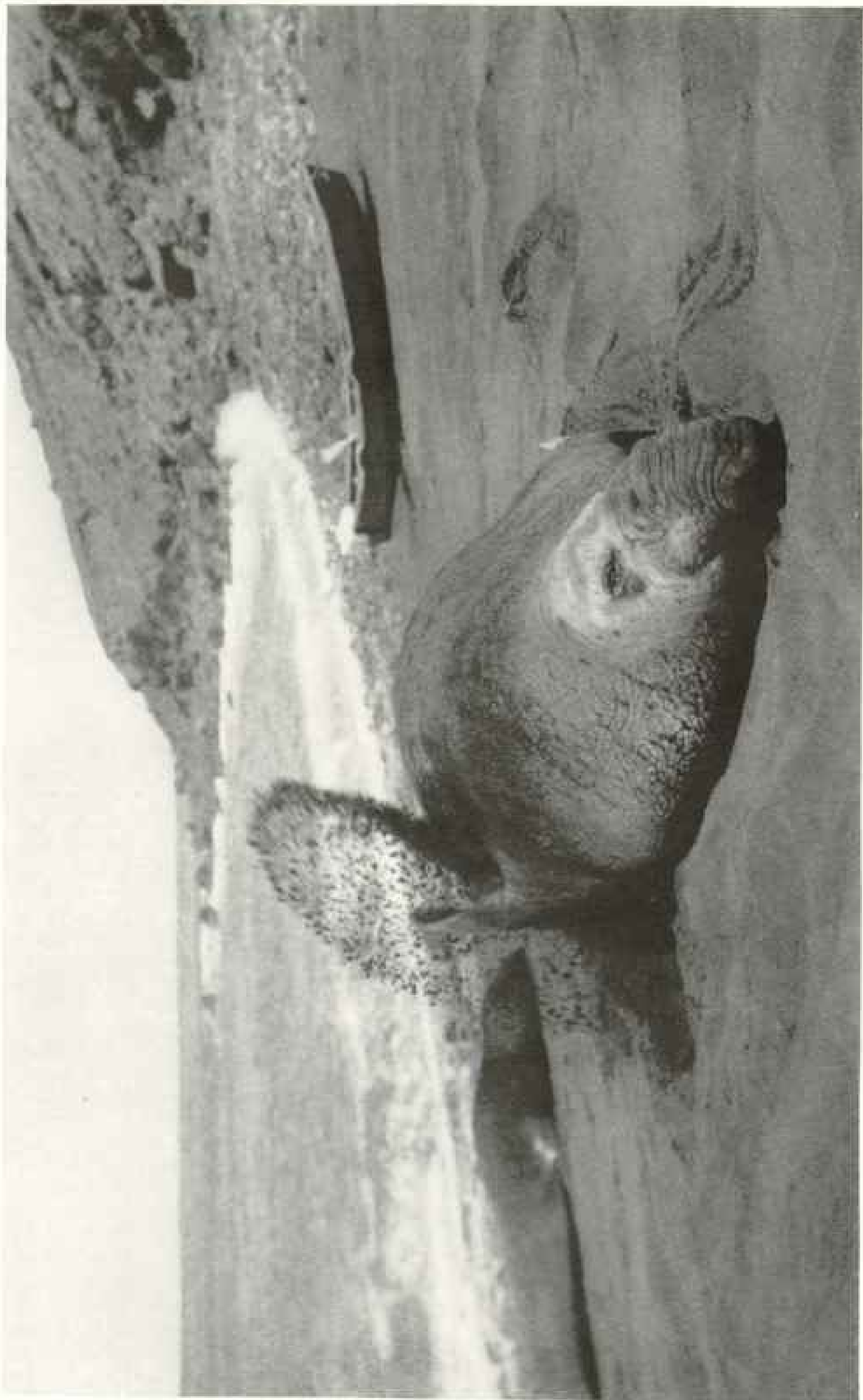
some time a trifle let down that they could catch nothing over one hundred pounds except sharks, were anxious to try other waters where marlin lurked behind every wave.

The second morning out from Isabela we anchored in sheltered Los Frailes Bay. A native fishing boat and a yacht, the *Black Swan*, were there ahead of us, and a visit to the latter proved encouraging to our fishermen. Marlin were running, three having been taken the day before (Plate 1). The kindly yacht owner even had some extra bait he was willing to donate for the good of the cause.

Our eager marlin fishers were on their way to the gulf in short order; and bird men, mammal men, and bug hunters landed rather ignominiously through a line of surf which welled up on the sharply sloping beach. By "ignominiously" I mean upside down. The line of musically rolling waves looked so innocent that we did not take the pains to back our way in, and a large comber caught us.

On the beach, where caracaras, vultures, and ravens were feeding upon a shark's carcass, were two bearded Mexicans, dressed in the usual blue jeans, sandals, and straw hats. They invited us to their little ranch, a snug place tucked away in an arroyo in the midst of desert country. The womenfolk were busy

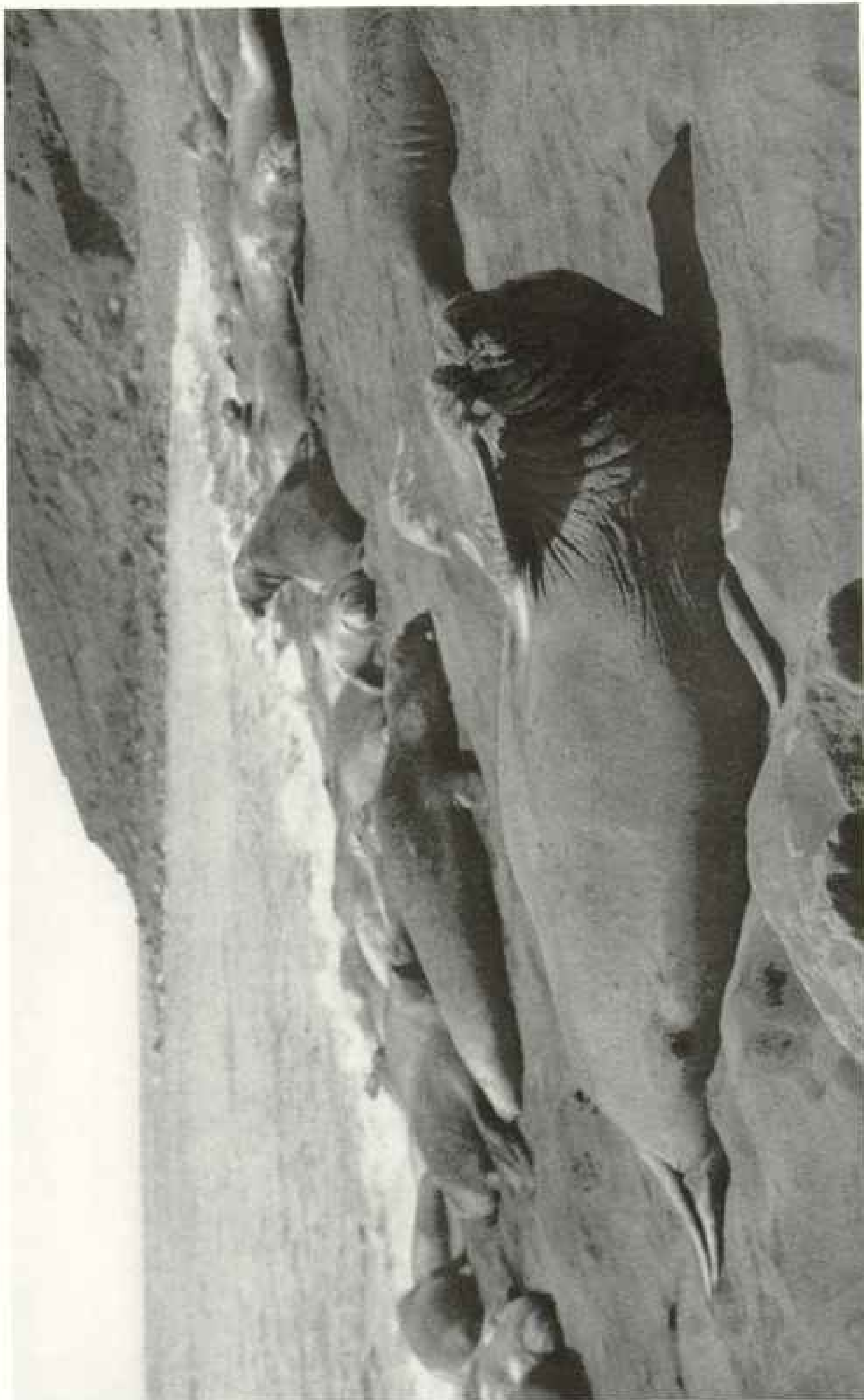




LEWIS, M. Hunt

**No Flies on This Old Fellow—He Tosses Sand upon His Back to Drive the Pests Away**

The elephant seal makes up for the absence of a switching tail by dexterously using his flippers. The blanket of sand also protects him from the hot rays of the sun. During cool nights, and on cold days, these denizens of Guadalupe Island root out trenches in the beach and lie in them to keep warm.



—TAMMIE M. HOY

**Simple Remedy for an Itchy Nose—Scratch It!**

The flexible trunk of the elephant seal attains a maximum length of about 16 inches and apparently serves no useful purpose. Noses of the females are not so long.

drawing water from their open well and pouring it into troughs for the cattle and goats gathered in the dooryard, while a couple of youngsters were trying to corral a frisky calf.

We devoted the several days that the *Kinkajou* remained anchored in Los Frailes Bay to investigating the thorn scrub of barren hills and valleys. Most of the birds of Baja California resemble forms found in the desert area of the southwestern United States, but because of isolation are of different races. Consequently, the area is of unusual interest to the bird man.

Verdins, brown towhees, thrashers, gnatcatchers, brilliantly colored cardinals, and scolding cactus wrens were common in the impenetrable tangle of thorn scrub and yucca. Long-tailed mockingbirds, which gave a flash of white in the wing as they flew to cover, were the most conspicuous.

Because the deserts of our own country are ablaze in springtime with flowering plants, we were surprised not to find similar conditions in the Cape region. Spring there is governed by the rains, which would not come until a few months later. Consequently, the elephant trees, grotesque shapes with smooth, soft bark, had put out only a few leaves, and the great cardons, the tree cacti common in the area, showed their inconspicuous flowers only here and there (page 345 and Plate II).

#### A Desert Vocal with Birds

The bird life, however, made up for lack of luxuriant vegetation, and we each sacrificed several shirts prowling among plants which seemed to snatch at us with outstretched claws. San Lucas quail were common, and we often heard the moaning notes of the little males in the heavy cover, although to get a glimpse of them was another matter. They rarely took wing at our approach, but merely moved off into the vegetation where they were safe.

At Los Frailes Bay our mammalogist, Kenneth Stager, who had been catching bats under the thatched roof of our Mexican friends' house, offered some natives 10 pesos to collect for him 10 specimens from a bat cave which they told him they had found several miles inland. They borrowed a flour sack and started off.

Kenneth was out hunting when the Mexicans returned, and unfortunately he had carelessly thrown his pocketbook on his bunk. Captain Bob had heard the bargain—a peso a bat—but not the stipulation of 10 as the limit. The natives saw no reason for returning with a mere 10. They brought 63, and Bob paid them 63 pesos for an oversupply of bats

that proved to be a common California form!

After three days our fishermen were ready to admit defeat. They had seen lots of marlin and hooked several, but Bill Pemberton alone had brought one to gaff. Of course there was the usual run of pan fish for the cook, little things weighing between 30 and 60 pounds, but these seemed to bring no joy. Ray Gray, most ardent angler of the crowd, had got nothing for his efforts but a case of sunburn that kept him awake nights.

At midnight, hour for me to go on watch, we upped anchor, rounded into the gulf, and headed northward. We had been warned against sleeping on watch, for the commercial fishermen often worked without lights to prevent rivals from discovering them when they found good schools of fish. Mindful of the warning, I was keeping a sharp lookout from the bow when I noticed what seemed a bright star directly on our course. The star was a lantern at the masthead of a boat coming our way. Barely in time we swung to starboard!

#### A Ghost Mining Camp at Muertos Bay

We dropped anchor in Muertos Bay at 6 a.m. All along the shore is a fine sand beach, and a broad valley grown with huge cardons extends northward to the divide. Pounded beyond repair by the force of the onshore waves, an old pier which once served a mine in the back country runs out into deep water. This pier, an old mill, and an abandoned railway are all that remain of someone's dream of wealth.

Among the huge cacti cardon woodpeckers abounded, Cape gilded flickers flashed across the pale blue sky, and vultures soared everywhere. There were several forms that we had not seen down the coast, most interesting being the yellow-legged gull, one of the rarest of North American sea birds. Its breeding ground seems to be confined to the Gulf of California, and few are observed elsewhere. Birds of this species cruised about our boat for scraps we threw overboard to lure them near.

Along the sandy beach we saw Belding's plover and occasionally willets loitering on their northward migration. Migrating flocks of lark buntings, the State bird of Colorado, had paused for a few days' rest in the dense tangle of cactus which formed an impenetrable mat over a large part of the valley. In Colorado they frequent open plains.

The only reptiles we encountered were two rattlesnakes. Possibly it was too hot for them and they were waiting for the chill of evening before venturing from places of hiding. Lizards of several species were common enough,



#### Osprey Nestlings, Sensing Danger, Play Possum

The youngsters, in their spacious home of sticks, twigs, and weeds, lie motionless as the camera clicks. Had the parents been home, pandemonium would have broken loose. Adult ospreys, or fish hawks, are noisy around the nest, calling, whistling, and scolding shrilly whenever an intruder appears.

especially one that had the habit of getting up on its hind legs and skidding along with reckless abandon.

Marlin, eager for bait, abounded in Muertos Bay. Within three hours the first afternoon our fishermen landed an old swordbill each. They beamed with triumph.

The next day while Bob Niedrach and I were chugging offshore with our portable motor attached to the skiff, endeavoring to find some of the murrelets which occur in the gulf, we saw the launch approaching. Ray was in the stern with his line far behind, and Bill was at the wheel shouting rough advice that could have been heard at Cape San Lucas. Ed Harrison crouched on the deck forward with his camera ready for action.

Suddenly a big marlin hit the lure and came from the water with a rush. Ray sat back in his harness, and the marlin gave one more leap into the air. Then, instead of sounding or attempting to take more line, the fish headed directly for the boat!

Whether it was charging or whether it was confused and did not know where it was going, we shall never be sure. It covered 75 yards so rapidly that the boys did not have time to circle out of its path.

With a leap it came out of the water and landed half on the deck, just forward of mid-ship, 160 pounds of violence. The anglers were lucky it landed forward and not in the cockpit, for it fell back into the water after smashing only the cowling.

The blow took the fight out of the marlin, and Ray soon had it to gaff. Two-thirds of its sword had been broken off, and what remained was just a big stump useful as a ram.

Though our sportsmen were reluctant to leave their fisherman's paradise, we sailed from Muertos Bay in the "graveyard watch" as usual and continued down the gulf toward Cape San Lucas with a fair wind kicking the *Kinkajou* merrily along.

The crescent-shaped harbor at Cape San Lucas was alive with anchored small craft, ranging from fishing boats which supplied the local tuna cannery with its raw product to pleasure yachts from California.

#### Mexican Officials Hospitable

The quarantine officials, white-clad Mexicans, came off in a rowboat propelled by a perspiring gendarme, who had strapped about his middle a revolver as big as a miniature cannon. Once aboard our craft he stalked

back and forth nervously, while the officials were below partaking heartily of refreshments. These representatives of the Mexican Government hospitably invited us to go ashore, expressing the hope that we could visit them at their headquarters. Later the villagers treated us most cordially, youngsters vying with one another to show us where specimens could be observed.

An excellent cannery at the head of the harbor means much in the economic life of the people of the cape. Like women "herring chokers" of Alaska, scores of girls work in the factory preparing fish caught by the men. A siren, sounded whenever a fish boat comes in, announces that workers are needed, and a colorful throng is soon plowing through the loose beach sand to the cannery.

The tide line adjacent to the cannery is an ornithologist's delight, for hundreds of immature yellow-legged gulls, vultures, ravens, and caracaras assemble there to feed on meat washed up by the oncoming waves. We saw a couple of pigs competing with the birds and seeming to be getting their share.

Field days in the Cape region are a constant delight, if one starts early enough in the morning. Because the country is more open than that at Los Frailes or Muertos Bays, there is no impenetrable tangle to tear one's clothing. Cardon forests surround the wooded plain on which the Mexicans have their straggling little town.

Back in the hills we came upon homes loosely built to give maximum ventilation. The majority of the houses had neat flower gardens, and most of the fences were covered by a vine with pink blossoms (*Antigonon leptopus*). Later we found these vines in full bloom throughout the forests of cacti. The student of desert plants would have enjoyable field trips in this region; for, in addition to the giant cardons 20 to 30 feet high, there are cacti of many species, ranging from the tree cactus to crawling forms. In regions adjacent to settlements, the cattle have opened trails.

I had the cook's assistant as a camera bearer on one occasion, and he soon had several barefooted helpers. How the boys could travel through the thorn-covered mountainside without being crippled for life was a mystery to me.

#### Countryside a Veritable Aviary

The cardon woodpeckers were nesting in holes in the tall plants, and the sharp rapping of birds upon dead wood reverberated through the forest of cactus. The abundance of these birds, Cape gilded flickers, and San Lucas

woodpeckers seemed to indicate that conditions were right for the survival of insectivorous species capable of boring into wood.

The soft note of the white-winged dove, *la paloma* of the Mexicans, came softly from every hillside; cardinals were calling, though just a little differently from those back home—and their near relatives, the colorful male pyrrhuloxias, sang from the highest cardons.

Small mammal life was not abundant, a few ground squirrels by day and bats by evening being all we encountered. The reptile men, however, had a grand time, with lizards and snakes to be had everywhere. One particularly interesting snake was a large white racer which looked like a ghost as it slid rapidly through the scrub tangle.

While the *Kinkajou* was anchored at San Lucas, our fishermen trolled around the harbor and caught spotted bonito and cabrilla to their hearts' content. They nearly caused a riot among the Mexican boys every time they came near the wharf, for the boys knew that the catch would be given away. We all enjoyed watching the youngsters scramble and go away so loaded with fish that they could hardly walk.

I would have been willing to stay indefinitely at San Lucas, but after a few days I noticed a faraway look in Bill's eyes as he began to tell me of the interesting birds to be found on San Benedicto of the Revilla Gigedo group 250 miles to the southward. A little judicious questioning revealed that the waters surrounding this volcanic island swarm with fish which with open mouths welcome anglers.

According to invariable practice, we pulled anchor at midnight. The schooner ran before a howling wind that laid her on her side, but we put knots behind at a remarkable rate.

#### No Place for a Crusoe

Robinson Crusoe would not have done very well had he landed on San Benedicto, which rises nearly a thousand feet from the sea, for it is built of igneous rock and volcanic ash that look as if they had been deposited in the last few days.

The only plants were a few low-growing bushes and fields of tall grass, the latter bearing a seed which must have been invented by the ruler of the melting places of igneous rock. It penetrated socks, trousers, and shirts. A day ashore meant new clothing, for the seeds could not be pulled out.

Pemberton was right about the birds. We found that this little island had an avian population derived from the islands of the Pacific rather than from Mexico. Wedge-tailed shearwaters lived in burrows deep in the volcanic

## Birds and Beasts of Mexico's Desert Islands



Kodachrome by Ed S. Harrison

### While the Cook Looks on, a Proud Angler Weighs His Marlin

One fish charged the boat from which it had been hooked, breaking off part of its formidable sword. Some varieties of marlin weighing more than 900 pounds have been caught by rod and reel.

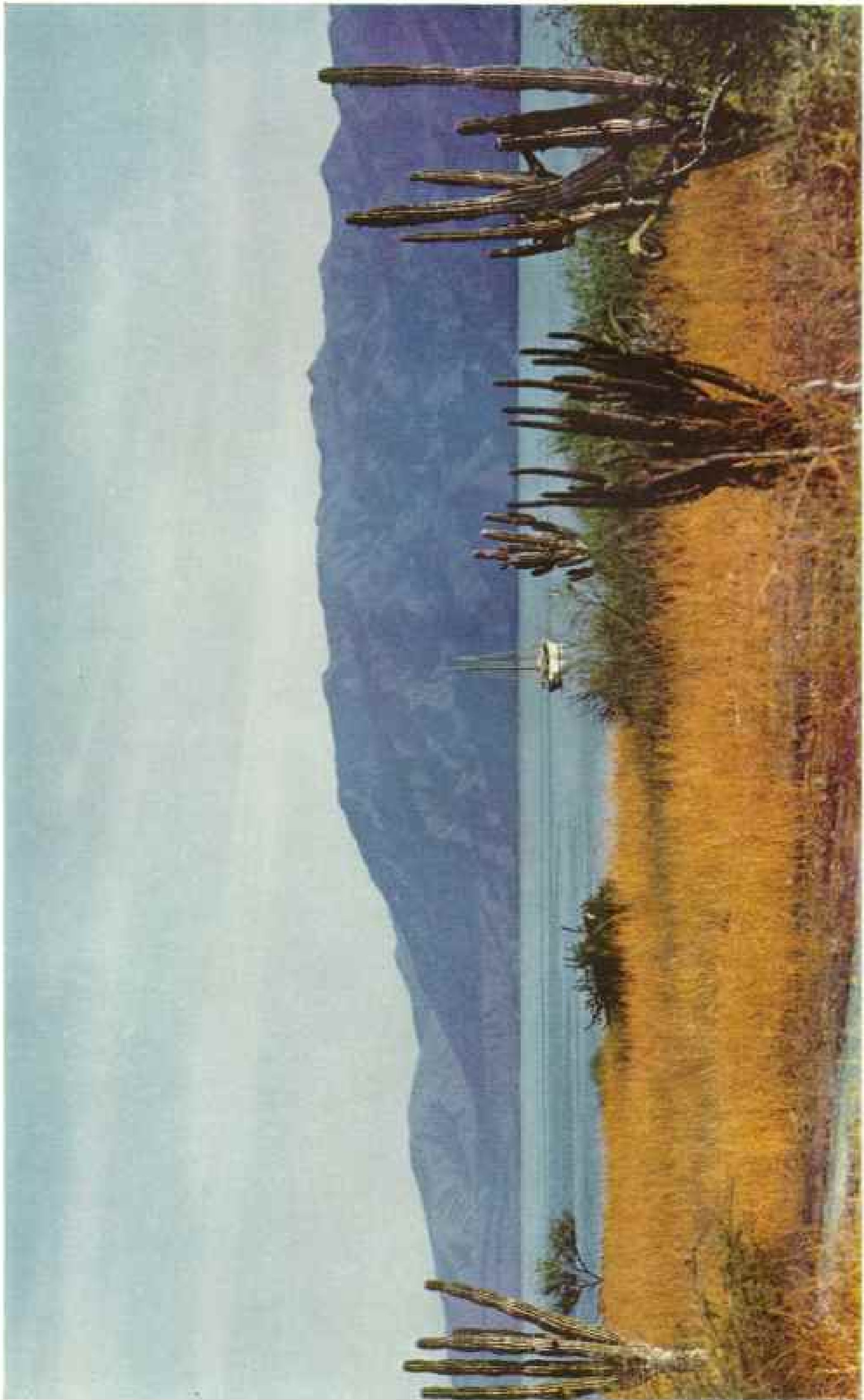


© National Geographic Society

Kodachrome by Alfred M. Boller and Robert F. Nindpark

### A Blue-footed Booby Family, Father, Mother, and Baby

These fish eaters breed by the hundreds on Isabela Island, off the west coast of Mexico.



© National Geographic Society

Photographs by Alfred M. Bailey and Robert J. Stebbins

**Before a Backdrop of Arid Mountains, the *Kinkajou* Lies at Anchor in Sun-drenched Muertos Bay**

This harbor, near the southern end of Baja California, on its east coast, abounds with marlin (Plate 1). In the foreground are weird cardon cacti. Woodpeckers live in these strange "trees," digging holes in them for their nests.



© National Geographic Society

### Her Mains'! Drawing Full, the *Kinkajon* Rolls Along Through Azure Seas

One man takes his trick at the wheel while his companions relax on the sunny deck. Scientists doubled as sailors on the cruise of the 75-foot schooner to Baja, California to study fish, birds, and mammals.

Recreation by Bill N. Harrison





Kodachrome by Alfred M. Heltz and Robert J. Mitchell

**In Clumsy Anger an Elephant Seal Tries to Attack an Intruder**

So awkward and heavy are the animals on land that their lunges are easily avoided. The seal in the background under the man's hand is shedding its skin and hair.



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Kodachrome by Ed N. Hartman

**Big Eyes Indicate the Elephant Seal Hunts Much of Its Food at Night**

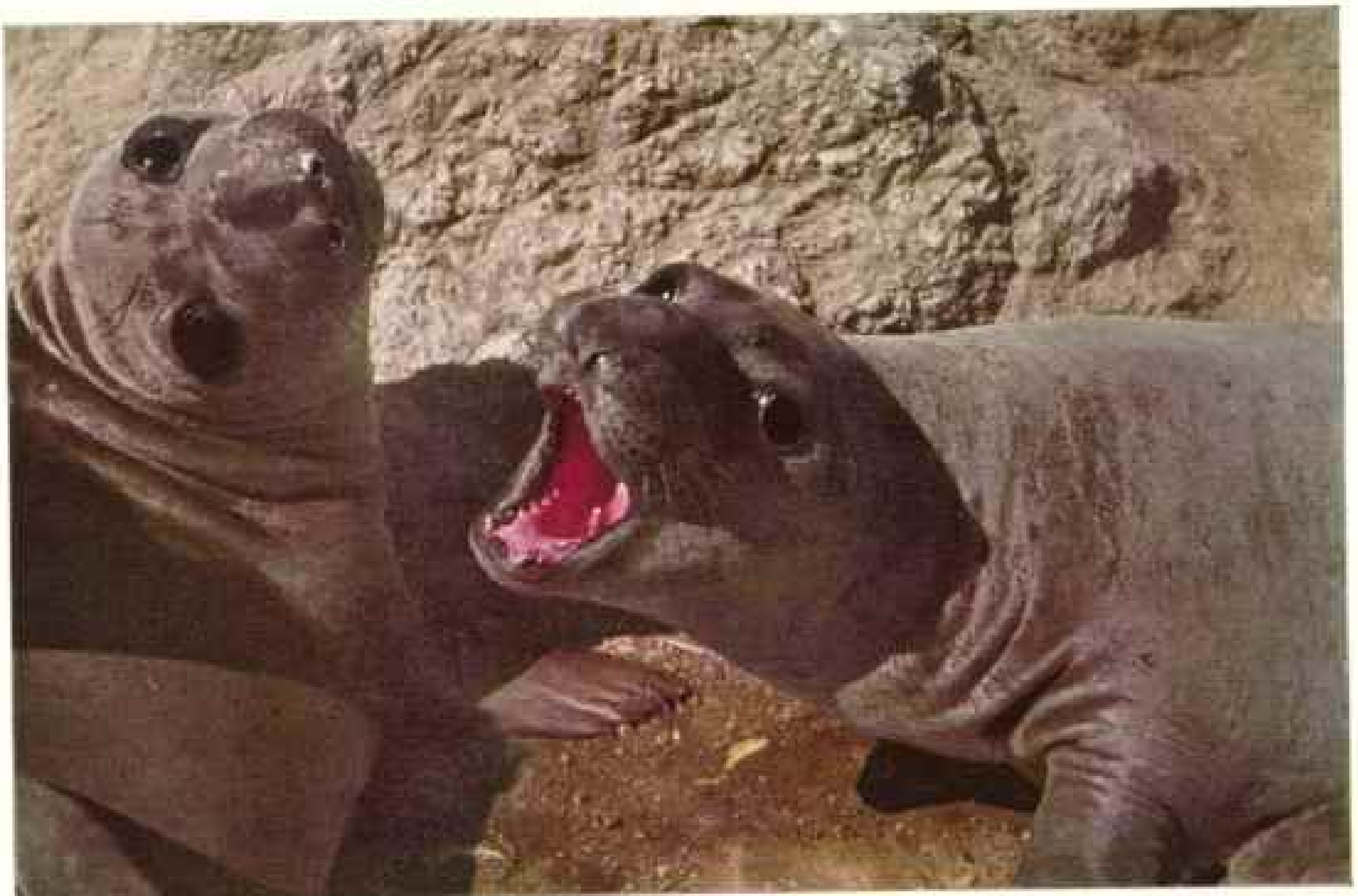
They are known to eat squid and in captivity feed greedily on fish.

Birds and Beasts of Mexico's Desert Islands



**"Aw, Won't You Please Go Away and Let Us Sleep?"**

Young elephant seals on the San Benito Islands made no move to flee when approached. Sleeping females and young do not object even to being walked upon.



Kodachrome by Ed N. Harrison

© National Geographic Society

**Teeth of an Elephant Seal Can Inflict an Ugly Wound**

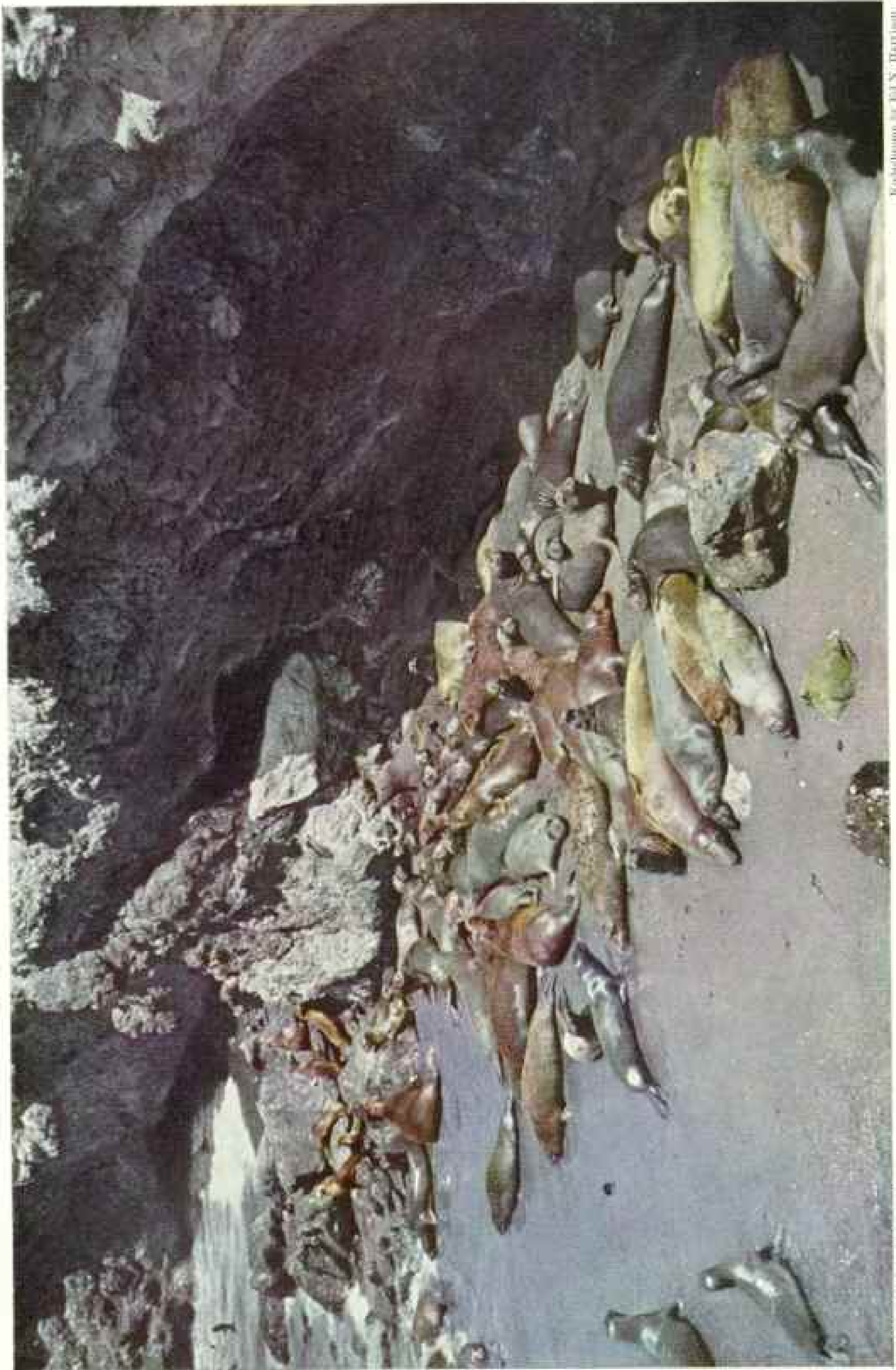
When cornered, the animals growl in protest and charge awkwardly with open mouths.



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Keaton/Smith for Nat. Geog. Soc.

**Man-o'-war-birds Often Dive at Other Birds to Force Them to Disgorge Fish, Then Swoop Down and Scoop Up the Booty in the Air.** Aptly called "pirates of the air," they also catch fish for themselves. The red throat pouch of the male in center is inflated only in the mating season. Next to him are a female, and a white-headed young bird born the previous year. Isabela Island.



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Reproduction by Ed N. Hartman

**Like a Pile of Fat Sausages, Elephant Seals Doze the Day Away on a San Benito Beach**

The flexible snout or proboscis is the reason for their name. Only a few of the animals exist and they are protected by the Mexican Government. A larger variety is found off the southern tip of South America.



Kodachrome by Ed S. Hartman

**Red-billed Tropic-birds Are the "Cliff Dwellers" of Isabela Island**

Long white tail feathers of the adult show well against the dark crannies of the cliff, favorite nesting places of these birds. The down-covered baby is only 8 to 10 days old.



© National Geographic Society

Kodachrome by Alfred M. Butler and Robert J. Neelbach

**Its Beautiful Plumage Thrives on a Diet of Fish and Squid**

The red-billed tropic-bird dives for its food and wanders far at sea between breeding seasons.

ash, and when evening came they swarmed over the water in unbelievable numbers. It is hard for one to appreciate the countless thousands of winged creatures of many species which throng the out-of-the-way islands of the world—each species to itself and often-times practically the only kind of bird found at a given place.

There were three kinds of boobies: blue-faced, red-footed, and Brewster's. Their habits were similar to the blue-footed species on Isabela, but their plumage was entirely different. All were nesting on the ground, the Brewster's in scattered pairs in the long grass along a dry arroyo, the others in colonies. The blue-faced boobies' nests were mere depressions scattered at least 15 feet apart over several acres of open ground (Plate I and page 346). The strikingly colored red-footed species built compact grass platforms in the dense stands of dry vegetation. All birds were incredibly tame, and the photographer could take pictures at will so long as he stayed out of range of the rapierlike thrusts of sharp beaks.

The man-o'-war was the same species I had found on islands of the Hawaiian group; its beak was more colorful than that of the Isabela bird, and its wings had a light-colored bar which was conspicuous in flight. Unlike the white-headed birds near the Mexican coast, the countless young in the platforms in the two-foot grass had cinnamon-colored heads.

We found holding down empty nests males with great gular pouches fully inflated, so that a group from the distance looked like a field of red flowers. An occasional man-o'-war would rise laboriously into the wind, the brightly colored bag wobbling to and fro. The movie cameras were set in the middle of the colony, and, as long as we moved slowly, the birds did not take alarm.

The sole land bird observed on this desert island was a little rock wren. Its song, reminiscent of our own western wren, was the only bird music to be heard.

#### Hooking the Wahoo

The sport fishing proved unexcelled. There were no marlin, but instead one of the gamiest of all fish, the wahoo. We enjoyed watching the men in the launch hook one of these fast fellows, and see it climb out of the water, skimming the surface at express-train speed. It was usually half exposed as it leaned against the line in its terrific effort to shake the hook. The wahoo were of rather equal size, running about 70 pounds of fight.

The fishermen could not stay in one place long, however, because of the sharks, which

were continually cutting hooked fish in two. These great predators became so intimate that they followed the launch and lay close to the surface when the boat was at rest. One big tiger almost as long as the launch took half a wahoo at a gulp, and then came within arms' length of the boat as the head was pulled aboard.

"Look at the devil," Ray said. "What does he want now?"

"He's waiting for the other half," Bill told him, and the remains were chucked overboard.

The old shark turned a rather baleful eye on the fishermen and then leisurely surged ahead, taking the fish and disappearing into the depths.

#### Lonely Natividad Island a Natural Flying Field

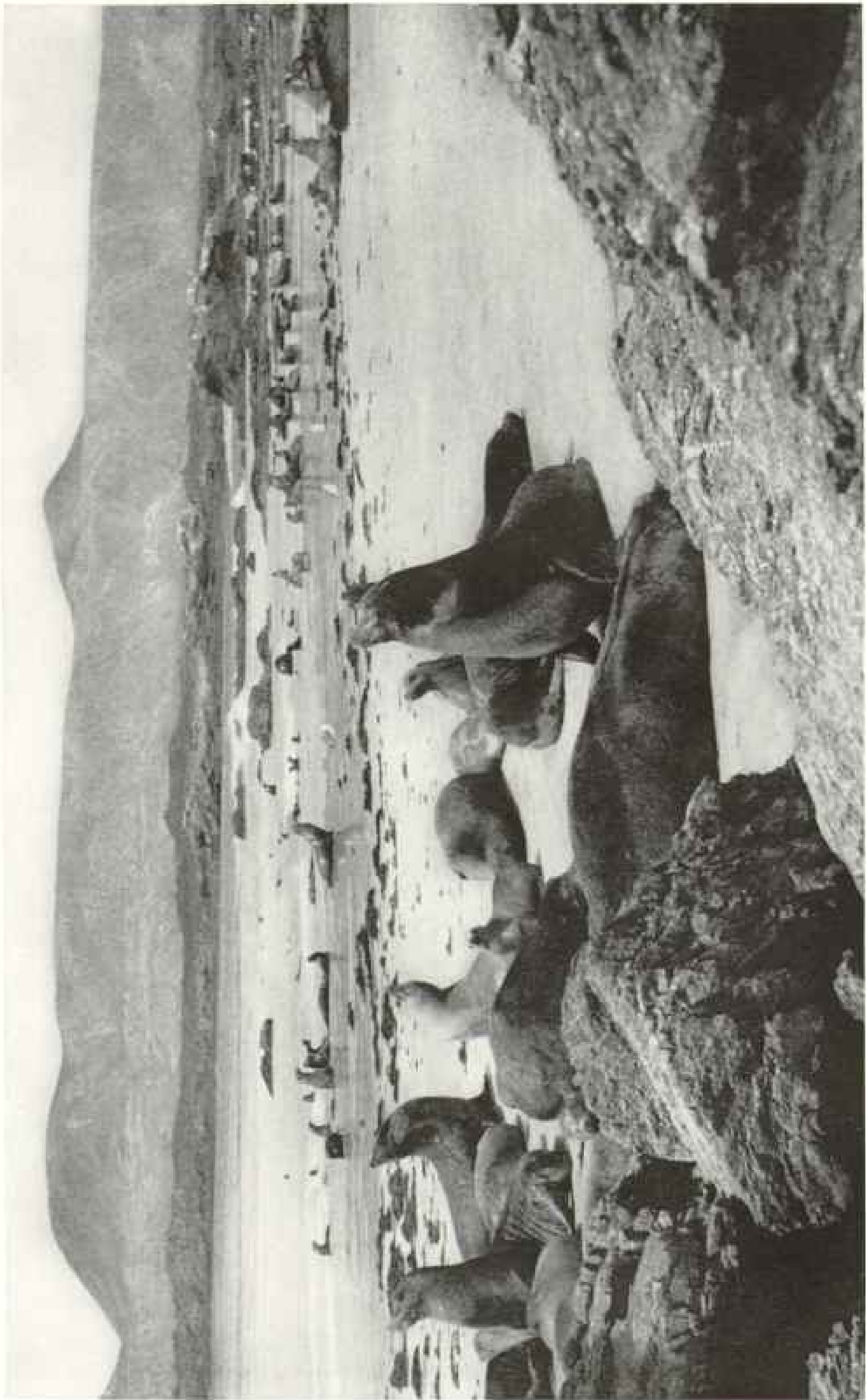
On the way from Benedicto northward to Natividad we had fine weather and, relieved of the pounding we had expected from strong head winds, came on the fourth day in sight of our destination. Natividad is a hilly island with extensive offshore reefs on the northeast side, over which combers roll white.

After the *Kinkajou* had been anchored well offshore, the going-ashore party loaded cameras and lunch in the skiff and started rowing. A big swell was rolling in and breaking waves were giving us trouble, when we saw a Mexican in the cove frantically motioning. We headed the way he pointed and made a landing of which we were proud.

Wind-swept, arid, and about four miles long, Natividad is not an island to attract travelers. The only trees are a few cardons. However, there is a large flat which would make an ideal airplane field, and which, because of the island's location midway down the coast of Baja California, could have a definite strategic value.

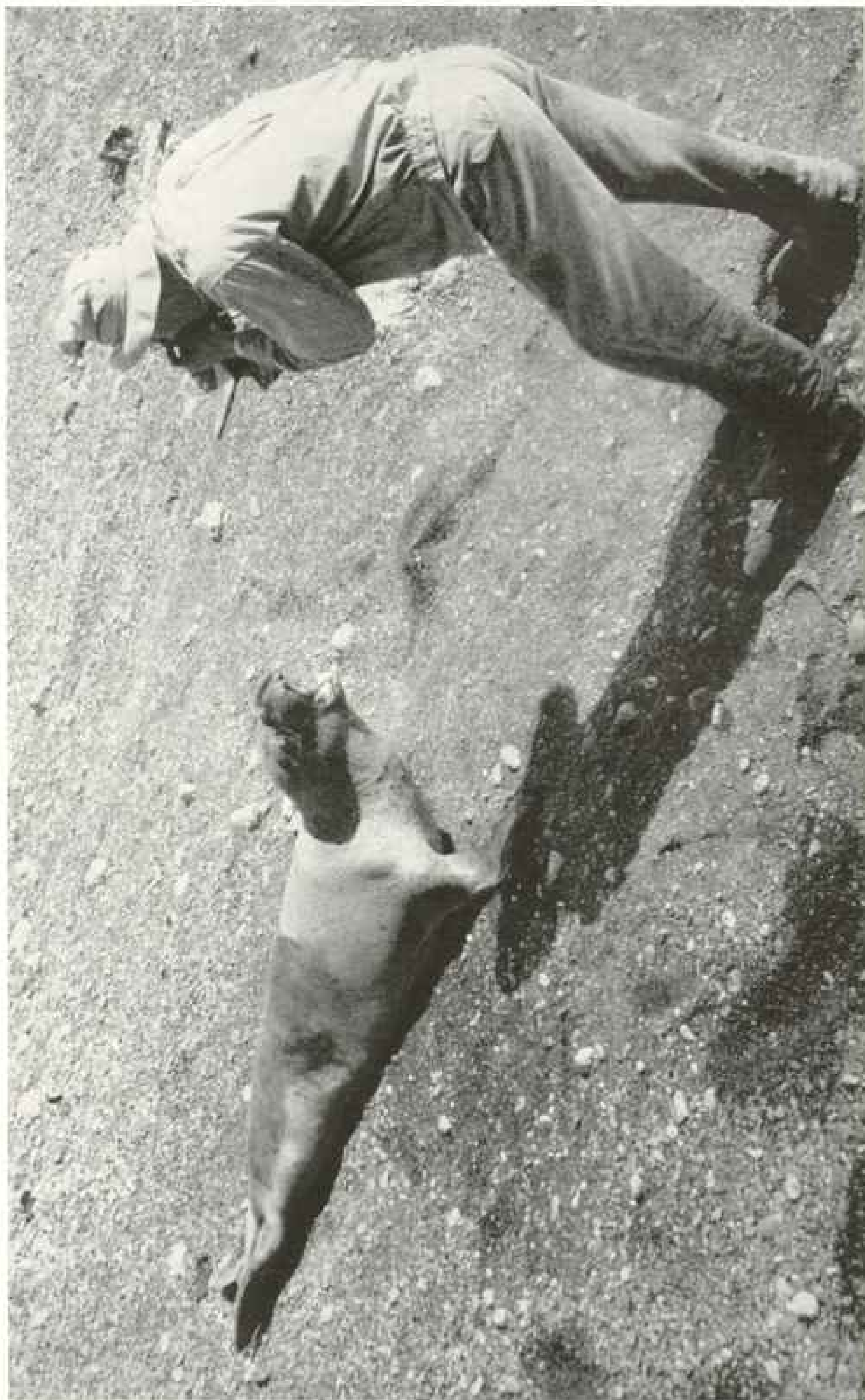
Ten Mexicans who live on the island as keepers of the light told us our schooner was the first boat except the lighthouse tender to stop there in two years. Of the last supply of water delivered to them only 230 gallons remained, and they were badly worried. They did not know when their supply ship would come.

Black-vented shearwaters had excavated nesting burrows all over the flat, which some day may be a haven of warplanes. When the Mexicans found we were looking for birds, they armed themselves with scoop shovels and started digging. The shearwaters were found about three feet underground, occasionally two in a burrow, but usually only one. A single egg is incubated in each nest.



**Sea Lions of All Sizes and Ages Live Amicably in One Herd on the San Benito Islands**

With the huge bulls are their mates and little ones. Several times the author observed old males, gathered peacefully in threes and fours, emitting noises which sounded like an attempt at a concert. Sea lions use all four flippers and pull along the hind part of their bodies.



Point a Camera at a San Benitos Elephant Seal, and It Opens Its Mouth and Says "Ah!"

Ed Harrison, naturalist-photographer member of the expedition, comes in for a close-up (Plates IV and V and page 364). The beasts seem unafraid, but take to the water when anyone approaches too closely. This fellow puts up a bluff, but he will retreat if the photographer advances.



After we had explored all the nesting burrows desired, we tried to pay our helpers. One who could speak a little English refused our offer, saying, "Oh, no, it is our pleasure."

They brought us some skins of hair seals and pokes of dried crayfish as a parting gift. Then, noting that the surf was breaking badly, they volunteered to help us back to the boat. We gladly accepted the offer, for it was always a risk to carry our motion-picture cameras through the waves.

#### Sea Lions Roar on the San Benitos

After a stormy overnight run on which we had difficulty in keeping in our bunks, we anchored in a crescent-shaped harbor made by the three San Benito Islands. The largest, nearly 700 feet high, and clothed with yucca and cactus, is the home of the lighthouse keeper. Except for birds, sea lions, and elephant seals, the Middle and East Benitos are uninhabited.

Middle Benito lies low, with chimneys of rocks jutting from its crest. Extending seaward are lava rocks, and there is a fine beach, the hauling-out place for a great herd of California sea lions (page 362).

Hundreds of these creatures were asleep above the high-water mark, and others were going and coming through the constantly breaking wall of surf. Sleek females were accompanied by pups, and the gigantic males, hog fat, waddled here and there as if keeping a weather eye on their harems.

The bulls seemed to get along well together. There was a constant barking, of course, and an occasional snarl and baring of teeth, but we saw nothing that resembled genuine combat. In fact, here and there we observed three or more old bulls together going through a sort of ritual, bowing to each other and roaring in unison.

Apparently they were having a grand time, but their show seemed not to impress the females. The independent ladies merely yawned, stretched a flipper, and dropped off to sleep. Finding good cover, I crawled to within 20 feet of one group and took snapshots to my heart's content.

Birds were exceedingly numerous on both Middle and East Benito, particularly Wyman's gulls, which were just beginning to nest. They were tame, and when we were stalking game with our camera there were always a few of them settling down near at hand to see what we were doing.

Frazar's and black oyster-catchers were observed in the same flock; wandering tattlers, Hudsonian curlews, and black turnstones en route to their Alaskan nesting grounds were

resting on the reefs, and ospreys had nests on every promontory.

I put up a photographic blind near one of the fish-hawk (osprey) nests and the next day crawled in to take pictures. It was not long before the graceful bird dropped to her nest. When the camera started, however, she heard the whir and stared at the blind without moving. The young remained flattened in the nest, sensing from the adult's actions that danger was near. Though I remained three hours in the blind, the motion pictures might just as well have been stills (page 351).

The most numerous birds were San Lucas sparrows, which nest on the San Benitos and migrate down the Baja California peninsula. They occurred everywhere, but were especially numerous near a little seepage of fresh water—the only spring we found on any of these desert islands. Horned larks and rock wrens were also common. The ground was undermined with the burrows of petrels, auklets, and shearwaters, but the nesting season of the former had not begun, though we found a few birds occupying their intended nesting sites.

From the number of needles thrust into us to the square inch we judged that the San Benitos harbored more cacti than any other place we had visited. The cholla seemed deliberately to reach out to hit us. Even the old sea lions which had hauled out on some of the rock slopes were covered with the vicious spines.

#### Elephant Seals Nearly Exterminated

In years gone by elephant seals were found on many of the islands and on the peninsula of Baja California (Plates IV, V, VII and pages 338, 348, 349, 363).

They gradually disappeared, however, until all that remained were on Guadalupe Island, about 250 miles southwest of San Diego. Hide and oil hunters, who had exterminated the fur seals and sea otters of Guadalupe, turned their attention to the sea elephants with such ruthlessness that naturalists feared the great brutes would become extinct.\*

Fortunately a few animals survived, and the herd grew. Numbers have been found in recent years on the San Benitos, but their presence here probably indicates a shift from one island to another, rather than any remarkable increase in the size of the colony.

East Benito, where the majority of the seals occur, is sharply indented by coves with shallow, boulder-strewn beaches, and steep walls hollowed near the sea. Occasional patches of

\* See "A Cruise Among Desert Islands," by G. Dallas Hanna and A. W. Anthony, NATIONAL GEOGRAPHIC MAGAZINE, July, 1923.



#### Peeling Like a Sunburned Bather, an Elephant Seal Sheds Its Cuticle

The old skin and hair peel off in large flakes, leaving the new skin on the rough, corrugated neck a bright geranium pink (page 366).

black sand make ideal hauling-out places for the sea mammals. Because the waters drop off deep close to shore where waves pound continuously even on a calm day, there are comparatively few places on the seaward side where a skiff may be landed.

Our first day on this island was memorable. As our launch rounded the lower end, we saw herds of sea lions perched upon prominent rocks. They dived into the sea at our approach. A third of the way along the eastern shore we found a protected bay and on the black sand 30 or so elephant seals, females and young animals, sprawled sound asleep.

We ran a skiff through a wash of surf in the middle of the herd, and as it crashed upon the beach the nearest animals raised their heads sleepily and looked us over, not the least alarmed at our sudden invasion of their privacy. We stood motionless, expecting them, like the sea lions on the rocks, to scramble into the water, but instead they dropped their heads and resumed their slumbers.

Not a great deal is known about the habits of these strange creatures. Their large eyes indicate that they are nocturnal to a great extent, passing the day hauled out on the sand and the night obtaining food. Their food supply, except for squid, is not certainly known, except that captive individuals in zoological gardens thrive on fish, which they eat in quantity.

#### Monster Elephant Seals Spar for Fun

We had hoped to find many of the big males on the basking grounds, but most of the larger animals were in the water. They lolled lazily about, two big ones occasionally getting together, rearing out of the water, and roaring as they struck at each other. At first I thought they were fighting, but subsequent examination of our motion-picture film convinced me that they were merely sparring for pleasure, not taking hold with their tusks.

They were far from handsome. Sprawled out, they resembled huge, moldy sausages,

for they shed their hair and with it their external skin. They are brownish in color until this seasonal change begins to take place, and then they become spotted and scrofulous-looking. When the old epidermis and hair have peeled off, however, a new coat appears, dark Maltese in color. When wet it resembles velvet (page 365).

We had no difficulty studying the animals at close range. We could walk among them slowly, keeping out of reach of their sudden lunges. When disturbed, they would roar threateningly and attempt to charge, but were so clumsy that they were easily sidestepped. Pemberton on one occasion jumped out of the way of a cantankerous animal and into the path of another. The seal grabbed him by the back of the leg and made an ugly wound.

#### Seals' Flippers Are Land Propellers

Like all other true seals, these creatures use their fore flippers for propelling themselves on land, simply humping themselves forward and dragging their hindquarters, with little help from the rear flippers. This is in direct contrast to the sea lions, which use all four limbs to good effect.

In their colonies the seals are accustomed to being piled upon by others, and we found that we could walk on sleeping animals without disturbing them. Their hair is so short that flying insects bother them badly, and they fight these tormentors by flicking sand on their backs with their fore flippers (p. 349). Sitting down on one big fellow, Ed Harrison was apparently mistaken for a gnat—the seal began throwing a barrage of sand at him.

A few elephant seals now range northward to the islands off the California coast, and it is hoped their numbers will increase in our waters. The San Benito colonies are watched

over by the light keeper, who investigates every boat that anchors in the vicinity to make sure the herds are undisturbed. Requests have been made of the Mexican Government for concessions to take the seals for dog food, but the officials in Mexico City have the interest of the animals at heart and have given them all protection possible.

After our stay on the San Benitos it was necessary to push the *Kinkajou* toward home. The good weather we had experienced on our long northward run had passed. We left the San Benitos with a strong north wind blowing, and set sails to tack back and forth. At noon the next day our yacht had plowed through 132 miles of water and was only 50 miles north of our starting point! The wind increased to such an extent that the *Kinkajou* was headed westward, the sails helping to steady the boat and holding her well over.

In the midst of the blow, Bill Pemberton started along the lee side of his ship, holding to the railing. He was reaching for the logbook to make some entries when a wave hit us and put the rail down low. The surprised Bill went overboard without touching the rope!

Though he was dressed in heavy clothes and an overcoat, he managed to grab the log line as the ship sailed by. The speed of the boat pulled him beneath the water, however, and he had to let go.

He was lost to view in the rolling sea before the craft could be headed into the wind and brought about. Circling back in frantic haste, we threw him a line and pulled him from the cold water, chagrined but none the worse for his experience.

We caught a westerly wind off Guadalupe and made great time toward home, pausing only briefly at the Coronados, the last of the desert islands.

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# On the Turks' Russian Frontier

BY EDWARD STEVENSON MURRAY

Everyday Life in the Fastnesses between the Black Sea and Ararat,  
Borderland of Oil and Minerals that Hitler Covets

*With Illustrations from Photographs by the Author*

MY friend Hassan Effendi lives deep in Asia Minor, far east of Istanbul. His little mountain village clings precariously to a steep slope. A roaring torrent tumbles below the town. Peaks of northeastern Turkey isolate Artvin from the outside world.

News filters in slowly. Swarthy Laz adventurers come up from the Black Sea coast to trade split-hilted knives for Artvin bearskins. Dark-eyed Georgian smugglers sneak across the snowy Russian border (map, page 370).

Now and then a strange donkey driver happens in from the south. If he has worked on the Asian caravan route past Ararat, he carries bits of news about fellow Mohammedans in Iran (Persia), Afghanistan, and India.

An old man is Hassan Effendi. His years of toil are over. But, while awaiting the call of the Holy Cupbearer, he still preserves a happy interest in his friends and the world about him. Life has been generous, granting him many sons (pages 369, 373).

It was through Ismail, his youngest son and my student at Robert College, beside the Bosphorus, that I came to visit him in his highland home.

## In a Land of Oil and Turmoil

In June I sailed out of the Bosphorus toward the Caucasus. My first sample of Hassan Effendi's old-style Eastern hospitality came when our coastal steamer dropped anchor at the eastern end of the Black Sea, once sequestered but now a land of oil and potential turmoil.

Beyond the next promontory lay Batumi and Russian Georgia, which Germany covets. As the rowboat grounded on the pebble beach, a smiling Turk, wearing a black fur cap and a silver-hilted dagger at his belt, came forward, grasped my hand, and carried it to his forehead.

"Hassan Effendi awaits you; I bring you his salaams."

For two days we rode through dark tunnels in semitropical undergrowth. Finally, fording a rushing mountain stream, we zigzagged up a long, steep slope and halted at the summit of a sharp ridge.

Far below us Artvin sprawled in a spotlight of sun. In the depths of the valley a streak of silver wound in and out. Somewhere beyond the maze of white-capped peaks ran the Turko-Russian border.

As we drew up before the garden gate, Ismail came out to greet me with warmth, but without effusion. In an upstairs parlor he stood respectfully at attention when his father entered, clad in a flowing silk gown.

"You are welcome, Effendi," said the old gentleman with simple formality. He bowed low while shaking my hand in both of his. Then, without another word, he slid out of his slippers, settled himself cross-legged on the divan, and motioned me to a seat beside him. There followed a few moments of polite silence.

Suddenly Hassan Effendi turned and greeted me again. He called for coffee and cigarettes, the adjuncts of Turkish hospitality, and began the extended and searching inquiries which are the cornerstone of Eastern courtesies.

Hassan Effendi's two-storied manor was not only a home but a tribal headquarters.

The patriarch occupied only a small room in the big, rambling building (page 369). Another wing was taken over by the sons of the household and their families. Numerous other rooms, which opened out on the long L-shaped hallways, were kept for guests.

Furnishings were few, serving necessity and comfort. I soon sensed that people, not possessions, constituted this home.

## Turk's House a Glorified Tent

A Turk treats his house as a glorified tent. Wherever he happens to be—in a train, on a ship, or by the bank of a stream—provided he has a basket of food and an armful of rugs, a Turk can sit himself down, arrange his few possessions about him, and play house in a charming and convincing manner (page 391).

The family nucleus consisted of Hassan Effendi and his wife, their sons, daughters, grandchildren, and in-laws. More or less permanent boarders included several orphaned cousins, two widowed aunts, Hassan Effendi's aged brother, and an old friend of the family. Finally, there were the ubiquitous distant cousins and friends who, in groups or singly,



#### What Spaghetti Is to the Italian, Barbecued Mutton Is to the Turk

Slices are stuck on an iron pike between spices and bits of tomato. Charcoal burning in the cupboard behind keeps the meat sizzling. The cook gives the pike a spin if it sticks because the hot-air propeller (top) fails to work.

casually dropped in, set up housekeeping in one or more of the many rooms, and settled down to visit for a month or two.

The cell-like bedrooms were rarely used save at night. The daily life of the household went on in the two parlors—the men's upstairs and the women's beneath.

Of course I never saw the inside of the women's parlor. In fact, I caught only distant and fleeting glimpses of the women except on the near-tragic day when I blundered into the men's parlor very early one morning and looked straight into the frightened eyes of Hassan Effendi's youngest daughter.

Seclusion made femininity the more mysterious. My student Ismail had told me something about his various aunts, cousins, and

sisters. My imagination was stirred by the muffled laughter and chatter which drifted up from the kitchen and women's parlor beneath.

Before long my subconscious mind had singled out particular voices and given them personalities. As voices became more familiar, the personalities grew more interesting.

The upstairs parlor served as a sort of campfire circle for the men. The long, low-ceilinged room ran the full length of the house. The floor and benches were covered with rich Persian and Bokhara rugs, family heirlooms handed down for centuries. The soft, silky nap had been polished by slippered and stockinged feet. In one corner lay a huge bear-skin.

The whitewashed walls were bare of pictures. The only articles of furniture were a center table and two chairs where games of backgammon were almost continuous. The monotonous rattle of dice and slap of gaming pieces accompanied

the conversation of those sitting around on the wall benches.

Guests were an everyday event. Life went on, undisturbed by their presence. After supper that first evening we congregated in the upstairs parlor, settling ourselves on the benches with pillows piled up for arm and back rests. Ismail passed around cigarettes.

Turkish sons neither smoke, sit cross-legged, nor stand with unbuttoned coats before their fathers. Ismail, the youngest, stood quietly near the door, waiting on his father, brothers, and guests and speaking only when addressed. The older married brothers entered freely into the conversation.

A timid knock announced coffee. Opening the door part way, Ismail took a tray of tiny



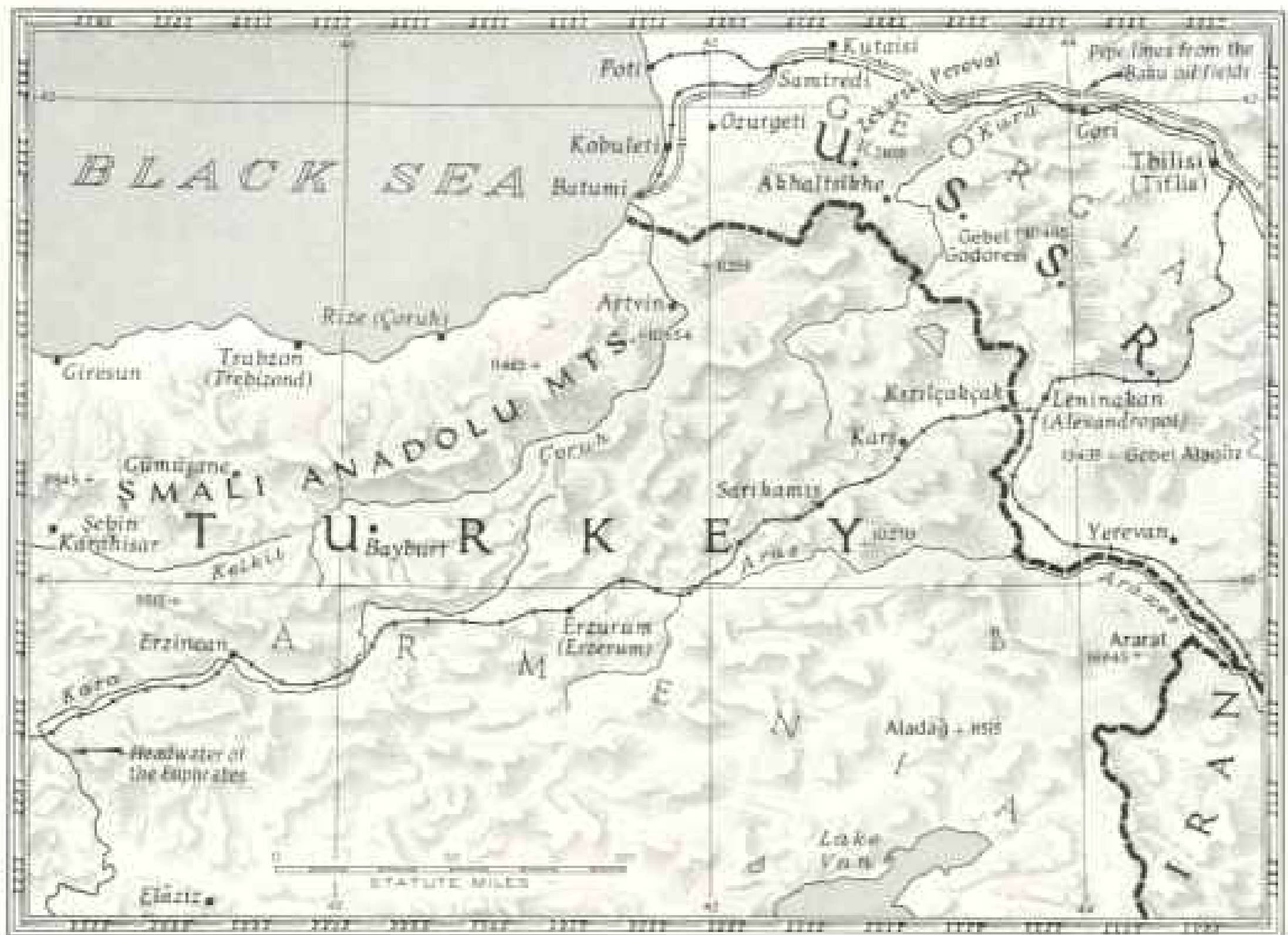
**In This Spacious Artvin Home Hassan Effendi Keeps Open House the Year Round**

His table always carries half again as much food as those sitting about it can consume. If his home becomes a rendezvous, he gains much "face" as a host. Food and a place to sleep are regarded by Turks as everyone's natural birthright, to be shared freely (page 386).



**They Toot and Drum, but There's Not a Jitterbug in Sight**

Dressed in white and with the author at his right, Hassan Effendi listens to the plaintive, quavery music he has provided for the village children on Friday, the Moslem Sabbath.



Drawn by Herbert Eastwood

### Using Artvin as a Base, the Author Traveled This Turkish-Soviet Frontier

Through the friendship of one of his students at Robert College, near Istanbul, Mr. Murray shared the home life of a prosperous Turkish merchant. He found high adventure riding the trails of eastern Turkey, roamed the Euphrates flats, visited the great bazaars of Erzurum, and talked "horse" in the black tents of the Kurds. There is only one rail link, which the Germans covet, between the Caucasus and western Turkey, but passengers must ride on three different trains. A narrow mountain railway connects the standard tracks west of Erzurum with the broad-gauge Russian system beyond Sarikamis.

cups from a slender, outstretched hand. Whispered directions from the unlighted hallway indicated which were sweet, which bitter.

#### Tales of Noah and the Ark

Conversation drifted to the Turkish prophet Nuh (Noah) and his Ark. Hassan Effendi believed that the Ark landed on Mount Ararat. Others insisted it was in the Taurus. All agreed that it was over eastern Turkey that the vessel had cruised during the Flood.

"There is a legend," said Ali Agha, the eldest son, "that the green Ark still stands on the summit of Mount Ararat, guarded by jinn. A priest once attempted to scale the heights, but every night when he lay down to rest the jinn of the mountain carried him back to the point from which he had started."

I suggested that some European climbers, including James Bryce, famed British Ambassador to the United States, had already reached the top. My friends smiled indulgently. "When you have seen the snow-capped cone

of Ağrı Dağı (Mount Ararat), you will know that no man can climb it and come back alive."

In the Artvin bazaar one hears of huge rings imbedded in mountain precipices, and of anchors, chains, and wrecks of old ships found in inaccessible regions of the mountains.

When interest in backgammon lagged, Hassan Effendi bade Ismail bring a last round of coffee.

The slap of slippers on the stairs marked the procession of women bringing the children to bed. A child came ahead and shut the folding doors of our parlor. Then they moved on down the hall. Soon came shouts of laughter and the patter of bare feet. The women were laying down thick comforters and blankets upon which the children gaily tumbled before being tucked in.

Hassan Effendi yawned and stroked his beard. Unfolding his legs, he clambered down from the wall bench, slid his feet into his slippers, gave a courteous salaam to the assembled group, and made off to bed.

The next morning Ismail was the only one waiting to have tea with me. The others, up at dawn, had already gone to the bazaar.

When we descended to the market place, I found the business day half over. The peasants from near-by villages had sold their produce, bought their goods, and were now trekking off homeward. By eight o'clock there was little trading left to be done, and the merchants had settled down to a leisurely day of visiting, smoking, and tea drinking.

Although Artvin's population is only about 2,500, its business district is that of a town ten times its size, for it serves as trading center of the valley folk for miles around.

#### Shops Classified by Streets

There are streets of copper-smiths, blacksmiths, wool carders, bakers, cobblers, and saddlers. Narrow thoroughfares, all crooked and some steep, open into a central cobbled square where Kurds, Turks, and dark-eyed Georgians mill about, bargaining for wheat, corn, and honey, sheep, goats, horses, donkeys, and mules, and the untanned skins of leopards and bears.

At one end of this market place stood Hassan Effendi's shop, the largest general store in the village (page 373).

His father had started the business. Having run it for nearly half a century, Hassan Effendi had now turned it over to his sons.

Everything that a Turkish peasant would desire, from salt to sweaters, was displayed on shelves, hung from rafters, or stacked around the room in barrels or baskets: nuts and nails, spices and straps, wheat and wool, rattaps and rugs, caps and candies and candles, and iron shares for wooden plow beams.

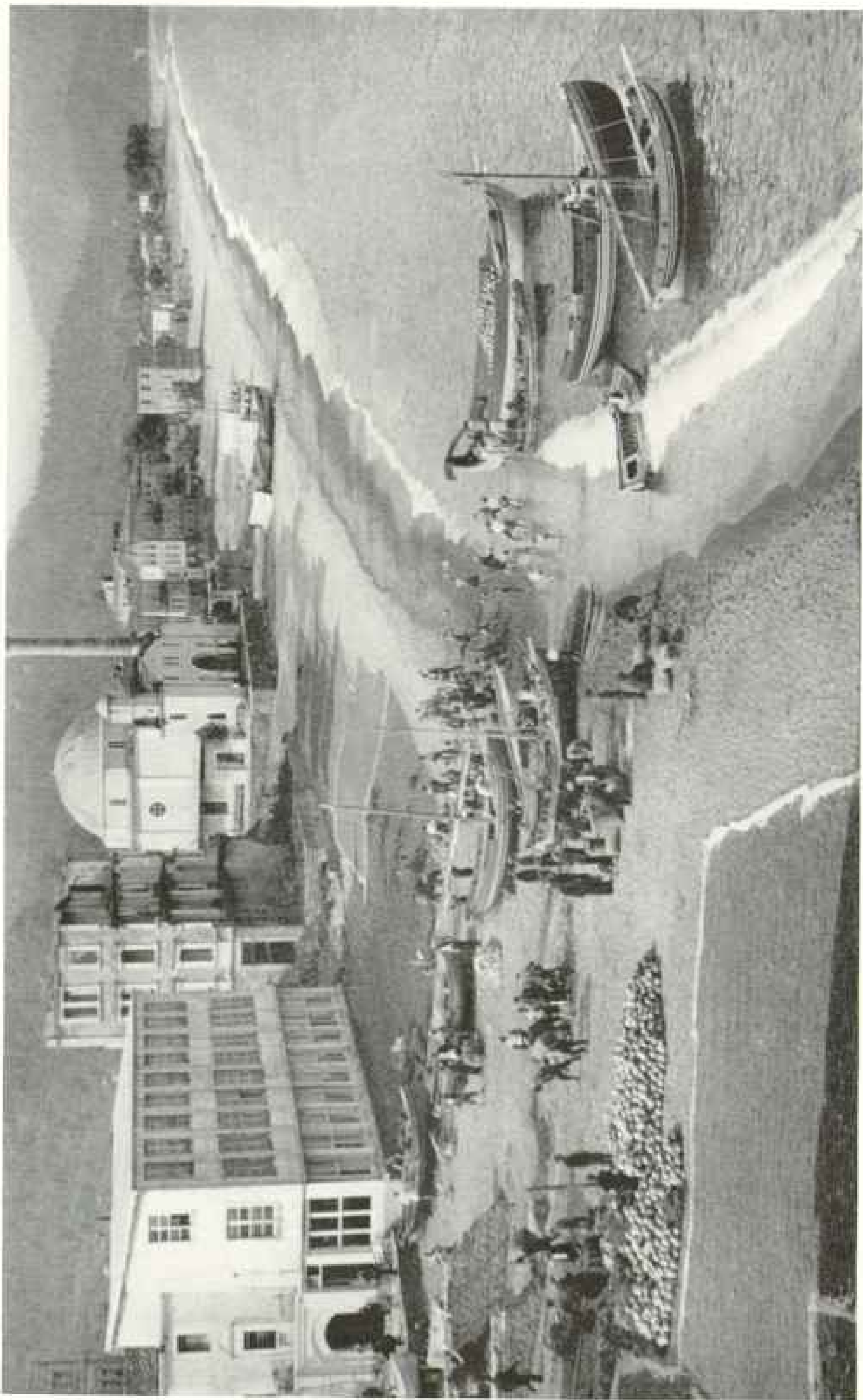
Bright-figured cambric from the new Turkish textile fac-



#### Don't Burn Your Fingers: Use Your Head!

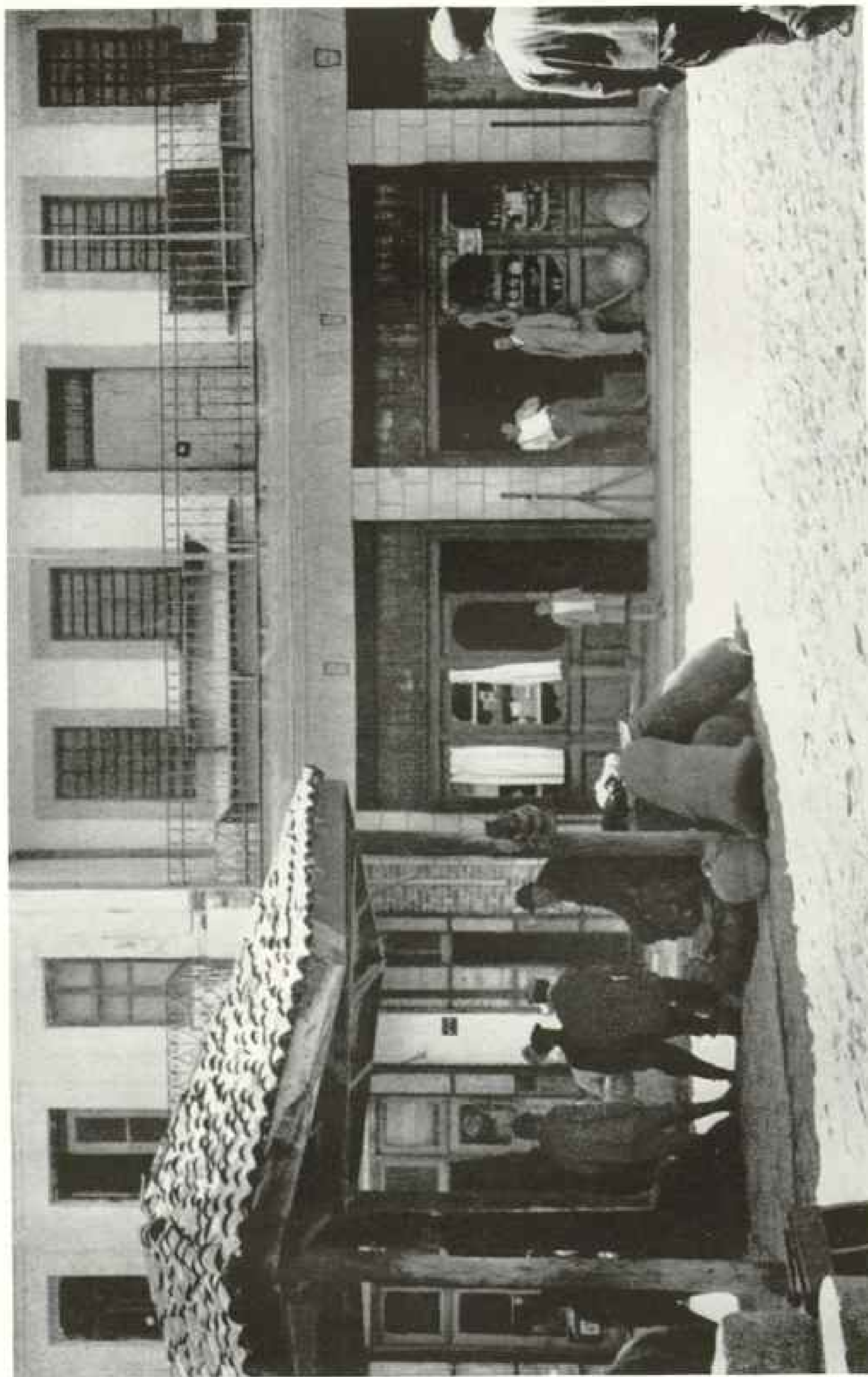
Housewives knead their own dough, but have it baked in the communal oven. Atop thick head pads, the youngsters bring home the baking hot out of the oven. Anatolian mountaineers use corn instead of wheat for their bread making. Turks explain that Lar and Georgian folk owe their fine carriage to balancing such head burdens.





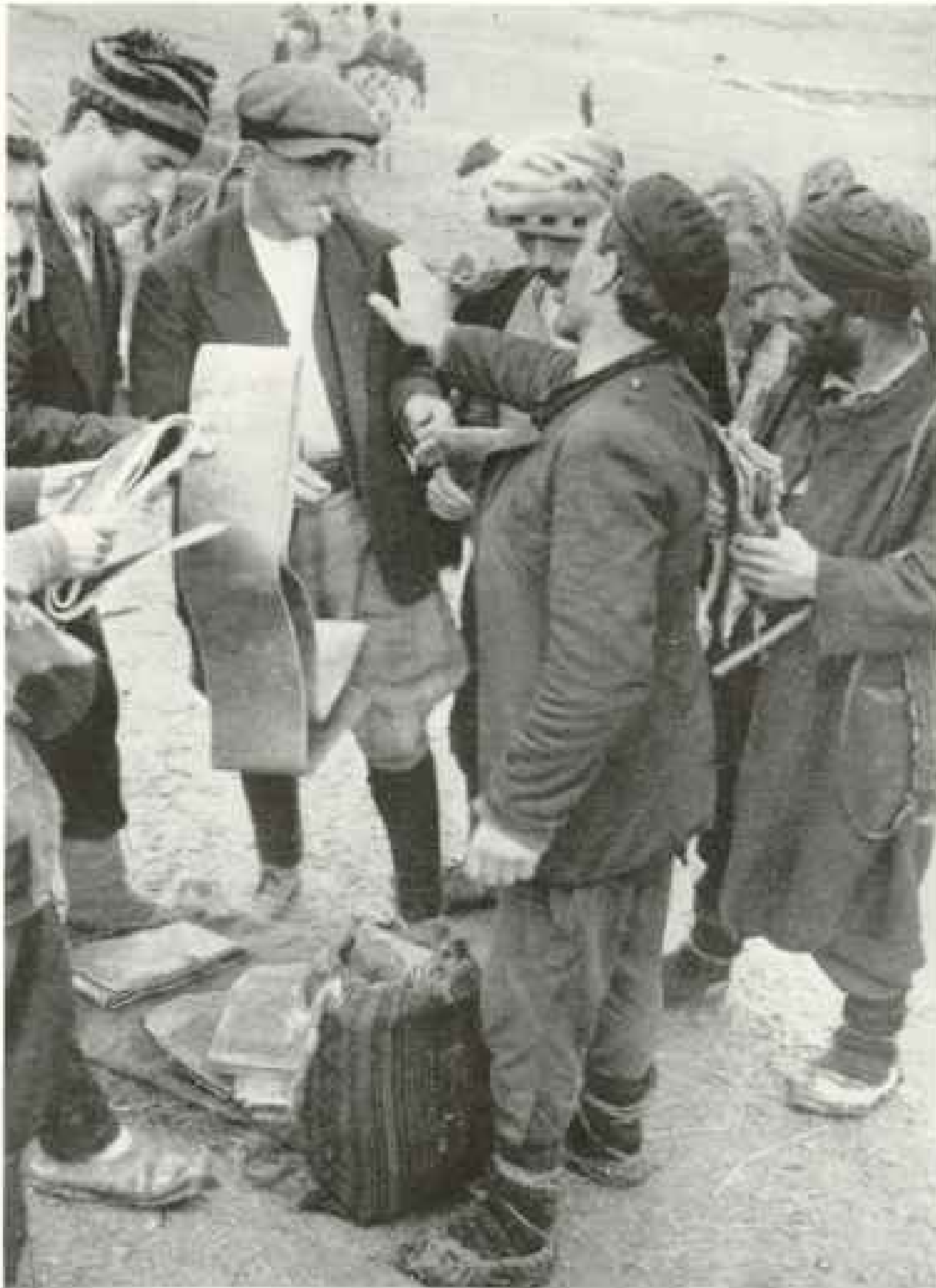
Melons Are Tossed Ashore on the Nut-carpeted Beach of Giresun, Which Was Xenophon's Cerasus

Like big brown rugs are the patches of Turkish filberts drying in the sun (page 377). Stopping porters carry sacks of these delicious hazelnuts back to the warehouses. Beyond them, men toss melons from hand to hand. In winter this is a stormy shore, and steamers from Batumi or Istanbul sometimes pass by without stopping. For ten days Xenophon's "Ten Thousand" Greeks stopped at Cerasus, then a Greek colony, on their famous retreat from Mesopotamia.



When the Tumult and the Shouting Dies in the Market Place at 8 A. M., Hassan Effendi's Department Store Carries On

This Turkish shop lacks only a cracker barrel to make it conform to the American idea of a rural "general store." It is now in the hands of the third generation. One son, Orhan, standing to the right in the doorway, won his M.A. in engineering at the University of Illinois. Ismail, the youngest, was the author's pupil at far-famed Robert College, which looks down on the Bosphorus near Istanbul (pages 367 and 371).



Turks Are Born Traders: Here They Bargain with Gestures for Moccasin Leather

The shrewd city merchant wanders into mountain fairs hoping to pick up native products for a song, but he usually finds the mountaineer his equal.

tories was in great demand. When a peasant found a design and color to his liking, he bought enough for his whole family. Passing through mountain villages, I could pick out children of the same family, because their clothes had all been made from the same bolt.

Across the square from Hassan Effendi's shop was the low-domed mosque, towered over by a single spiked minaret. Five times a day the old muezzin, squeezing up the winding stairway to the high balcony, issued the call to prayer. Once his call was "*Allah ekber*" (Allah is greatest) in Arabic. Today the cry is in Turkish, "*Tanri uludur*" (God is great).

When not on duty at the mosque the *hodja*

(*hoca*), or religious teacher, visited in Hassan Effendi's shop. Half of the store-length counter was used for transacting business. On the other half, with his leather-stockinged feet curled up under him, the *hodja* spent most of his day.

#### Timepiece a Plaything in Timeless Turkey

The eastern Turk's concept of time is still medieval. Hours, minutes, and seconds he rarely uses. A watch he treats as a plaything. His life is broken up into days and seasons. His life stretches ahead endlessly and he has time for everything which he really wants to do. You may hear him say, "I don't choose to—" or "I would rather not." But "I haven't time" is not his alibi.

As Ali Agha was introducing me to the *hodja*, two customers entered the store. Ali greeted them, drew up chairs, and asked, "What will you drink?" One chose coffee; the other, tea. Ali pulled an overhead cord, once for coffee and twice for tea. Down at the end of the market place a bell tinkled.

When I investigated this community bell pull, I found a network of cords running from all the surrounding shops and converging on the coffeehouse.

Said the coffeehouse keeper, who had served Artvin shopkeepers for twenty-five years, "I can always tell which merchant is ordering, simply from the sound of the bell, but my helpers have to watch the strings."

Ali and his customers sipped their drinks. Only after they had exhausted the full gamut of polite inquiries did they proceed with business. Since the game of arriving at a mutually satisfactory price for the bearskin ran over-

time, Ali ordered another round of drinks.

Suppers at Hassan Effendi's were late and leisurely. We men first gathered in the upstairs parlor for a round of tea. When supper was ready, a child called us. The dining salon was small and the table rough, but the food was fit for a baron's board.

The center of the table was reserved for the main-course platters. The rest was crammed with shredded cheese, ripe olives, radishes, sliced cucumbers, tomato salad, and fruits.

Ismail went to the door to take the steaming platters which the women brought from the kitchen. We usually started out with soup, followed by a meat dish, then meat with vegetables, rice wrapped in grape leaves, pilav, stuffed squash, custard, and pastry. Almost invariably we finished up with a bowl of delicious sour-milk dessert—yoghurt.

Individual plates were unnecessary. We used our forks and spoons to help ourselves to what we wanted. There was always more than we could eat. Few words were spoken at table. When not eating, we simply sat.

It was not until several nights after my arrival that I had my first real visit with Hassan Effendi. That evening, as usual, I nibbled away at a ripe olive, picked up a final slip of shredded cheese, and wiped my fingers on the long napkin-towel which was spread over the knees of all of us around the table.

Ismail carried the kerosene lamp into the hallway, leaving the dining room in darkness. I brought up the rear, so that any women in our path might have time to scuttle unseen to the kitchen.

After coffee and a couple of games of backgammon, the elder sons went off to the steam bath. Ismail and some of the near relatives went downstairs to visit in the women's parlor. Other guests drifted off. Finally I was conversing alone with the old gentleman.

#### Emancipate Women? "Impossible!"

Though by blood Hassan Effendi was a Georgian, by upbringing and religious heritage he was a Turk. Like most present-day Turks, he believed in monogamy. He was friendly, peaceful, democratic, and tolerant.

However proud he might be of the new Republic, he remained essentially conservative. Railroads, highways, factories, and schools had his enthusiastic approval; but he was irrevocably opposed to women's new freedom and to what he called the "fast life" in Ankara.

I incautiously asked, "The emancipation of women in Turkey must proceed slowly, must it not?" My host sat for a few moments staring at the floor, then disposed of the subject with one word: "Impossible!"

Ismail and I frequently walked the trails around the village.

"I suppose you are surprised to find women still veiled here in eastern Turkey," he remarked one day.

I admitted that it did seem strange, for I rarely saw a veiled woman on the streets of Istanbul, Ankara, or Izmir. In the western Provinces it is a misdemeanor for women to appear veiled on the streets.

"Our fathers thought it a disgrace for a woman to appear before strange men with her face uncovered," explained Ismail, "and our fathers still retain the authority. We may acclaim feminine reforms while we are in Istanbul and Ankara, but when we return to our homes in the east we must resign ourselves to following many of the old customs of our conservative parents."

#### Mileage Modifies Modesty

For seven weeks I ate, slept, and moved about in Hassan Effendi's house. Only once, by accident, did I come face to face with any females of the household (page 368).

Back in Istanbul that winter I met my student Ismail showing a young girl around the college campus. She was dressed in smart European clothes, was powdered and rouged, and was unrecognizable as one of the black-garbed and veiled forms which noiselessly slipped about in the Artvin manor house.

One day while hiking to a near-by jasmine grove I questioned Ismail on how his eldest brother had succeeded in building up such a fine business in the city of Kars.

"Did your father help him or did he do it with his own money?"

"With his own money?" exclaimed Ismail. "But he has no money of his own! All we make is given to our father, who doles it out as we need it."

"And you?"

"Well, my father and brothers are sending me to school now, but naturally I expect to put my earnings into the family money chest after I finish my education."

"And if one of your brothers were good for nothing?"

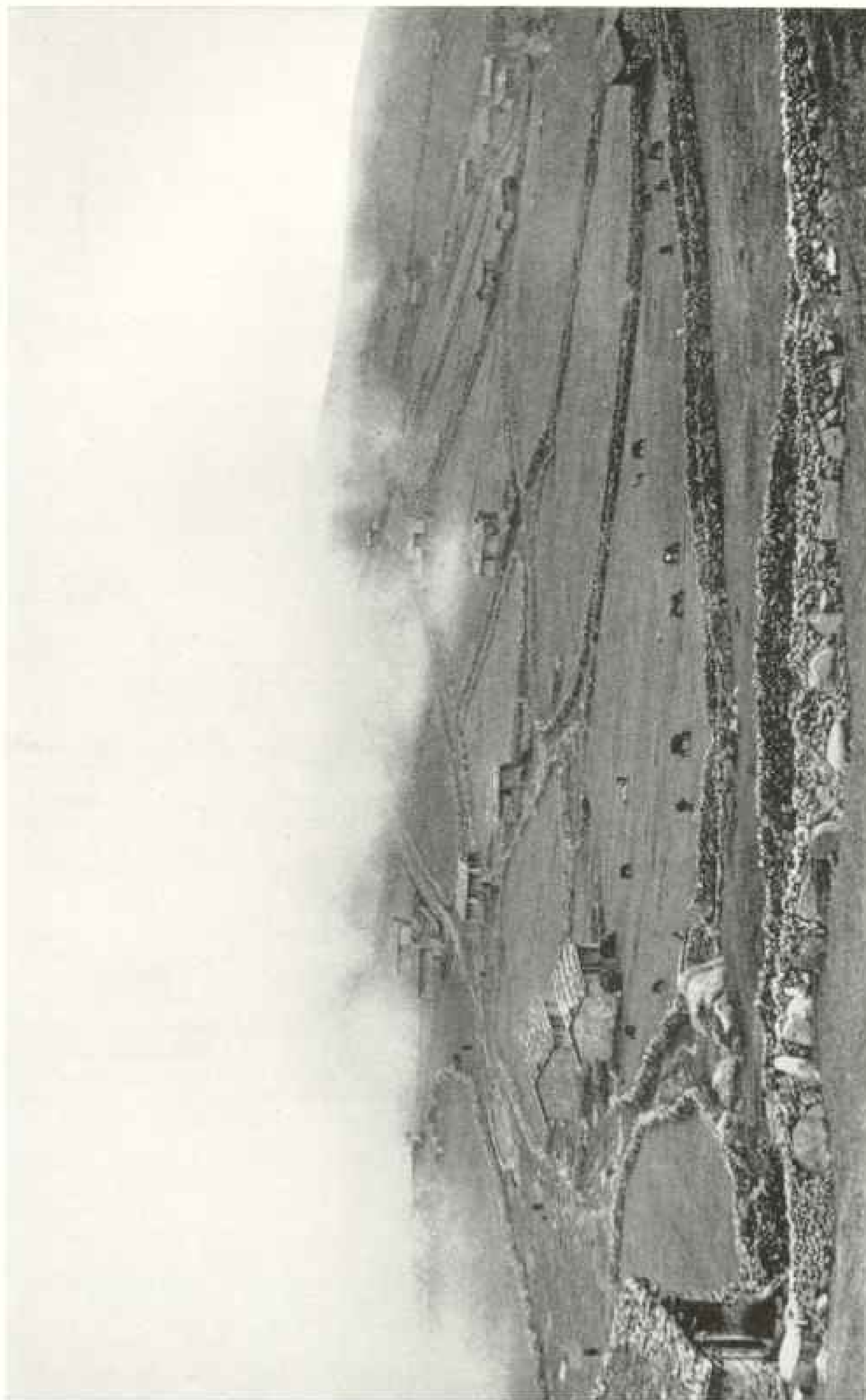
"Such would be the will of Allah! But father would give him whatever he needed."

"What will you do when your father dies?"

"The eldest brother will become guardian of the money and properties; or if there are too many of us we may divide the possessions."

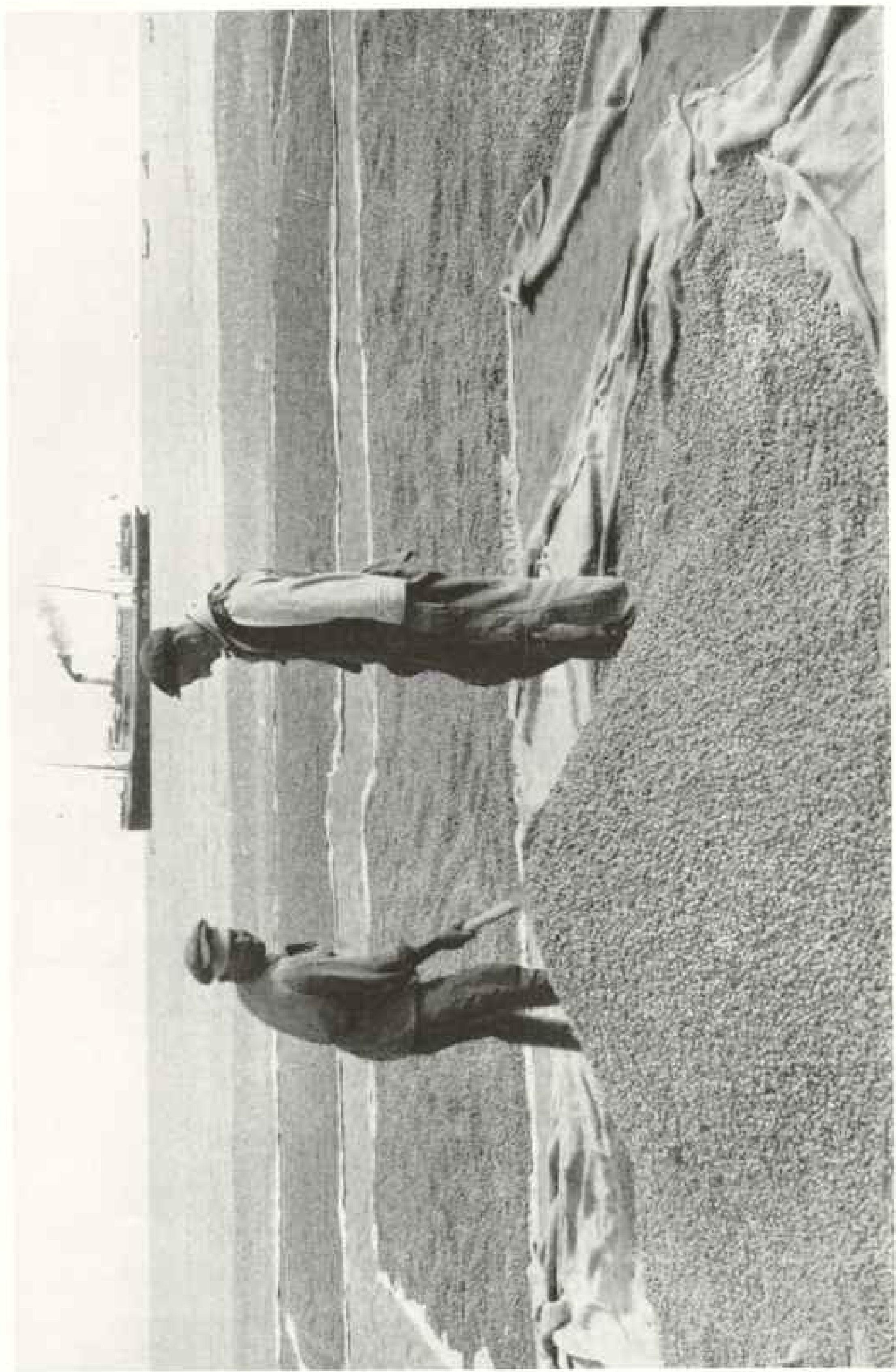
"How would the lazy brother fare?"

"Everything would be divided equally." Then, facetiously, he added, "Probably we would give him a larger share, since he would need it!"



**Turkish Flocks and Herds Climb in Summer to Cloud-cooled Common Pastures above the Timber Line**

While farmers till the valleys, the herdsmen move to the hills and live in rude stone huts. Though most of Anatolia is dry, the mountains bordering the Black Sea pile up drippy clouds to keep the grasslands green.



**Mounds of Choice Turkish Filberts Dry on the Black Sea Shore While a Turkish Steamer Rides at Anchor**

Chief pre-Christmas cargoes at Giresun are bulging bags of Anatolian hazelnuts, bound for Europe. Now war blockades interfere with the trade. Roasted filberts are a favorite substitute for "peanuts and popcorn" on the Bosphorus ferries (page 372).

For weeks I had been looking forward to the annual Artvin bullfight. The hodja, the blacksmith, and the good-natured coffeehouse keeper had told me stories of past battles.

On the morning of the bullfight the bazaar was deserted. The trails were alive with folk clambering up to the ancient arena, a level spot above the town. Even the hodja joined in the celebration. By the time we of Hassan Effendi's household arrived, a throng had already assembled. The women established themselves on a distant mound where they could remove their veils.

#### A Bullfight—Artvin Style

The animals arrived one by one, each surrounded by its retainers. Separate bull camps were set up in all corners of the field. No master of ceremonies was needed; everyone seemed to know what to do.

Two peasants led their bulls into the center of the arena, then ran for safety. The contest began with pawing and bellowing. Then followed eying, feinting, kicking up of dirt, and locking horns. Finally the bulls charged headlong at each other.

In the first match, lasting only a few minutes, not a drop of blood was shed. The defeated bull simply took to his hoofs. Another challenging bull was brought up to face the victor, and the maneuvering began all over again. This kept up all morning.

At last a huge yellow bull took the field and began chasing his challengers, one after the other, off the lot. The last undefeated bull was brought up. One snort, a cloud of dust, and the yellow champion had his opponent on the run. Straight for the crowd they came. The bystanders scrambled for safety, but in the rush one man stumbled and fell.

"Lie flat! Lie flat!" cried others.

The prostrate man lay full in the bulls' path, but both animals leaped over him and charged on down the hill.

The near-casualty picked himself up and joined the other peasants in pursuit. They found the victor bellowing defiance and charging a clump of scrub oak. They brought him back and hung a gorgeous string of blue beads around his neck to ward off the "evil eye."

Peasants gathered around, touching his flanks, while the "fierce" champion submitted to their petting, as docile as a kitten.

Each day in Artvin was lived out as it came. A Turk finds life's meaning in the mere fun of living. He wants leisure to converse with his associates, to picnic by a mountain spring, to promenade in the cool of the evening, to savor good food, sparkling water, and congenial friends.

To the Turks, silence is as important as expression. Often when the parlor was full of guests, we would sit for minutes on end without anyone in the room so much as clearing his throat. Silences, themselves a joy and a relaxation, lent an air of freedom and freshness to the conversation.

I once asked a young Turkish professor at the American college why he did not mix more with the foreigners.

"I can't stand the nervous tension," he said, smiling. "The continual flow of words and the ever-present terror of a lull in the conversation simply exhaust me."

For nearly a week I had been threatening to set off alone to visit the famous mountain fair, but Hassan Effendi persuaded me to wait.

"You are my guest," he explained. "If you went off to the fair unescorted, my friends would say, 'Hassan Effendi is a small host.'"

One day Hassan Effendi brought news that the village miller, an old friend of the family, was going. He would be my guide and companion. Early next morning my horse was brought to the garden gate, and the old gentleman came in gown and slippers to see me off.

"Be sure and come back," he called after me. "Orhon will certainly be here."

Orhon, a graduate of Robert College, had just received his master's degree in engineering at the University of Illinois.

By the third morning of our journey we were far from any towns, high above the tree line, and shivering whenever the sun went under a cloud. Then the trail struck off toward the Black Sea coast and suddenly came out upon a gigantic amphitheater, fully a mile across and a thousand feet deep, as if some Olympian god had gouged out a piece of the mountainside with his trowel.

From a well-trodden market place (page 380), numerous trails fanned out to disappear around the grassy sides of the amphitheater.

On the northern horizon great banks of white clouds boiled and tumbled as they rolled in off the Black Sea and smothered the peaks and valleys below us.

We picked our way gingerly down the steep trail and drew up in front of a low hut. The innkeeper swung off the saddlebags and led our mounts to the underground stable.

We sat outside, ranging our chairs along the sunny wall of the inn. Between shade and sun was all the difference between winter and summer.

We washed in the stream of water which the innkeeper played into the bowl from a pitcher. The Turk, even after the sweating of the Turkish bath, always performs his ablutions in a stream of running water.



**Wearing His Cap Sideways, a Turkish Fisherman Crochets a New Net**

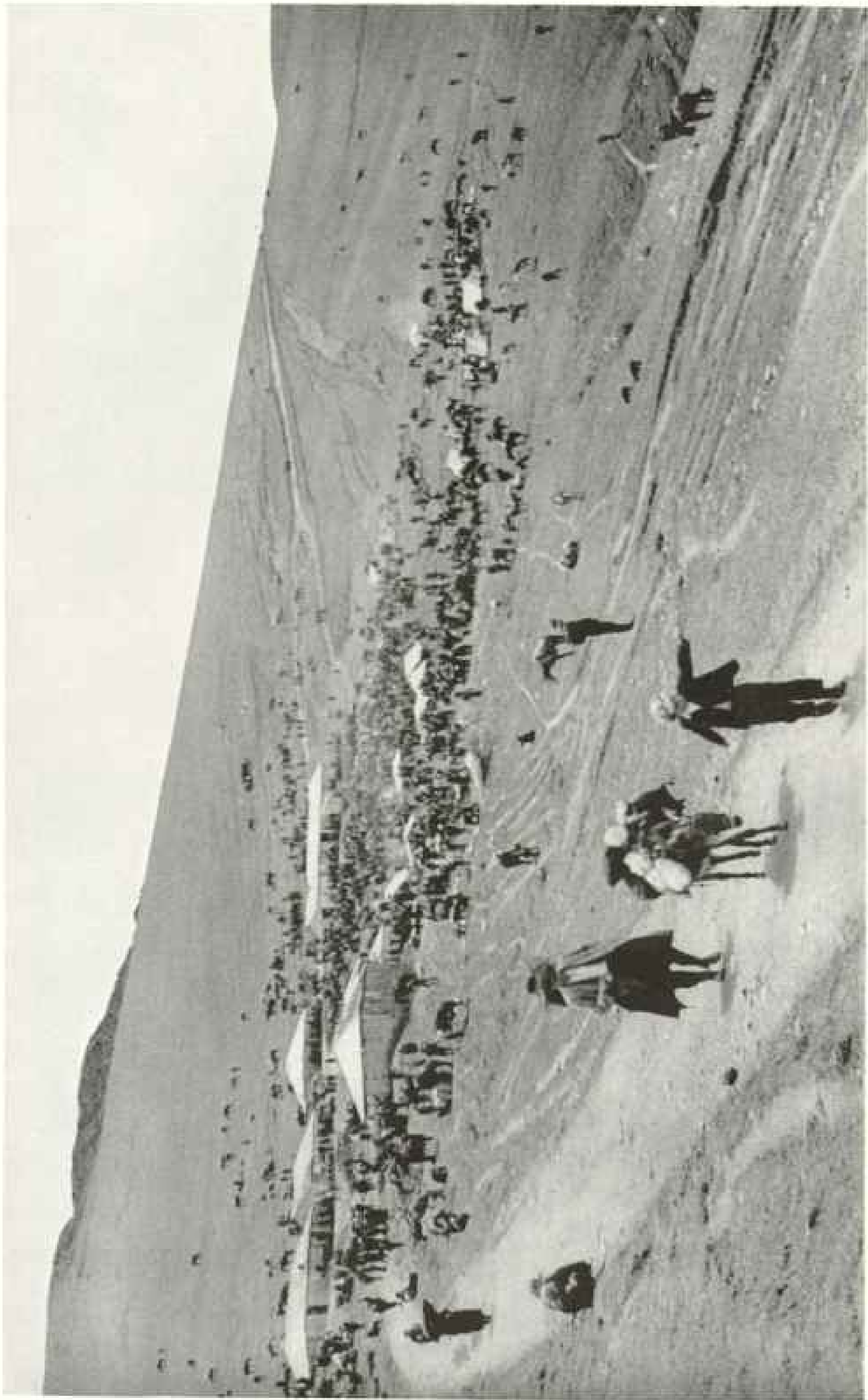
When the fez was forbidden and the cap took its place, the visor interfered with prayer. Devout Moslems wore their caps reversed, like one-time movie cameramen. In the chilly Black Sea the season is short, for the fish appear only in the summer. As the waters cool in the fall, the fish converge on the narrow Bosphorus and swim back into the Aegean.



**A Shepherd Boy Stoops to Suck Cool Water from a Spring through a Hollow Reed**

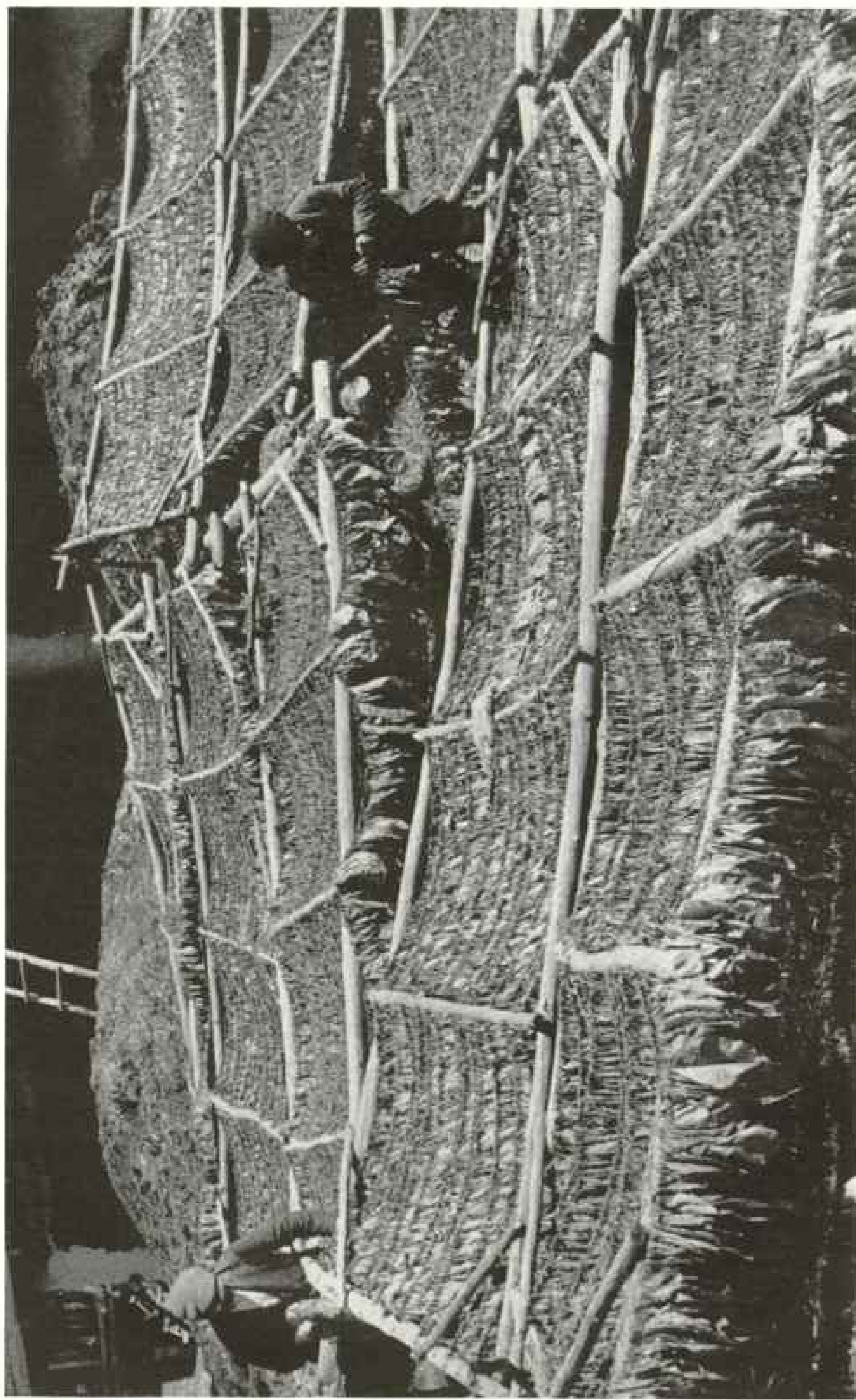
These youngsters live out on the mountains throughout the summer, driving the flocks from grass to water hole and back to a makeshift corral in the evening.





Once a Week, This Trail-worn Slope in the Mountains of Eastern Anatolia Becomes a Gathering Place Where Goods and News Are Exchanged

Generations of market goers have worn deep ruts in the hillside for miles around. Even in the densest fog one can easily find his way to the fairground. Some vendors erect tents, others spread their wares out in the sun. All keep one nervous eye watching the heavens for signs of frequent and sudden showers (page 378).



#### Turkish Tobacco, Here Curing in the Sun, Is Grown All Along the Eastern Black Sea Coast

From this region much leaf is normally shipped to the United States, where it is used to make world-famous American blended cigarettes. Samson's 1939 crop was bought by Americans and, because of the war, was brought out by a roundabout trail through the Persian Gulf with the assistance of the U. S. Department of Commerce. Such small-leaf tobacco gives aroma and flavor and commands a high price. Each leaf has to be handled many times; it must be picked, dried, classified, inspected, and reclassified. Drying requires expert judgment; just so much sun and that at the right time.



### Sheepshearing Is a Social Occasion near the Caucasian Frontier

When the author's innkeeper, in the foreground, heard there was a sheepshearing bee going on near by, he locked up the inn and galloped over the hills to help. He was a jack-of-all-trades; he knitted his own cap and socks from yarn he spun himself with wool given him for helping at the shearing.

Mountaineers from near-by sheepfolds sat around on stones or makeshift wooden stools, spinning thread or knitting socks. I asked one bewhiskered knitter why.

"One must have something to do when one is doing nothing."

There was a goodly crowd that evening. A single kerosene lamp dimly lit up the long, narrow room, thick with smoke from the leaky stove. We huddled about the fire, keeping below the cloud of smoke as best we could.

Market comers kept straggling in, and we had to enlarge our circle to include another cloth merchant from Trabzon (Trebizond), an itinerant barber, and venders of horseshoes, beeswax, and nails.

"Before Atatürk you could not ride safely through these mountains even in the daytime," one of the company recalled. "Kurdish bandits lay in wait at every mountain pass. Now you can go wherever you please, night or day."

At one end of our room was a raised plat-

form with piles of blankets ranged along the wall. When the innkeeper began making down the beds, two hodjas left to perform their ablutions and say their prayers.

We stripped to our undershirts and curled up on our bedrolls. The innkeeper wrapped his coat about him and slept bolt upright in his chair.

### Daylight Saving Needs No Law

Long before sunrise he had started the fire-stove. When I awoke, the bed platform was deserted. I was just in time to see a flat red sun rising over the Caucasus and fog banks rolling shoreward from the Black Sea.

The mammoth amphitheater was a moving pattern of black caravans converging on the fairgrounds. Young bloods and patriarchs galloped in. City traders and venders trotted along, leading a pack horse or two. The average peasant drove a couple of donkeys laden with sacks of wheat, baskets of fruit, or vats of



#### A Sewing Machine Comes to the Fair

Homespun cloth and hand-knitted socks are still popular in eastern Turkey. But when it comes to running a straight seam, a faithful Singer proves its worth. Making fire from flint and tinder, and swift sewing on a foot-treadle machine, are both commonplace in village life of Anatolia (page 386).

butter. Children herded along flocks of sheep and droves of calves. Half-veiled women plodded along on foot with produce strapped to their backs. Many also carried infants.

#### Fair Like a Big Movie Set

By midmorning the market teemed with a thousand people, and the fair looked like a gigantic movie set. Against the green background of the hills one could make out groups milling about animals, trading in foods, inspecting fabrics, galloping on horses, running after sheep, engaging in argument, sitting, watching, chatting, dozing, and drinking tea and coffee.

A hundred feet below the grounds, on a grassy terrace, was an open-air mosque where worshipers prostrated themselves before a simple stone dais pointing toward Mecca.

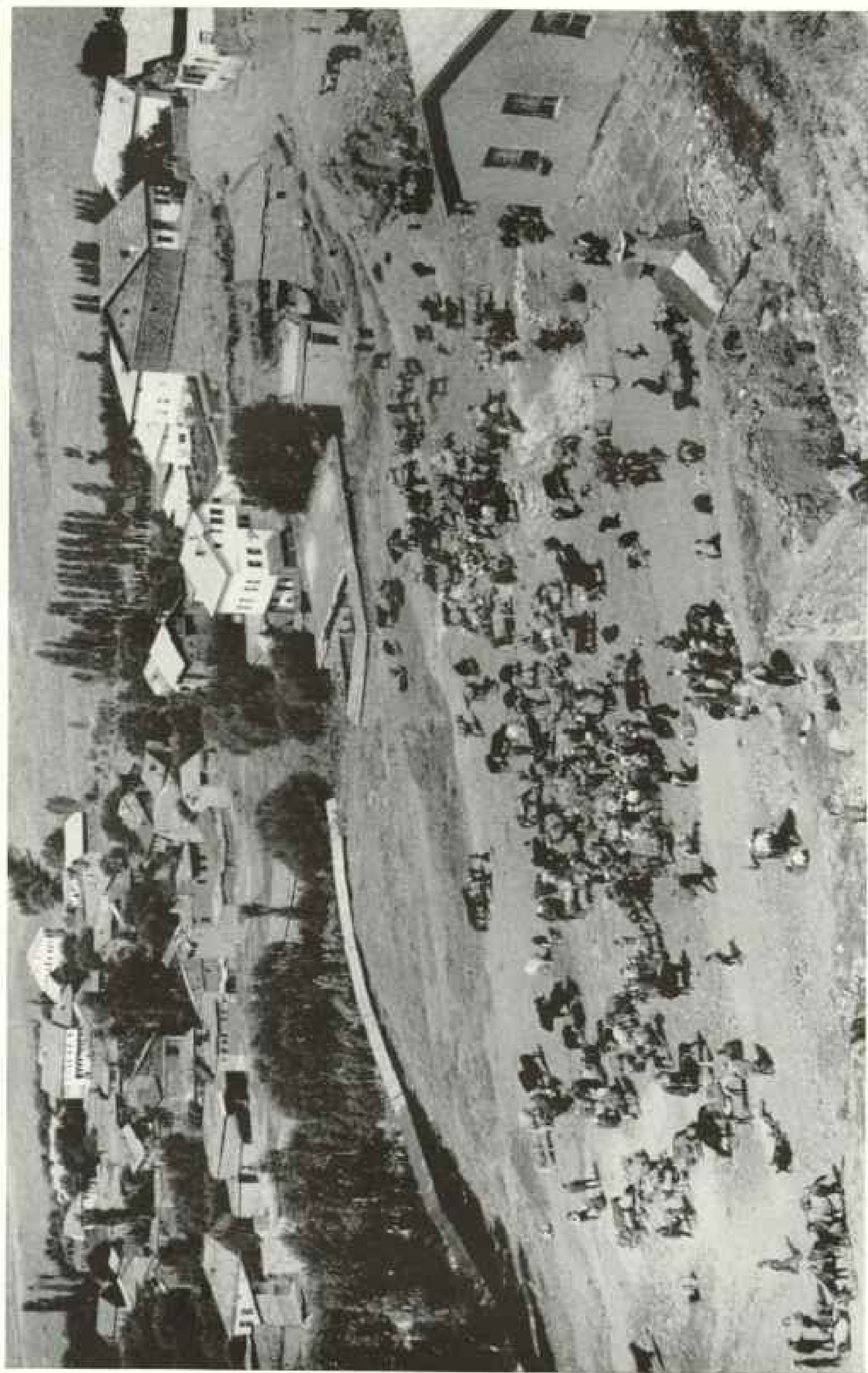
Sauntering around the fairground, I came to the shambles. Cattle, sheep, and goats were led off one by one.

A semicircle of enormous sheep dogs hovered about, waiting to fight for the offal.

The Turkish butcher goes about his gruesome business with swift dexterity. If it is a sheep or goat, after the killing a small slit is made in the hide of one leg. With his mouth over this fissure in the skin, the butcher blows until he is literally blue in the face. The animal form inflates like a balloon, so separating hide from underlying tissue that the butcher can complete the skinning with a few deft flourishes of his knife.

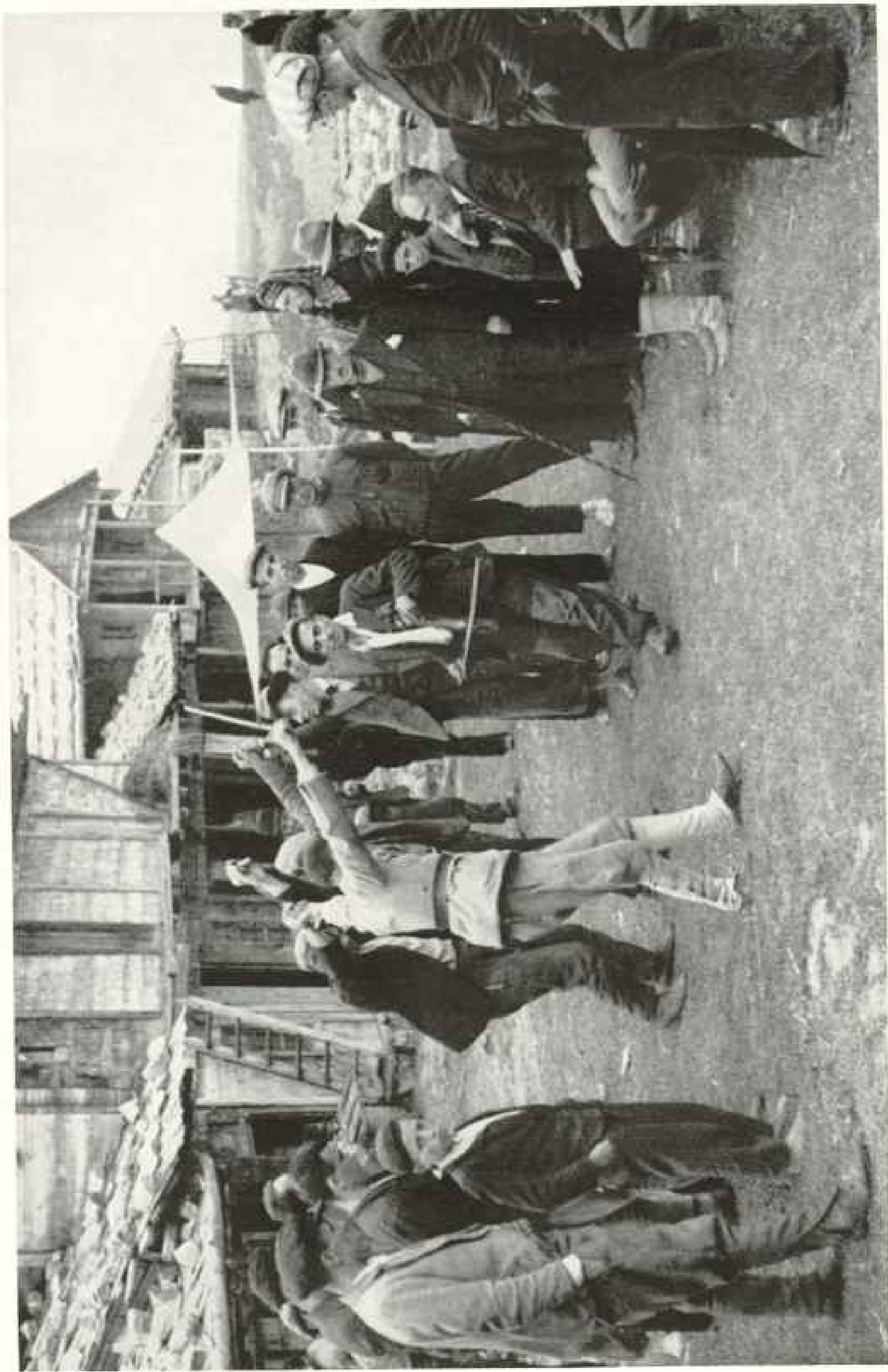
In another quarter an itinerant barber, with the lure of a cracked hand mirror and some sweet-smelling soap, was inveigling the peasants to have their beards shorn despite the Prophet's injunction: "Even as the glory of woman is her hair, so is the beard the escutcheon of masculinity."

The wives of the mountaineers, careless of showing their faces, mingled in the throng. A few groups of heavily veiled females sat apart.



Each Trail to This Anatolian Cattle Market Is a Memory Lane, Going Far Back into History

No wonder Şebîn Karahisar is a place of boots and saddles, of blacksmiths and camel bells. This town, perched on a high saddle above the Kelkit River, is a caravan center dating back to Xenophon's retreating Greeks and Tamerlane's triumphant horde. Caravans set out from here toward Mount Ararat, Mesopotamia (Iraq), the Black Sea, and the railroad terminal at Sivas. Donkeys, mules, horses, sheep, and cattle are bartered in the bazaar.



**With Music, the Laz Wins Friends, Influences People, and Enjoys Life**

Found on both sides of the Turko-Russian frontier, the Lazs are related to the Georgians. To them, song and dance are as vital as food. Here Adli, a Laz violinist, sweeps his bow in an unusual way, so that he can share in the dancing and singing. He played on from sunset until the last marketer had gone home.



**Domestic Science Experts Graduate Early from a Hard School**  
 (Children must care for one another, and by the time a Turkish village woman is married she knows all the family problems and most of the answers.)

These were the women of the orthodox.

My friend the tailor was busy with an old sewing machine he had brought in from Russia by pack horse (page 383). The crowd of curious and wide-eyed peasants who milled about his shop never thinned. He spent the day repairing rips in pants and rents in dresses, drawing patch material from a seemingly bottomless sack.

#### Sampling Honey to Avoid "Honey Fits"

Hundreds of loaves of bread were stacked on the ground in pyramids. As the peasants sold their sheep, goats, and butter and so got ready money, the piles of bread soon dwindled.

A bewhiskered peasant sat behind a huge bowl of brown honey which he was selling by the ladleful. Prospective buyers dipped

their fingers into the bowl and stood about, smacking their lips and cocking their heads cannily.

There is poison honey in these hills. Xenophon, describing the Retreat of the Ten Thousand in 400 B. C., tells how his men were poisoned by honey in this same region.

No one could tell me what plant is responsible, but many testified to suffering from honey fits.

"They come on without warning," explained one buyer, "usually an hour or so after you have eaten. I was suddenly taken with a terrible headache. I fell unconscious and remembered nothing until I awoke clear-headed, none the worse for the attack, late that evening."

The schoolteacher invited me to lunch. In Turkey you must eat much and often. The innkeeper brought out a copper tray with a large bowl of green beans stewed in mutton. The teacher invited the bystanders to join us. Conventionally,

they refused. In Turkey, food and a place to sleep are considered the birthright of all. Even among strangers no one sits to eat without inviting all to partake.

Just below the inn terrace men were feeling flanks, pulling tails, and running exploratory fingers through thick wool. A blacksmith's smithy consisted of a stake in the ground, a string of horseshoes, and a box of nails.

A peasant came up and asked me what  $17\frac{1}{2}$  times 56 equaled. It was a calculation involved in a sale of wheat. I got out pencil and paper, multiplied the figures, and, preening myself a bit on my learning, announced importantly: "980."

"Exactly what I got," exclaimed the peasant, "only the other man wouldn't believe me because I did it in my head."

He then made off with my slip of paper to prove his point. Not a little deflated, I searched him out later and asked him how he did it.

"It is a simple system my father taught me. Now for example, to multiply  $17\frac{1}{2}$  times 56, you divide  $17\frac{1}{2}$  up into 10, 5 and  $2\frac{1}{2}$ . Multiply each by 56 and add up the sums.

"I don't see anything simple about that," I faltered.

"Multiplying by 10 is child's play, while 5 is just half of 10, and  $2\frac{1}{2}$  just half of 5. Forget the zero. Add 56, 28, and 14 and you have 98. Add the zero—980. Isn't that simple?"

I recalled that the Arabs gave us our system of numerals and greatly improved computation methods.

### Prayers and Packing

After afternoon prayers, folks began packing up. Merchants from the city collected their vats of butter and bags of cheese. Peasants loaded their donkeys with bolts of cloth and jerks of mutton. Mountaineer tribesmen took inventory of the new patches the family clothing had acquired.

Within a half hour the market place was well-nigh deserted.

On the long trek back to Artvin through the mountains we were pelted by hail, drenched by cloudbursts, enveloped in mists, and blown about by mad, cold winds. Wrapping our fur coats about us, we got what comfort we could from looking off southward over the hot plains of Anatolia.

It was no little thrill to come up over the last ridge and see Artvin lying an hour's descent below us.

In Artvin, Hassan Effendi's servant came running. He grasped my hand and carried it to his forehead, then toted my saddlebags off to the house.

Hassan Effendi and I exchanged formal greetings, nothing more. It is impolite to badger a visitor with questions when he comes in, tired and dusty from the trail; nor does one cram an evening's precious gossip into a few helter-skelter moments on the doorstep.

The old gentleman left me to straighten up my affairs, soak for an hour in the steamy bath, and then appear in the upstairs parlor in a more tranquil frame of mind.

"My son Orhon," said Hassan Effendi as I walked into the room. I shook hands with a stocky, dark-haired young man with the poise of a man of the world.

"You have a splendid country," said Orhon in answer to my first question. "What with your roads, laughter, women, barbershops, libraries, engineering schools, and efficiency,

America is a paradise for Americans; but I am a Turk." Thus our friendship began.

I came to understand why Orhon was not only content but eager to return to Turkey's far frontier. He had caught a vision of the transformation that awaited his own people.

Quickly he dropped back into the conservative, old-fashioned habits of an Artvin Turk. He slipped off his shoes at the front door. In the evenings, in the upstairs parlor, he would curl his feet up under him on the wall bench (providing his father was not present) and, sipping loudly of his coffee, converse with his brothers and guests with unaffected simplicity.

One week end two Istanbul merchants visited the house. They were—as Orhon explained it—given to wine, women, and song. The Turkish beverage, *raki*, is a clear, potent grape alcohol, which, when mixed with a little water, turns a milky white. A Turk takes a swallow of the *raki*, then dives with his fork for a morsel of food to cushion the "kick."

Drinking in Hassan Effendi's household, as in most middle-class Turkish homes, was a rare event. When a drinking party was on, Hassan Effendi discreetly absented himself. Orhon, in fact, was the only one of the brothers who touched liquor, and he sipped only the minimum required of a host.

### Way of a Turkish Man with a Maid

When Orhon and I went on walks beyond the village, we discussed women. He liked the independence of American women, but was amazed to see how many were unmarried. In Turkey an unmarried woman is a rarity.

"If a daughter remains unmarried, the discredit falls on her parents," he explained. "Naturally they bend every effort to find a suitable and agreeable boy from among the families of their friends.

"A younger daughter never marries before her older sister. My younger sister is good-looking and could have any of the young men in the region. Her older sister is not much of a beauty, but is capable and sweet-tempered. She has had a number of suitors, too, but none that father thought was good enough.

"He was quite taken with a young man in town who comes from an old and respected family now in rather straitened circumstances. Father has offered to give my sister a \$5,000 dowry, as well as set the boy up in business. They are going to be married next spring."

"How do the Artvin young people have any choice in the matter, with the girls veiled and secluded as they are?" I asked.

Orhon began chuckling to himself.

"Really, Nuri Effendi, your question is aca-



demie. Most Turkish marriages are mutually desired. You must have faith in the unfailing ingenuity of youth.

"My older brother and his wife Saniha played together as children. Our families often visited back and forth, so Ali Agha and Saniha saw a good deal of each other. When Saniha took the veil, Ali Agha forgot her until he began thinking about a wife. Then he used to go out of his way to promenade past her house, imagining her watching him from behind the latticed windows.

"Several times he came home from the bazaar with his mind in a whirl and confided to us younger brothers that, while shopping, Saniha had lifted the side of her veil toward him, pretending she saw no one around.

"Mother was a good sport, too. When she invited Saniha to tea, she always let my brother know. An ingenious young fellow can always find a way to glimpse his beloved, and Saniha, wise to the possibilities, was certain to dress in her most bewitching finery and take pains to display her unveiled charms during the visit.

"The final arrangements for the marriage were made by our parents; but if any two young folks were ever in love, they were."

Orhon prepared to leave for Ankara to take examinations as engineer in the Artvin district. I had for some time been planning a trip to the Kara Su (Black River), headwaters of the Euphrates.

#### To the City of Silver

So Orhon and I rode westward through the mountains. At the end of a week we slithered down a steep trail into Gümüşane (Gümüş Khaneh). This is the Silver City famed in ancient times for its metal mines, and visited by Marco Polo on his long trek to the court of the Great Khan in what is now Peiping.

Dismounting in the court of the caravansary, we sat down by the fountain. Having called for tea, the innkeeper went through the full gamut of conventional questions: Where did we come from? What were we doing in the city? How old were we? Were we married, and if not, why not?

Suddenly he drew out his watch and exclaimed, "Four o'clock!" (Four hours after sunup by old Turkish time.) "Hurry, effendis! Your bath closes at noon." In the afternoon the bath proprietor turns over his establishment to his wife and the women.

A sallow-faced fellow brought slippers, led us along a balcony overlooking the central arcade, and ushered us into a large room with divans ranged along its four walls.

As I finished disrobing, a half-naked attendant held up a voluminous loincloth in front of me, then wrapped it snugly about my hips.

Balanced on noisy clogs, we made our way through a series of rooms, each hotter than the last. After removing the first layer of soil, we lay down on the warm stone slab where attendants, with rough cloths, began peeling off the epidermis.

We were pink, exhausted, and half-skinned before being released from this ordeal; but the sight of the cuticle-littered floor made us realize our new cleanness. To a Turk, it is the removal of this soil-stained skin which constitutes a bath.

After another series of hot douses we staggered up to our couches on the balcony. The proprietor swathed us in towels, brought tea, and left us in a state of dreamy contentment.

#### The New Turkish Woman

When we got back to the caravansary, Nami Effendi, a classmate of Orhon's, was waiting for us. A business man of Ankara, he spent his summers here at his father's old home.

Sauntering down along the riverbank, we came up to Nami Effendi's back door through the orchard.

"Nermine! Nermine!" he called.

A patter of feet from behind prompted me to turn. I looked squarely into the eyes of a delightfully pretty girl wearing the latest in Parisian modes.

I was caught off my guard. Six weeks in the veiled east had conditioned me to feel it indecent to look on the bare face of a woman.

"My wife," said Nami Effendi. Nermine had grasped my hand before I realized I was being introduced. Lipstick, rouge, and reddened fingernails. Later I noticed tinted toenails peeping through openwork sandals.

We men sat down in the grape arbor while Nermine skipped off to engineer the dinner. As Orhon and Nami Effendi talked business and old times, I had leisure to recast my conception of Turkish women.

Nermine came back carrying a heavy tray and laughing gayly at an old servant, who hobbled along behind her remonstrating, "Let me carry it."

When the lid was lifted from the center dish, Nermine daintily dipped in her fingers and deftly twisted off a bit of fried eggplant.

"Where are the forks?" queried Nami Effendi. "Our guests will be shocked."

"Oh, I'm sure they won't mind," laughed Nermine. "We like to eat without forks and spoons up here.

"Did you read," she continued, "that there

are now 16 women deputies in the new Turkish Parliament? That is more women than in your American House of Deputies," she added, her eyes sparkling.

"Women are taking over more and more jobs in Turkey. Last June dozens of girls graduated from my alma mater. Many of them will teach in new village schools. We women will soon have achieved equality."

Nami Effendi smiled indulgently.

#### Riding a Zigzag Trail

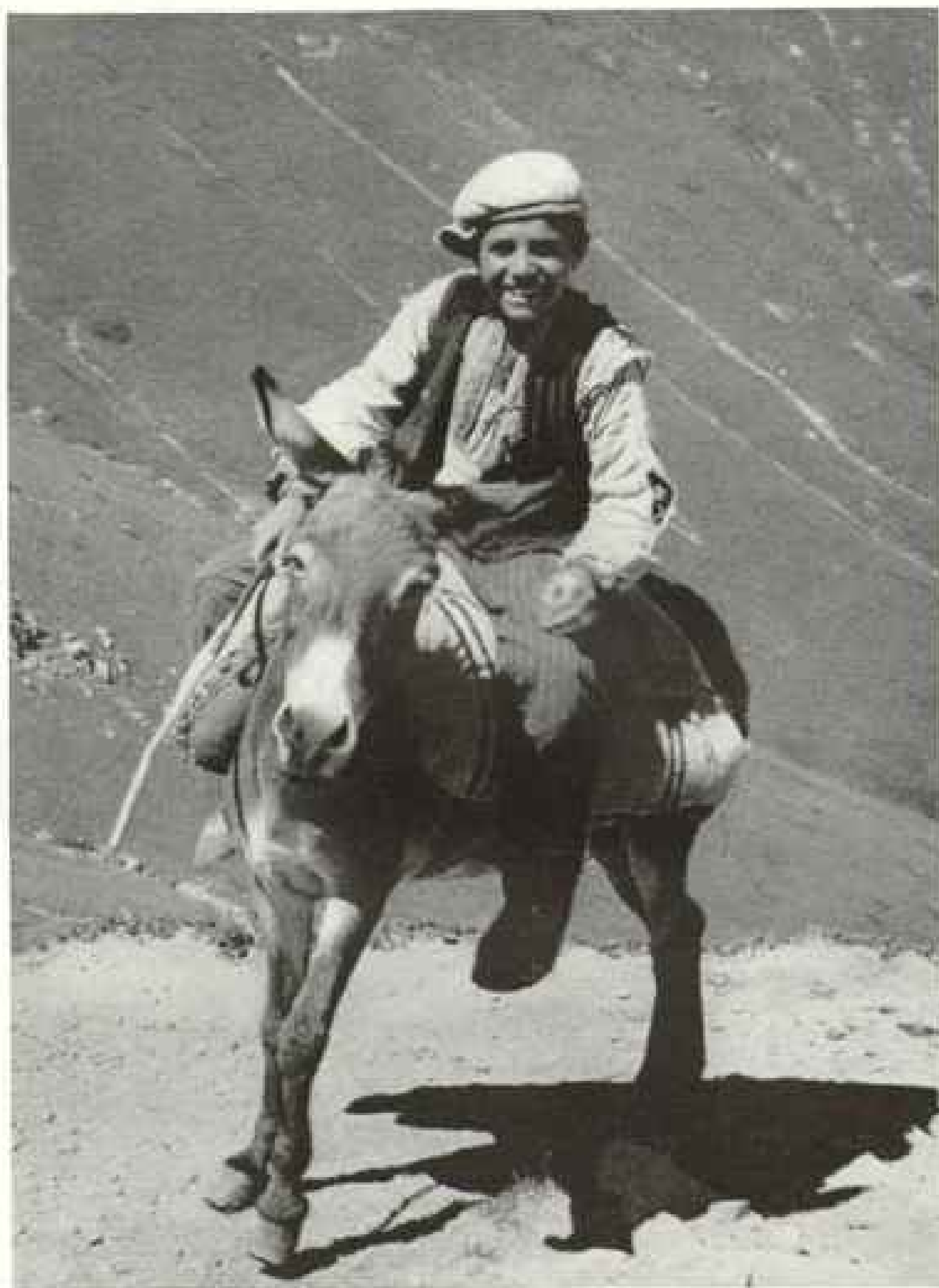
When Orhon left for Trabzon, Samsun, and Ankara, I struck south toward the headwaters of the Euphrates.

By noon I had fallen in with a jovial middle-aged peasant with a huge nose, bushy hair, and flowing whiskers. With twelve horses, Neb Effendi was also headed for the Euphrates, so we traveled together in an ever-changing southbound caravan.

Riding the trails of eastern Turkey is high adventure. The country is magnificent. Paths run through deep forests, over rocky crags, along precipitous gorges, down into hot valleys, and across streams spanned by pine-trunk bridges. Since trails cater to local instead of through traffic, they zigzag through all the little villages.

Few travel alone. Those going the same pace fall in together. Others drop behind or speed ahead to faster riders. At each village some drop out. Others, who have been sitting in the north shadow of the village inn, tighten girths, fasten on saddlebags, and join the caravan.

Cold trailside springs not only add to the pleasures of travel but also furnish a never-ending source of conversation, since certain springs have a legendary fame.



#### His World Is Small, but He Knows It by Heart

Riding a donkey as apprentice to a caravan chief, this boy has traveled trails once known to Xenophon and Tamerlane. From donkeyback he has seen snowy Ararat and looked down on the Black Sea, where Jason sought the Golden Fleece. When his "schooling" is over, his own caravan will tread the age-old route to Persia (Iran) and the East.

On the black lava slopes of Mount Ararat, for instance, is a bubbling fount. After drinking only two cups of this matchless elixir, they say you can consume a whole sheep at a sitting! There are springs so cold that you cannot pick out six stones in rapid succession. Others burn your fingers or give you a headache.

Up near the headwaters of the Euphrates is a spring whose water sours milk instantly. Finally there are the red, yellow, aromatic, and periodic morning-and-evening springs, those which cure all ailments, and those which petrify everything they touch.



### Toiling Turks Shrink a Tire to a Solid Wooden Wheel

Except for the iron band, such oxcart wheels resemble those used in Babylonia 5,000 years ago. The whole axle turns on bearings which groan at their task. Such narrow-tired wheels are so destructive to Turkey's new motor roads that oxcarts are often forced to detour to trails of their own.

Peasant wayfarers kept peppering me with questions:

"Why is it cold high up, nearer the sun?"

"Why is the sun larger when it rises and sets than at midday?"

"How do you explain the moon's phases?"

Living most of his life in the open, the peasant is keenly curious about the universe.

At gendarme posts we had to register and show our credentials. Such precautions have reduced banditry in Asia Minor, so that I was not amazed to pass a Turkish jail and see the gates wide open, with the guards, prisoners, and relatives sitting about.

On the third day, zigzagging up a long, steep slope, we came out on a wind-swept, treeless divide. Below us lay the valley of the Euphrates, here known as the Kara Su.

I looked in vain for the river. Here at

its headwaters in the mountains this mighty river of Babylon is but a slender stream. Neb Effendi pointed out his village, a dense blot of green just where the valley wall leveled off to meet the plain.

It was dark when we pulled up before Neb Effendi's hut. There was a scurry of women and children. Rugs and blankets were laid out on the roof, to which we mounted by an outside ladder. A little girl came running from somewhere with two pitch flares which she set up edgewise against a soot-blackened stone.

Neighbors came to welcome their friend, and soon a dozen faces circled the flickering lights. A horseman clattered up the path and called for Neb Effendi. My host disappeared down the ladder and returned in a few minutes with a fellow horse



#### A Turk Removes His Shoes before Going "Inside," Even if His House Is Only a Mat

"When noon came around," the author writes, "my trail companion would call on some friend in the village, who would invite us to lunch. Even a casual acquaintance would seem honored by the visit. On a goat-hair mat, spread in the shade of a wheat stack, he would serve fried eggs, bread, and tea on a tin-plated copper tray battered and scarred from many generations of use."

trader from a far-off village near Lake Van.

Neb Effendi's hospitality had been recommended to him by a trail companion. He took his place in the circle and conversation was resumed.

#### Marriage by Capture

"Another of our girls was stolen from the fields today," said one. I looked up, incredulous, but the others seemed to accept the circumstance as a matter of course.

Here the ancient custom of marriage by capture still survives. A young man sets his eye on a girl. Perhaps her father objects. The boy gets some of his cronies to help him carry the girl off.

"This young villager, who stole our girl," explained Neb Effendi, "will hide with his

booty in the forests for a few days and then come back to his village."

"But what does the girl say?"

"In one case the girl, seemingly content, persuaded her captor to come out of hiding. Then she ran to the gendarmes and accused him of abduction. He was given ten years in prison.

"But usually the girl accepts the situation. More likely, she is thrilled by it. A stolen bride has much 'face.' Anyway, if she accuses her captor and deserts him, no other man would marry her."

Virginity is essential to matrimony for a Turkish maid.

The marriage state is held in high esteem. "When a man marries, he perfecteth half his religion," said Mohammed.

In the flickering light of the pitch flares I threw out the query, "Is not two years of compulsory military training rather long?"

"Long?" echoed the horse trader. "In the days of the sultans, a man spent ten years in the service. I had an uncle who went into the army in 1910 and did not return to his family until 1924. By that time his wife had died and his children no longer remembered him."

"The training is not long enough," chimed in another. "We send off our sons to the army, unlettered and unacquainted with the world. They come back two years later reading, writing, and talking intelligently about the problems of the Republic."

Recruits from the progressive western cities are sent east. Those from the conservative east serve in Ankara, Izmir (Smyrna), and Istanbul, and so can become leaders when they return to the backward eastern villages.

#### Horse Talk in Black Tents of the Kurds

During the days that followed, the horse trader and I roamed the Euphrates flats. We visited the great bazaars of Erzincan, talked "horse" in the black tents of the Kurds, and searched out the huts of peasant horse breeders.

Hadji could always strike up an acquaintance through some filly, foal, or studhorse of which he had knowledge, thus getting a line on the year's crop of horses. We frequently returned to sleep on Neb Effendi's roof, as our host had insisted.

When I saw him off for a second trip to the Erzincan bazaars, I told the horse trader that I was leaving in a few days for Artvin.

"Wait for me," he said, "and we shall ride the mountain trails together. I have many friends in the villages and with them we shall eat much mutton and grow fat."

When I saw the many grain stacks behind his house, I knew that Neb Effendi was one of the rich peasants of the valley. The Euphrates plains were dotted with threshing floors, enveloped in clouds of chaff and dust. Here sowing, harvesting, and threshing the grain are still done by hand.

The grain is cut by scythe if the ground is level or by sickle if rough and stony. The lighter job of raking it into cocks falls to the women. With wooden pitchforks the men then load it onto two-wheeled carts and haul it to the threshing floors.

There ox-drawn sledges, toothed with flints, are dragged over it until the grain is separated.

At Neb Effendi's, one little driver was only three years old. But managing an ox sledge is not much of a trick. Since the oxen are trained to circle endlessly, reins are unneces-

sary. One merely has to prod to start and shout to stop. The driver's chief responsibility is to catch any dung that falls before it can foul the grain.

"Why not put noseguards on the oxen?" I asked.

"The day is long and the animals must have strength to carry on," Neb Effendi replied. The peasants still obey the ancient injunction of Deuteronomy 25:4—"Thou shalt not muzzle the ox when he treadeth out the corn."

One evening I told Neb Effendi that I must set off for Artvin the next morning. At dawn I was surprised to find a rumpled and empty blanket roll on the roof beside me. Below in the stables I discovered the returned horse trader currying my horse. The fates had decreed that we ride together.

As Hadji had friends in every village, each day was punctuated by visits and siestas. Hadji had traveled widely among the Kurds, so I plied him with questions about these brave but lawless people.

Because of their wild ways, the Kurds have long been held in disrepute. Most of them believe in Mohammed, but fail to adhere to many Moslem precepts. The women go unveiled.

In the old days the traveler who stopped at a Kurdish tent might be given a hearty welcome and treated as a brother during his stay. When he departed, the Kurds loaded him with gifts, led him to the edge of their territory, and, after bidding him godspeed, put a bullet through his head.

At the forking of the trails Hadji struck off southeast toward the Persian border ranges, while I turned north toward Artvin.

Back in the Artvin bazaar the hodja was telling his beads as of yore. I drank a glass of tea with butcher and baker, and conversation began where we had left off weeks before.

At last the skein of time played out. When the day came for me to leave, there was no commotion at the great manor house where guests come and go. The world is small, trails are many, and, if the fates decree, folk will meet again.

The old gentleman came out to smile me on my way. I was leaving the mountains where I had met with so much sincerity, kindness, and unbounded hospitality.

My route stretched away toward Mount Ararat and a rendezvous with Hadji, the horse trader. Interest, excitement, and grandeur marked our trail through the Kurdish highlands and past Lake Van to Mesopotamia's rim. But the richest adventure lay behind me in Hassan Effendi's mountain village, where I had drunk deep from the well of life.

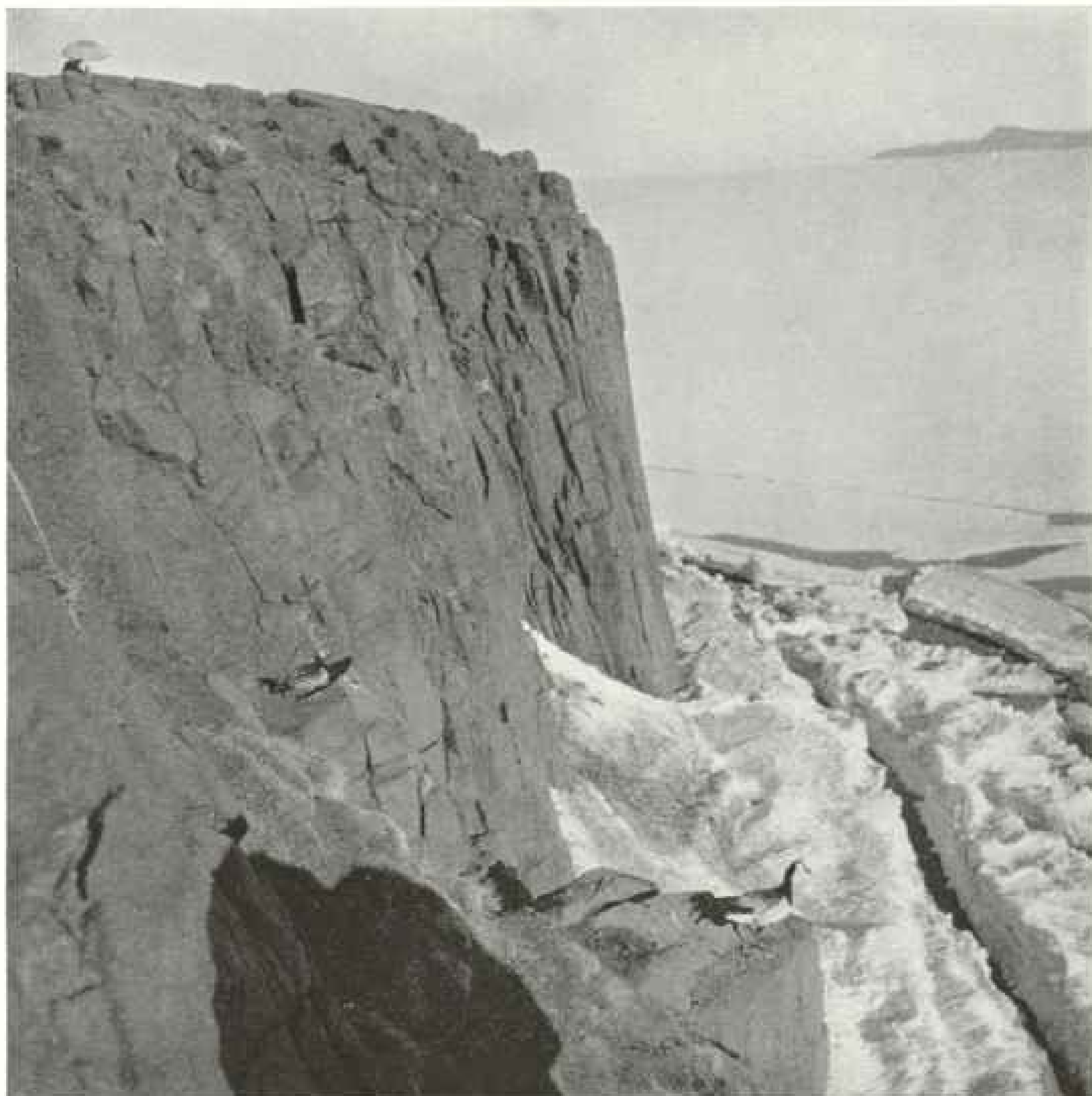
## Desolate Greenland, Now an American Outpost



Willie Knutsen from *These Lands*

### Angmagssalik Women Row Out in Their Umiak to Tell Explorer Friends of Invasion Fears

In August, 1940, when Capt. Willie Knutsen on his *Ringsel* arrived off the Eskimo village with his third expedition to the east coast of Greenland (page 395), the natives were excited over a stray barrage balloon from England which had caught its dangling cable on their rocky shore. They had thought it was a Nazi war machine.



Wittie Knutsen from Three Linn

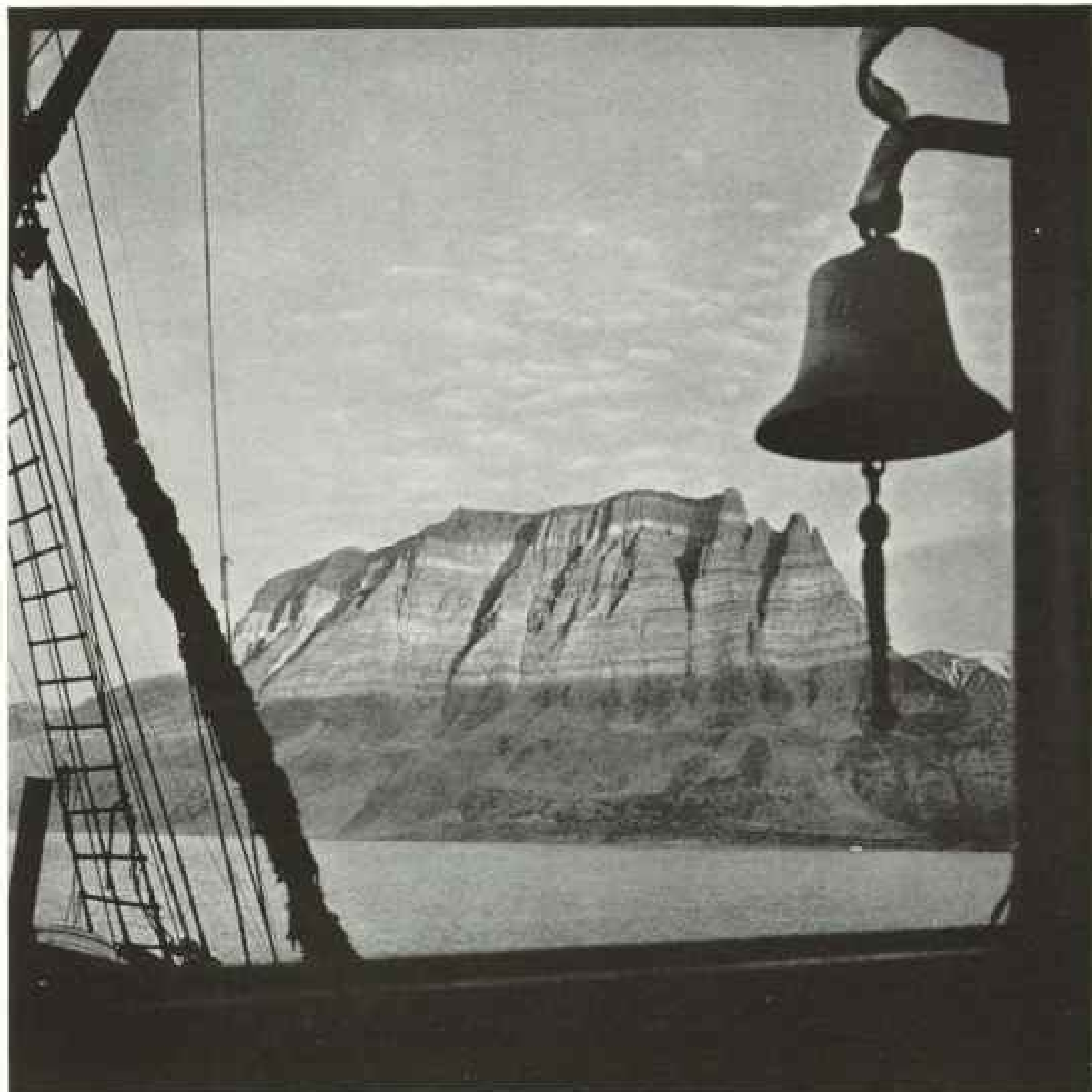
### In June the Ice off Cape Mary, Eastern Greenland, Starts to Break Up

The harbor is clear, except for some drift, by about the end of the first week in July and remains open until early October, when winter again locks it.

In 1958 Captain Knutsen saw German flyers test a new kind of plane in this area. They made repeated experimental trips from Spitsbergen to Greenland, hopping from one floe to another. By such trials they demonstrated that supplies could be brought to the island even when the fjords were closed to the strongest ships.

Even in winter when bays along the coast are unnavigable, the inland lakes are usually free and afford easy landing places for amphibian aircraft. Here the summer sun is hot, as is evidenced by the Eskimo woman with a parasol atop the promontory.

Barnacle geese, two of which are perched on the rocky face of the cliff, nest undisturbed in the desolate wastes. From northeastern Greenland these birds migrate eastward to join others from breeding grounds in Spitsbergen and Novaya Zemlya. They winter in Europe south to northern France, Germany, and Poland. Only casual strays are seen in the eastern United States.

Willie Knutsen from *Three Lions*

### The Midnight Sun Lights "Devil's Castle" on Kejser Franz Josephs Fjord

Capt. Willie Knutsen was a member of Count Gaston Micaud's *Quest* expedition in 1936 and led the Norwegian-French Expedition in 1938. After the German invasion of Norway in April, 1940, he was permitted, because of his American citizenship, to return to Greenland on the *Ringrel* to continue his studies.

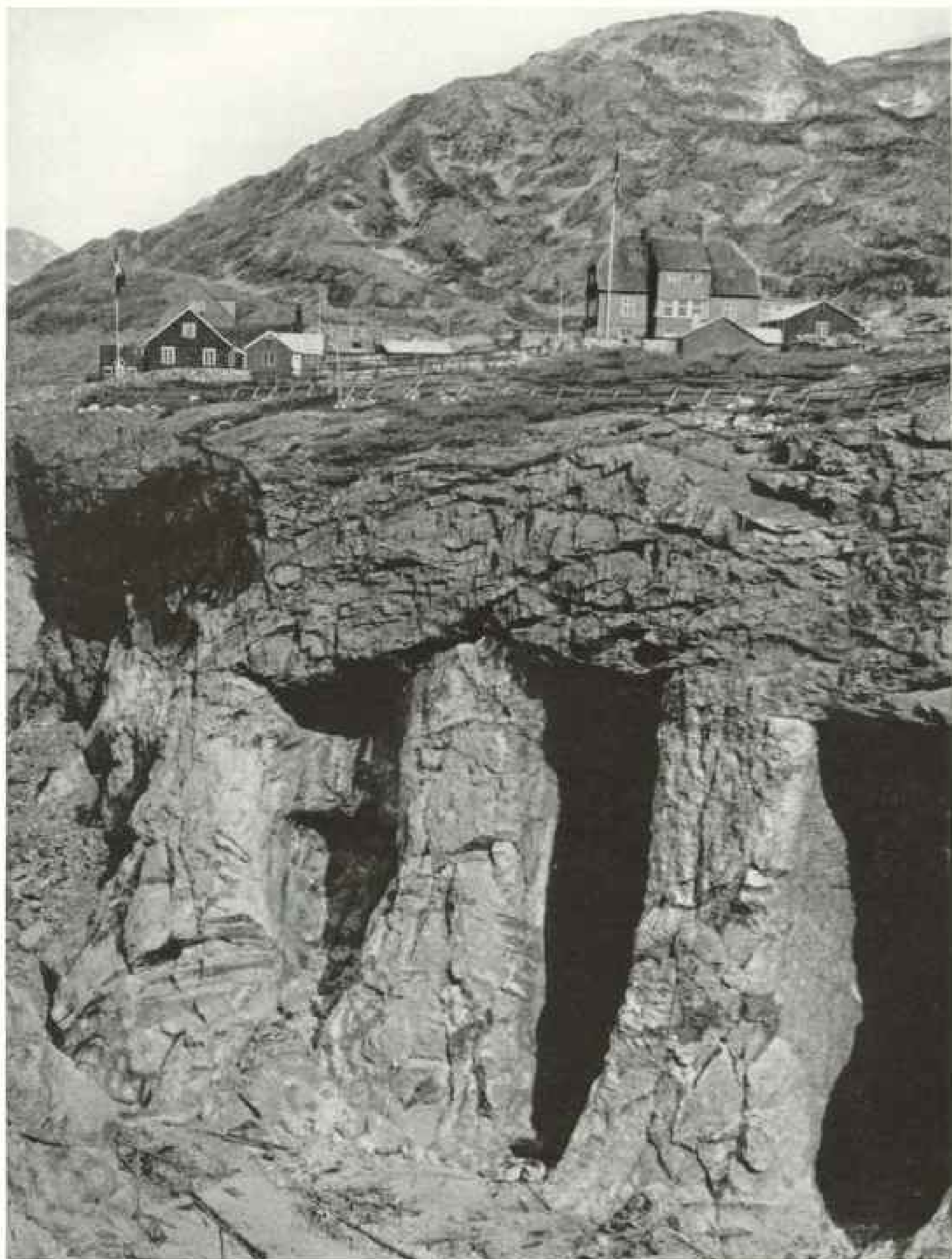
When he came to the United States he left his ship in charge of its Norwegian crew. They took it back to Norway, where it is now interned (page 398).

From the deck of the *Quest* Captain Knutsen took this picture of the Teufelschloss, eastern Greenland, in the summer of 1937.

Although the land is barren, the stratified cliffs show layers of blue, green, and yellow comparable to the Grand Canyon. Between mid-June and mid-September each year the waters hereabout are open to navigation, but any ship lingering until October is frozen in for nine months.

Fog is almost always present over the pack-ice belt and off the coast during the warm season, but it lies low, extending barely above the mast of a vessel. Many days are as clear as this. Inland lakes are free of mists.





Ewing Galloway

#### Ore Used in Making Vitally Necessary Aluminum Is Mined at Ivigtut

Danes discovered here in 1794 cryolite, a fluoride of sodium and aluminum, virtually unknown in the rest of the world. Only in south Greenland is it found in sufficient quantity for commercial purposes. The Eskimos thought it a special kind of ice, but it paid to the Danish Crown in taxes most of the expenses of the colony.



Willis Kautson from *Three Lions*

**Coast Guard Officers Visit Ruins of a Church Where Leif the Lucky May Have Worshipped**

Near Julianehaab, on the southern coast, are found many remnants of buildings constructed by Norse sea rovers about 900 years ago. Eric the Red founded the first settlements in Greenland. Many historians believe the "Vinland" to which his son, Leif Ericsson, voyaged from here about A. D. 1000 was the American mainland.



With Knutsen from Three Islands

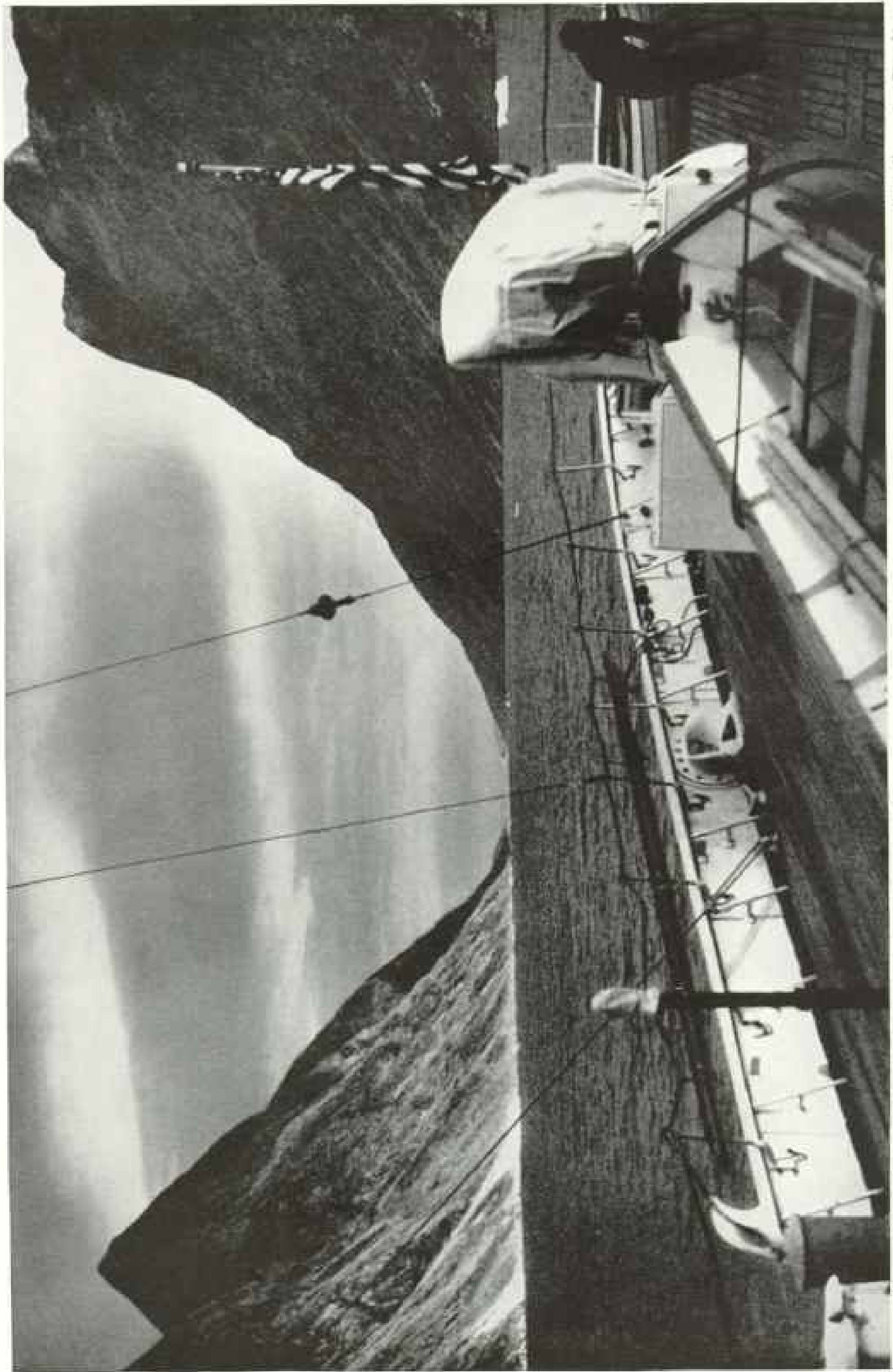
**U. S. Patrol Ship *Northland* Anchors Amid Ice Floes Near the *Ringsel* in Angmagssalik Harbor**

Obligated to abandon his expedition because of the war, Mr. Knutsen came to New York on the Coast Guard cutter, leaving his own ship and equipment behind.



With Knutsen from Three Islands

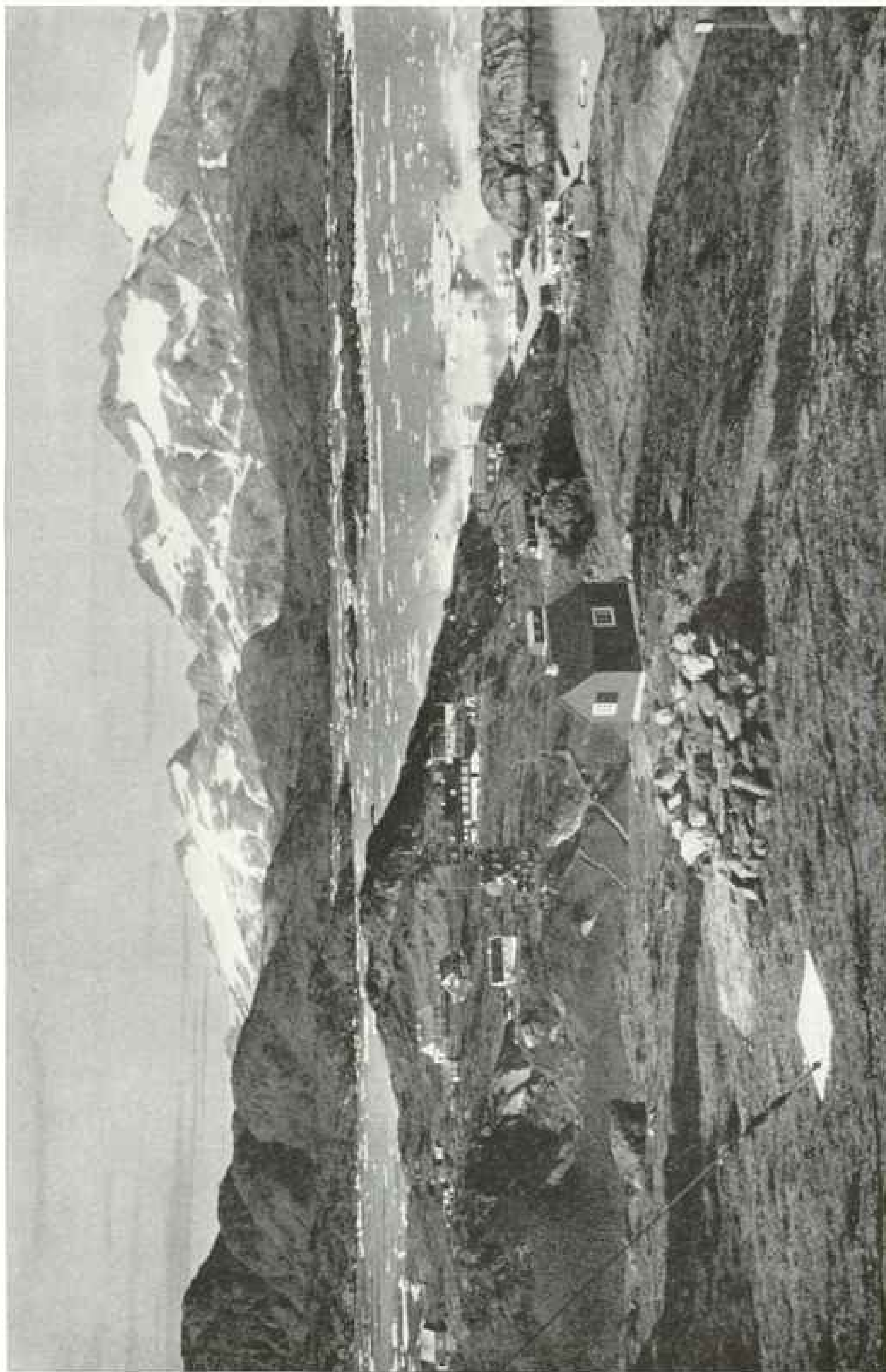
Near Jullianaab, Southern Greenland, Coastguardmen Visit Ruins of Norse Houses and Stables as Well as a Church (page 397)



Walter Kunzmann from Dover Island

**The *Northland* Thoroughly Investigated the Navigable Waters of Greenland**

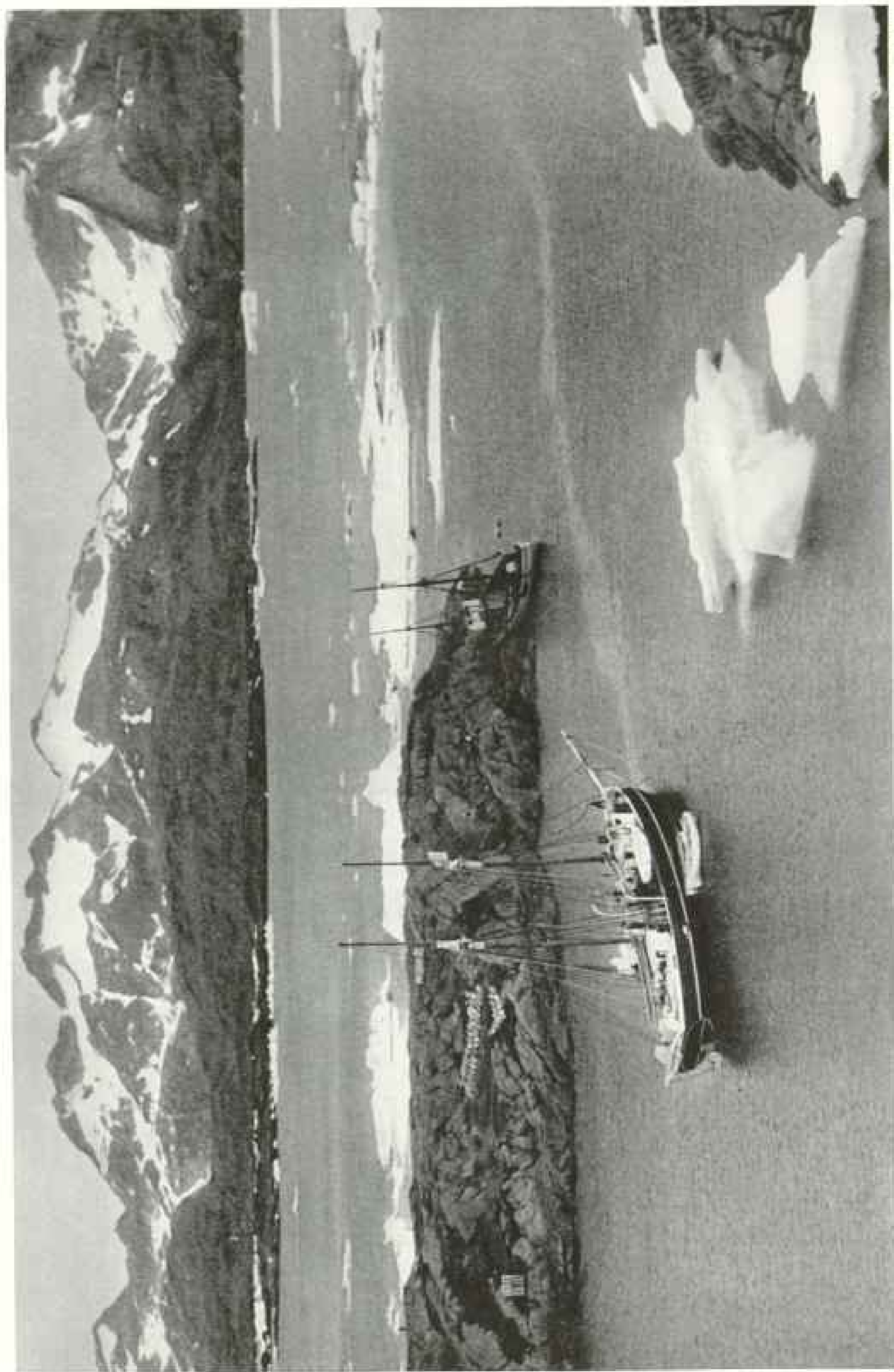
Here the United States Coast Guard cutter is entering a fjord on the southeast coast. The fjord is much clearer of drift ice than the harbor of Angmagssalik (opposite page). Both pictures were taken in August, 1940.



With permission from Thors Ebbert

### Angmagssalik Is the Only Important Settlement on the East Coast of Greenland

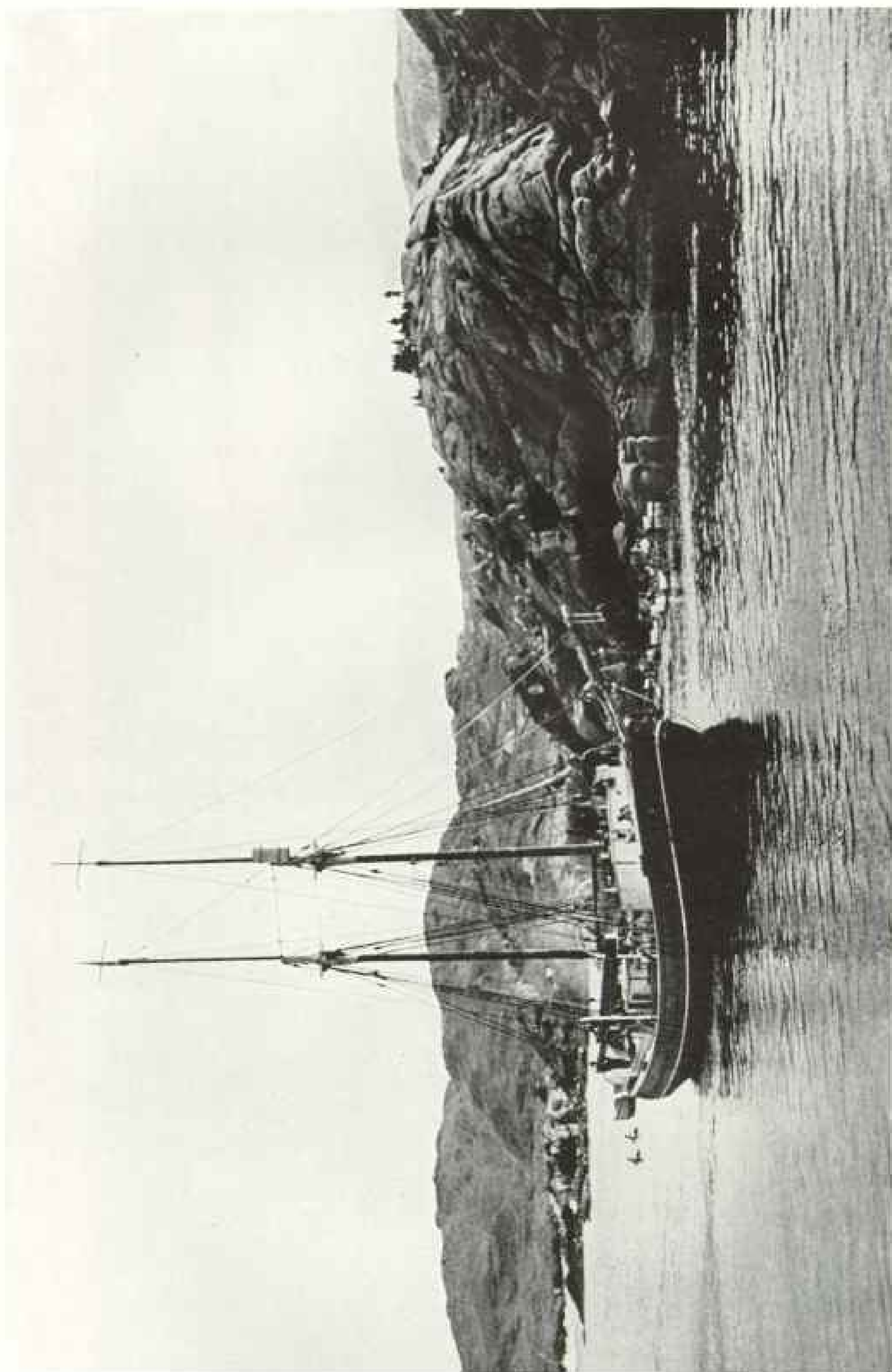
Scattered over rocky hillsides are dwellings in which about 100 Eskimos live. All wood for building must be brought in ships. This photograph was taken from the radio station. There are three such stations farther north, all established to report weather conditions. Even in midsummer the harbor is dotted with drift ice.



With Keelson from Thorpe Lund

### The Late Explorer Rasmussen's Ship Joined Young Knutsen's Vessel in Angmagssalik Harbor

Both the *Sockomgen* (foreground) and the *Ringel* (at the point of land, center) had seen long service in Greenland (page 465). The Danish geographer had been interested mainly in discovery; the youthful Norwegian-American combined the search for scientific data with modeling Eskimo types in clay.



White Knutson from Thors Liana

**When Knud Rasmussen's *Sockongen* Came to Angmagssalik in 1940, World Attention Was on Greenland**

Its position as a stepping stone between Europe and Canada and its rich cryolite deposits make it valuable. Some 250 Danes and 17,000 Eskimos live on the island.



F. Voss

#### Even in Summer the Eskimo Likes His Parla Hood

Checkered cotton, formerly imported from Denmark, now from the United States, takes the place of the sealskin worn in winter. The garment is made in the same style as the traditional fur apparel.

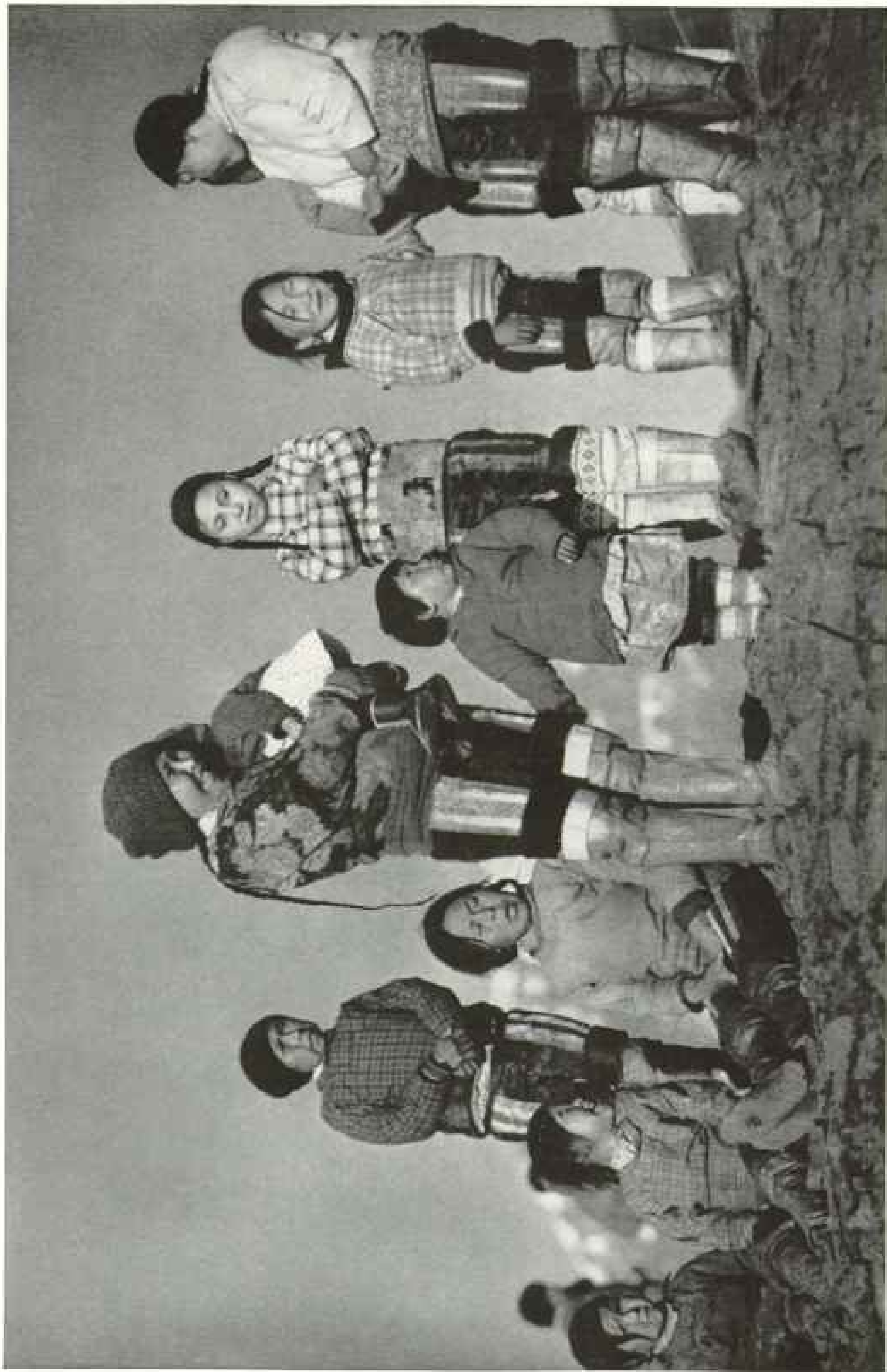


F. Voss

#### Offered a Bit of Chocolate, a Little Eskimo Beams

Her wants are simple. A movie on a patrol ship is a great occasion to her now that the United States has assumed a protectorate over Greenland. She wears a summer dress of gingham bought at the Danish store in Anngagsalik.

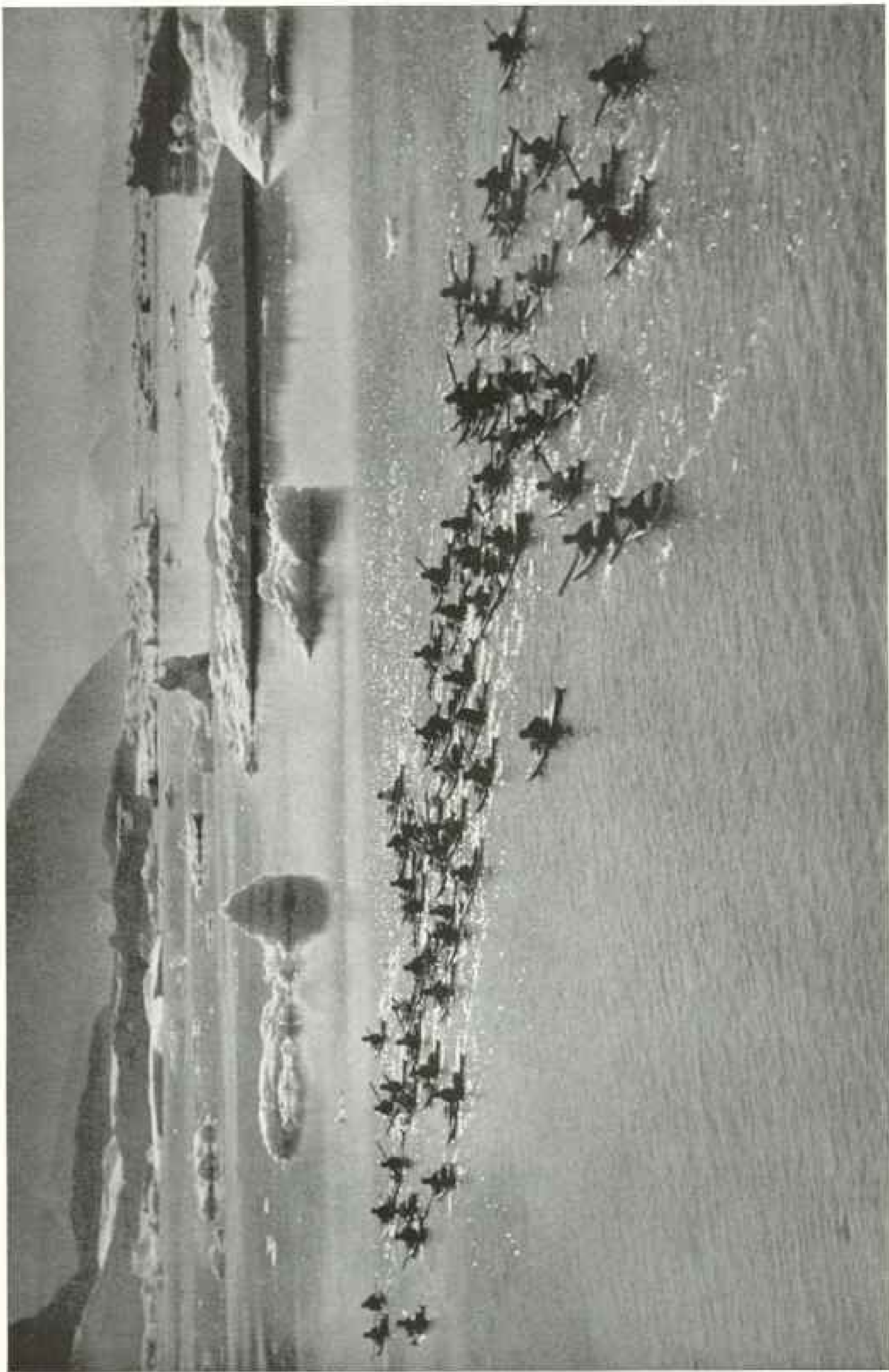




Women and Children Wait on Shore While Their Men Paddle Kayaks out to Rasmussen's Old Ship

When they go on the water, they use large skin-covered umiaks which accommodate a score of passengers (page 193). The weather at the time of the Sackniggon's arrival in the summer of 1940 was still chilly (note the fur apparel), and large floes of ice were adrift in the bay (pages 401-2).

K. Young



F. Voss

**Eskimos Turn Out with Their Whole Kayak Fleet to Welcome the Ship of Their Mourned Friend Knud Rasmussen**

The famous explorer, whose mother was Eskimo and whose father was Danish, was beloved by all the natives at Angmagssalik. In fact, until his death in 1933, they looked upon him almost as king of Greenland. His exploration ship, *Sorønnen*, was in the harbor when Willie Knutsen was there in the *Ringvef*.



### A Historic Conference—The President of the United States and the Prime Minister of Britain Meet on the Atlantic

Behind the President and Mr. Churchill are, left to right, Harry L. Hopkins, lease-lend administrator; W. Averell Harriman, lease-lend aide in London; Admiral E. J. King, commander-in-chief of the U. S. Atlantic Fleet; General George C. Marshall, Chief of Staff, U. S. Army; Sir John G. Dill, chief of the British Imperial Staff; Admiral Harold R. Stark, U. S. Chief of Naval Operations; and Admiral Sir Alfred Dudley Pound, First Sea Lord of Britain. During five days of August, 1941, for the first time in history the people of the United States did not know where their President was.

# New Map of the Atlantic Ocean

Foremost Sea of Commerce Becomes World's Battleground and Its Peaceful Islands Rise to Strategic Importance

BY LEO A. BORAH AND WELLMAN CHAMBERLIN

**I**N 1939 the National Geographic Society's Map of the Atlantic portrayed the world's foremost highway of commerce.

Now a new Map of the Atlantic shows the world's most fateful battleground.\*

No longer does a "broad Atlantic" separate the tense but thus far peaceful Western Hemisphere from war-torn Europe. Airplanes have reduced the time of crossing from days to hours and turned what was once a tremendous water hazard into a "puddle jump."

Were hostile forces in command of Iceland, Greenland, the Azores, the Canaries, and the Cape Verde Islands, every coastal city from Newfoundland to Argentina would be within possible striking distance of air raiders. Only the United States Navy and its newly acquired defense bases would serve as an outer guard for the eastern United States.

In 1939 the Atlantic Squadron of the United States Navy was based on the mainland coast from Portsmouth, New Hampshire, to Charleston, with a right arm extending 1,100 miles off Florida, through Guantánamo, Cuba, Puerto Rico, and the Virgin Islands. This arm only partly guarded the vital Panama Canal.

Now an Atlantic Fleet of secret strength is operating off our shores. A string of new air and naval bases carries our front line of defense some seven hundred miles eastward.

## American Might Guards Greenland

In April, 1941, the United States assumed protection of Greenland as essential to the security of the Western Hemisphere and announced that it would construct military bases there (pages 393 to 406).

From north to south this island is 1,655 miles long and approximately 700 miles wide; it contains 840,000 square miles. About six-sevenths of its area is covered by perpetual ice and snow fields.

In the NATIONAL GEOGRAPHIC MAGAZINE for July, 1940, the veteran Arctic explorer Captain Robert A. Bartlett wrote of the possibilities of Greenland as a base of war operations:

"When Germany entered Denmark, the question arose whether this 'protectorate' extends to Denmark's island of Greenland, and, if it does, what the effect will be on North Americans.

"The answer is found in geography. If

military forces come to Greenland, they will find a diverse island, beautiful, amazing, difficult, icebound; yet a place which might well serve as a year-round base for air operations and in summer for maneuvers by sea and land.

"The distance from the west coast of Greenland to Cape Dyer, Canada, is less than 200 miles, and northern Greenland is only 12 to 14 miles from Ellesmere Island. It is only 200 miles as the sea bird flies from Greenland to Iceland, and from there 500 miles to the British Isles, 625 to Norway.

"Thus, while Greenland belongs to North America, it is actually a convenient stepping-stone for airplanes flying to this continent from Europe."

Godthaab, Greenland, where an American consulate has been established, lies 1,150 air miles from St. John's, Newfoundland. Cape Farewell, Greenland, is 900 air miles from St. John's. Godthaab is 500 miles from northern Labrador. Significant distances from Cape Farewell are: to Boston 1,670 miles; to Bermuda 2,130 miles; to Reykjavik, Iceland, 760 miles; to Scapa Flow, Scotland, 1,420 miles; to Fayal, Azores, 1,610 miles.

From Godthaab the new defense lines run southward to St. John's, Newfoundland, 1,150 miles, Bermuda 1,230 miles, Antigua 1,065 miles, St. Lucia 220 miles, Trinidad 235 miles, Georgetown 350 miles, making a total of 4,250 statute miles.

This line encloses more than 4,200,000 square miles of the Atlantic (over 5,000,000 with Iceland occupied), including the Caribbean and Gulf of Mexico within the outer line of defense of this country. From it United States forces are patrolling an area of about 7,700,000 square miles, two and one-half times the area of the United States, nearly that of the North American Continent.

Five of the six locations to which the United States obtained rights from the British in last September's destroyer trade lie along the Caribbean; British Guiana, though not on the Caribbean, is nevertheless linked with the de-

\* Members wishing additional copies of the map, "Atlantic Ocean," may obtain them by writing the National Geographic Society, Washington, D. C. Prices, in United States and Possessions, 50¢ on paper (unfolded); 75¢ mounted on linen. Outside of United States and Possessions; 75¢ on paper; \$1 on linen. Postage prepaid.



Christina de Castro

### Women Do the Heavy Work in the Cape Verdes

Like the majority of their 163,000 fellow inhabitants, they are of mixed African, Moorish, and Portuguese blood (page 411). Their home is at Praia, in the lowlands of São Tiago, where they find employment as porters when cargo ships come in.

sense of that area. Rights in Newfoundland and Bermuda were a gift from Great Britain.

From the Bahama Islands' station, naval patrol units will be able to guard the 29 islands and some 3,000 islets and rocks that make up this archipelago. The station, lying on Great Exuma Island, will be an advance post for the naval base at Guantánamo and will help observe the hide-outs furnished by the Bahamas.

Backing Guantánamo lies Jamaica athwart Windward Passage, only 600 miles from the vital Canal Zone. Near Port Royal, where Nelson commanded the batteries at a fort built

in the days of Henry Morgan, famous buccaneer governor, will be one of the strongest of the new establishments.

Twenty miles west, Portland Bight will act as fleet anchorage, with Galleon Harbour fortified to serve as a protected haven. In fact, a fairly large area of historic Jamaica will fly the Stars and Stripes.

Eastward, Puerto Rico is being transformed to earn its nickname, "Gibraltar of the Caribbean." Together with St. Thomas, in the American Virgins, it provides an important United States position standing guard between Mona and Anegada Passages.

Spaced in the curve of the Lesser Antilles are the 108 square miles of Antigua, guarding the northern section, and St. Lucia holding the south. In Antigua the United States will have a station of some three square miles on Parham Sound. The station on St. Lucia is on Gros Islet Bay, about 35 miles from Fort-de-France, capital of Vichy-controlled Martinique.

Anchoring the southern end of this line lies Trinidad. Here the great Gulf of Paria furnishes one of the world's finest anchorages.

Trinidad stands guard on the southern approaches to the Caribbean and brings

the United States flag within 2,130 miles of Natal, Brazil. Though this distance is still not so short as the 1,870 air miles to Vichy's Dakar, the advance air bases in British Guiana, backed up by Trinidad, lie slightly closer than Dakar.

The range of modern bombers, submarines, and fast surface raiders has reduced the Atlantic narrows, between Dakar and Natal, to practically the status of a strait.

Off Dakar, about 1,600 miles from Brazil, lie Portugal's Cape Verde Islands. If Dakar should become a hostile base, the Cape Verdes probably would be under the same control,



Bernard F. Higgins, Jr.

#### Ponta Delgada, on São Miguel, Has the Largest Harbor in the Azores

With its many churches and clean white houses built among green hills, this city of 18,000 people presents a charming picture to travelers approaching by sea. Passengers come ashore at the foot of the graceful clock tower. At the beginning of a sheltering pier four-fifths of a mile long stands the fort of São Brás, manned by Portuguese soldiers (page 417).

The *Robin Moor* was sunk in this "strait" only 500 miles from the Cape Verde Islands, and experts believe that the German submarine was supplied in those islands.

The British have used some of the 14 mountainous and rocky islands in the crescent-shaped archipelago as refueling stops. Many ships sailing between Europe and South America, as well as along the African coast, take on fuel at the islands. Dakar is a competitor for this coaling business.

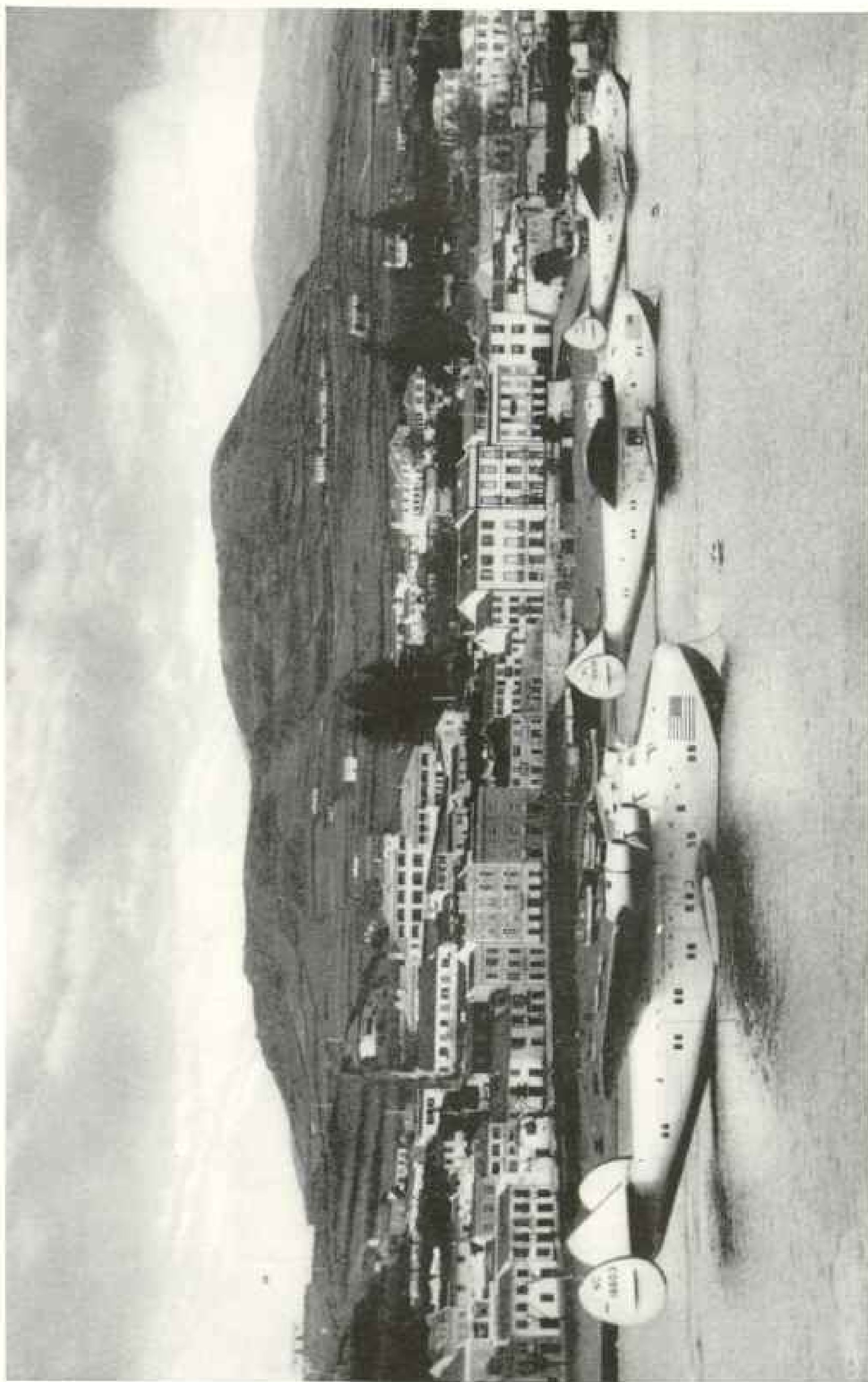
The Cape Verde group is swept almost constantly by winds. Both the high volcanic slopes and the seashore itself appear bleak and arid from the deck of an approaching steamer. Cape Verde means "Green Cape," but that is a misnomer. The interior valleys of the larger islands, made fertile by soil

washed down the mountainsides, are the only spots which justify that title. The name comes from the African cape of the same name.

If the islands could be placed together on the State of Rhode Island, only a few rugged edges would extend over the borders. São Tiago, the largest, has about three-fourths the area of the city of Los Angeles. Some of the islands are not even inhabited.

The best harbor is at Porto Grande, on the island of São Vicente. It has good anchorage and is protected on three sides by mountains, with the entrance partly shut off by the nearby island of Santo Antão. The only other sizable sheltered port is Praia, on São Tiago, where the Portuguese Governor General lives.

Most of the islands' 162,000 inhabitants, the vast majority of whom are negroes or



PHOTOGRAPH BY ALBERT R. BROWN

### Eyes of the World Are on Horta, Station for Transatlantic Clippers and Cables

Since 1919, when the U. S. Navy seaplane *NC-1* passed here on the first successful flight from Newfoundland to England, the little Portuguese city of 7,000 on the island of Fayal in the Azores has been important in aviation news. It is now a regular stop for aircraft en route from the Americas to neutral Portugal and a hub of cable communications between the hemispheres (page 418).

mulattoes, live in compact towns and villages on the mountain slopes. The remainder are huddled in seaside settlements and spread over the interior valleys. Women do much of the heavy work (page 408).

Fresh water is a luxury in some parts of the islands, but in the valleys the natives—descendants of slaves brought from Africa by early Portuguese settlers—raise coffee, corn, sugar cane, oranges, sweet potatoes, tobacco, and other agricultural products. Other natives make a living by weaving straw hats, curing fish, or manufacturing rum. On three of the less mountainous islands salt is produced in commercial quantities (page 412).

Vasco da Gama paused at the Cape Verdes on his way around the Cape of Good Hope to India. Sir Francis Drake paid an unfriendly visit in 1585 and sacked some towns on São Tiago. Many Portuguese mariners landed there while searching the seas for new colonies to add to their kingdom's vast domain; and now transatlantic flyers use them as a fueling station between Africa and South America.

Even today many valley people seldom leave their neighborhoods except to sell fruit, tobacco, castor beans, coffee, potatoes, and yams, which they produce on their small farms.

#### The Flowery Canaries Now Sinister

The Spanish-owned Canary Islands\* are located between British Gibraltar and Dakar, France's vital West African port. The entire western bulge of Africa, both north and south of the islands, is a sort of "international row" of colonies, including those of Great Britain, France, Portugal, and Spain.

Skirting these coasts normally are some of the world's most important travel routes, now become doubly strategic with the shutting off of other trade lanes. One of these runs through the Canaries on the way to Gibraltar and the Mediterranean. Another leads west of the islands, eventually to the British Isles.

In this day of short cuts, Las Palmas, Canary Island port, has, on the contrary, been lengthened to Las Palmas de Gran Canaria, or the Palms of the Grand Canary.

This port was in the spotlight in December, 1940, when General Francisco Franco announced that it would be made a military base. Then there was speculation as to its possible use as a German submarine base to harry British shipping. Germans had held waterfront concessions in the harbor.

Las Palmas offers a well-protected haven for large ships and has long been an important coaling station. In normal times it had a coal pile of 30,000 tons, while fuel oil storage also ran into thousands of tons.

The port is the most important in the Canaries. Together with its actual port, La Luz, it has some 90,000 inhabitants, making it the largest city in the islands.

On the north side the harbor is protected by a promontory, Isleta Peninsula. A lighthouse with its lamp 802 feet above high water occupies the promontory heights.

La Luz Harbor has two breakwaters protecting and enlarging it. The outer one is fairly new and is over a mile and a half long.

Since rain is infrequent and of short duration, cargo can, if necessary, remain uncovered on the wharves and suffer little damage.

The coaling of ships was practically a British monopoly. While the port is used by ships in transit, there is growing export in the Canaries of bananas, tomatoes, and potatoes.

Gran Canaria is the leading island of the Canaries. It has good fisheries, and Las Palmas harbor makes it best known to tourists. The island is almost circular and rises to a height of 6,400 feet in the highest ridge. It has an area of about 650 square miles.

With the war's realignment of shipping lanes, the port of Las Palmas de Gran Canaria has assumed increasing importance, for it lies only about 140 miles off the African coast.

On the map the Canary Islands appear in scattered formation and in varied shapes and sizes. Together they cover a land area of more than 2,800 square miles. They hold well over half a million people.

For purposes of administration the islands rank as part of Spain proper. They are divided into the two provinces of Tenerife and Las Palmas, with capitals at Santa Cruz de Tenerife and Las Palmas de Gran Canaria (pages 415, 417).

In the Tenerife group are counted the western islands of Tenerife, Gomera, La Palma (page 413), and Hierro. In the eastern section of Las Palmas are Gran Canaria (where Las Palmas City is located), Lanzarote, Fuerteventura, and additional islets.

On Gomera exists a "language without words . . . a kind of whistling."

A 15th-century chronicle relates:

"The barrancos are marvelously large and deep, and the country is inhabited by people who speak the strangest of all . . . with their lips as if they were without tongues, and it is said there that a great prince for no fault of theirs had them put into exile and had their tongues cut out, and according to their way of speaking, one could believe it."

"The legends attached to the origin of the

\* See "Hunting for Plants in the Canary Islands," by David Fairchild, NATIONAL GEOGRAPHIC MAGAZINE, May, 1930.

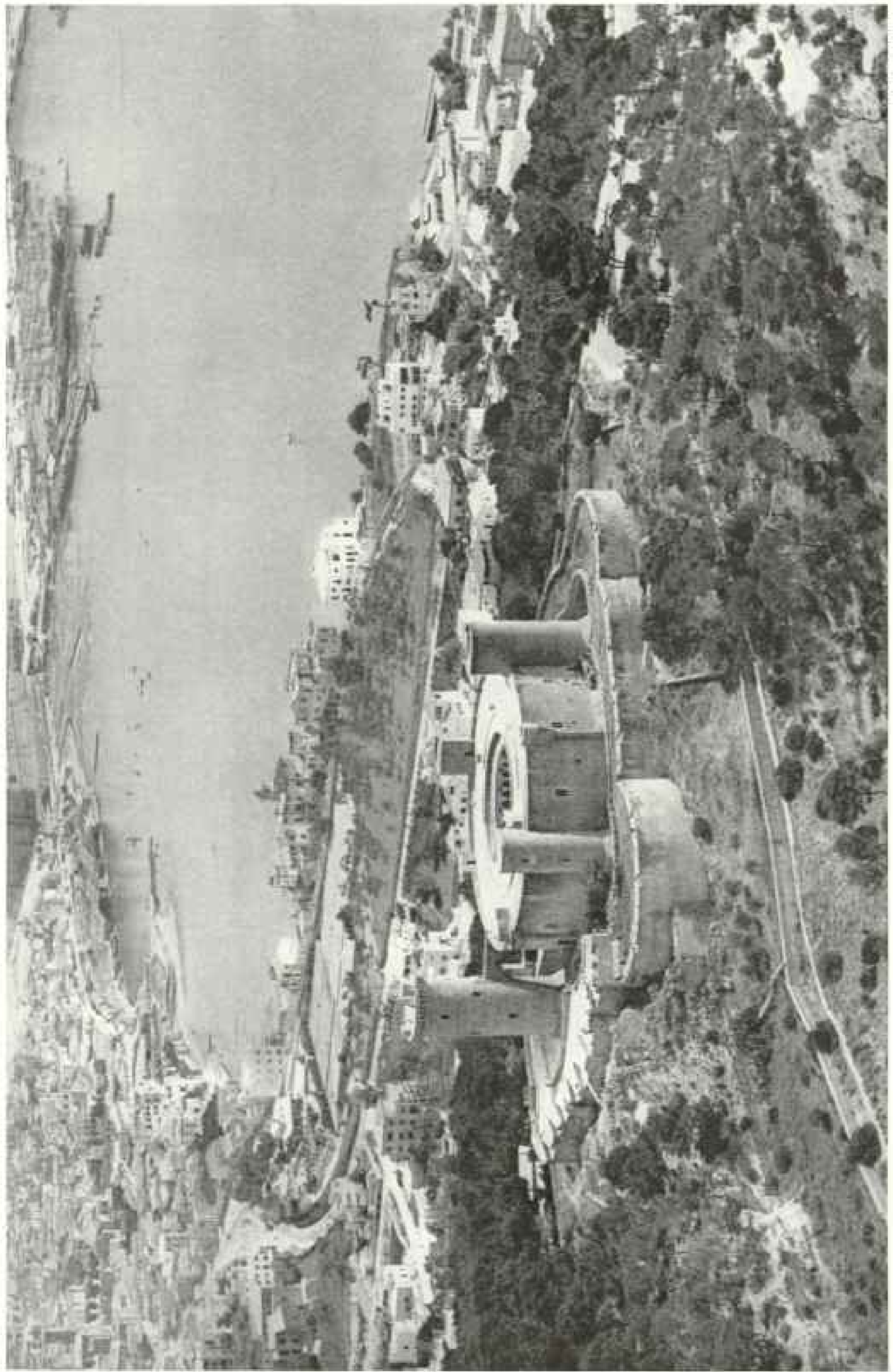




George F. Butler Collection

### The Throat of an Extinct Cape Verde Volcano Is Gargled with a Saline Solution

In this age-old natural settling basin sea water is evaporated to obtain the finest table salt. The industry, developed on three of the lesser islands, is most profitable on (Sul). Three Portuguese islands lie athwart the main steamer lanes between Europe and Capetown, about 350 miles off the important French-African port of Dakar (p. 409).



Spain Maintains a Garrisoned Fort on La Palma, Western Canaries

Although this delightful island has a population of 60,000, it is off the beaten track of steamers. Its principal town and only port is Santa Cruz de la Palma, and its chief industry is agriculture. Because of German water-front concessions, there was some speculation recently on the possibility of a Nazi submarine base here by (p. 411).

© E. M. Johnson

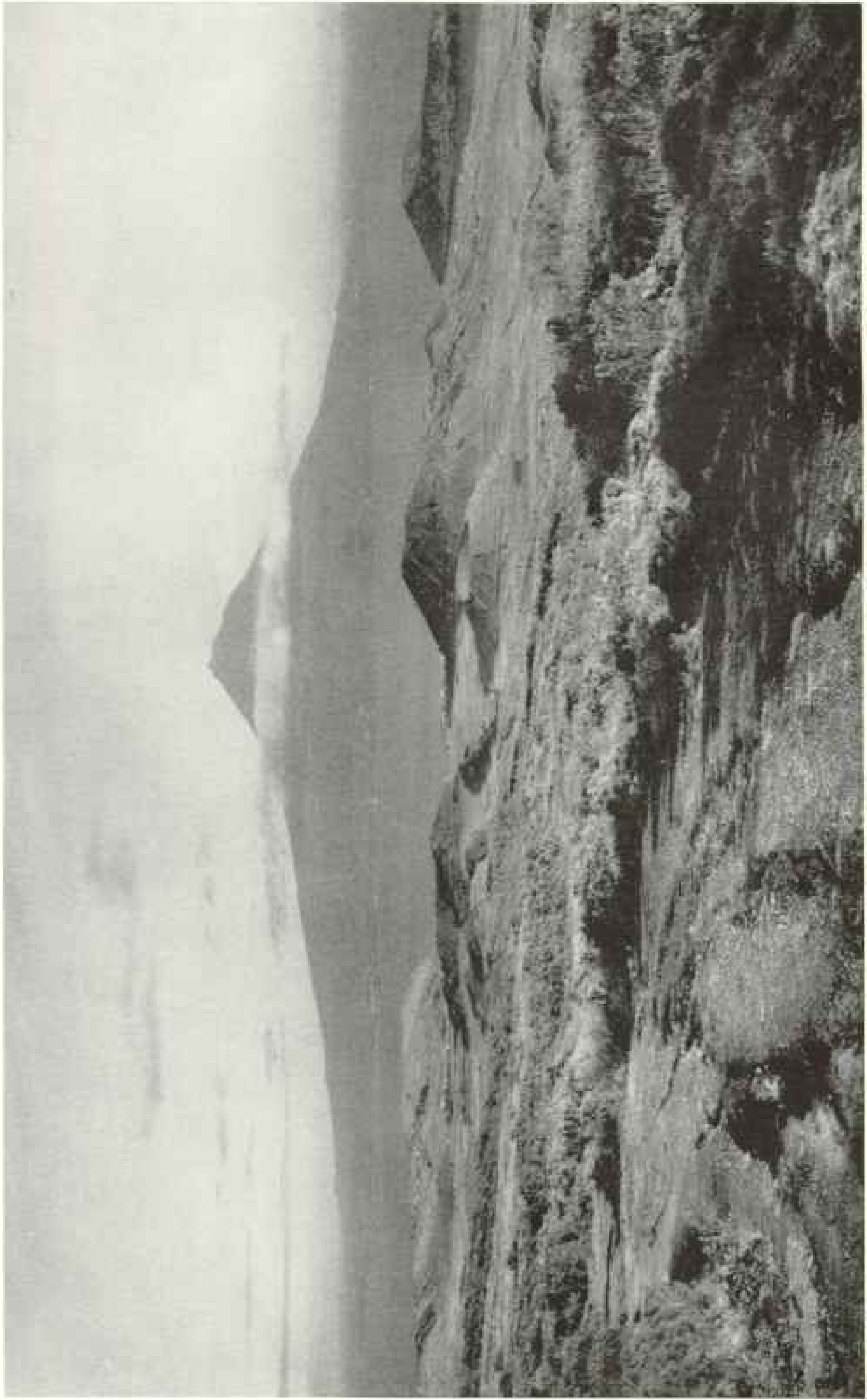
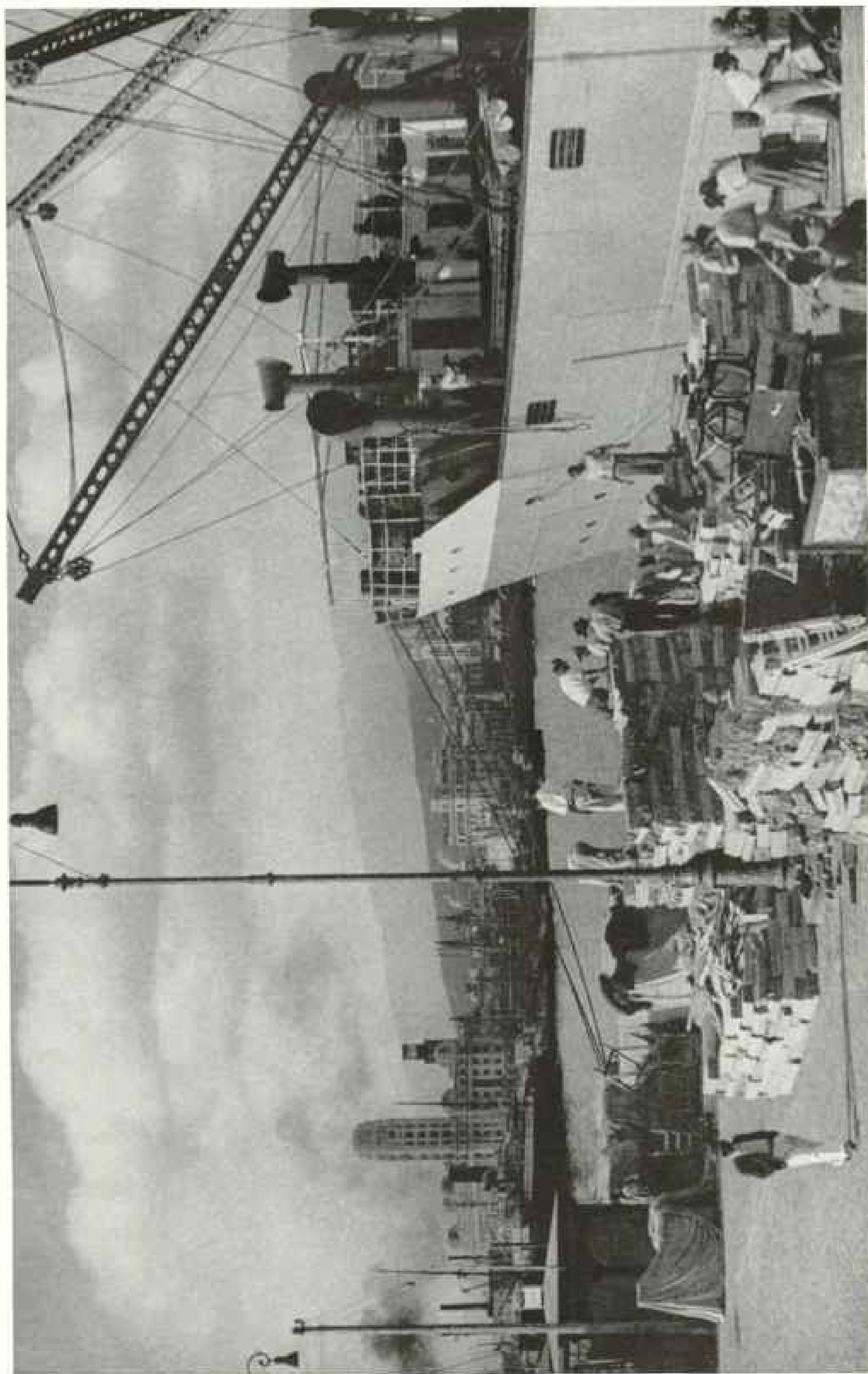


Photo by Fern Abard

**Vineyards Are Everywhere in the Azores; They Even Climb the Lower Slopes of Pico Alto, Highest Peak in the Islands**

Here seen from Fayal, this volcano, usually cloud-capped, rises nearly a mile and a half above the sea on the island of Pico. Numerous burnt-out craters attest the volcanic origin of the Azores. Disastrous earthquakes and eruptions have devastated them in the past. Unlike the barren Cape Verde, these islands are well watered (p. 418).



© Hiram Tschilo-Laska Film European

**Santa Cruz de Tenerife, a Modern City with Skyscrapers, Lies in the Atlantic 200 Miles off Africa**

Most cargo vessels berth at the pier, but big steamers anchor in the roadstead. Passengers are brought ashore in motor launches. Many houses in this Canary Island port have wooden balconies and charming patios reminiscent of old Seville. Here, in 1797, Admiral Nelson lost his arm in a daring but unsuccessful attempt by a British fleet to capture the port from the Spanish (page 411).



Wilmot Tolson

### "Singing Carts" Bring Sugar Beets to a Factory in the Azores

With wooden wheels turning on greaseless wooden axles, these ox-drawn vehicles creak along the roads. Motor trucks are also used here at Ponta Delgada, modern capital of São Miguel (page 409), but many farmers cling to their old-time methods of hauling.

language are charming," wrote Gest Vey in the *New York Times* for March 3, 1935, "but there are more prosaic explanations than amputated tongues. Because of the stern physiography of a volcanic island criss-crossed by impassable gorges, the aboriginal inhabitants had no ready means of communication. Since whistling would carry farther than the shouted word, a whistling code grew from necessity into a sort of short-tongue. By the time the Conquistadores arrived in the early 15th century, the language was as highly developed as the original language.

"When the road now under construction permits rapid communication between the illiterates of the hills and the educated cityfolk, the bird language will be no more."

If the coming of motor traffic could hamper the whistling language, how much more may the sound of warplanes and bombs affect it!

Although the average visitor seldom sees more of the Canaries than Tenerife, Gomera, and Gran Canaria, the other islands are also of interest, particularly to students of geology, zoology, and botany. The western islands, where hundreds of species of rare plants grow luxuriantly, are a botanist's paradise. Magnificent scenery is found everywhere. A volcanic eruption occurred in 1909.

The Canaries have an ancient history. They were called the "Fortunate Islands" by the Romans, who believed them to be the Greek "Isles of the Blest." *Canaria* in Spanish now is translated as "canary bird," a native of the region. The name of the islands, however, was not given because of the birds; the reverse is true. Originally the Canaries were so named from the Latin word *canis*, or "dog." This was due to the onetime presence on the islands of a breed of huge dogs.

For the last four and a half centuries the islands have been in Spain's possession.

The modern islanders, a mixture of races including Spanish, Norman, Flemish, and Irish blood, take their living chiefly from the sea and from the soil. From Canary grapes during the 17th century came the famous "Canary sack," especially prized by English importers.

A military outpost of Spain, the Canaries have long had a garrison.

Continental and island possessions of Spain have a population of 1,881,000; more than a third is found in the Canary Islands.

Although Spain's possessions amount to little more than 133,000 square miles in area, they occupy highly strategic positions.

With the International Zone of Tangier, occupied by Spain in 1940, Spanish Morocco



© Hans Tschira from Europe

#### War Has Ruined Business for Canary Island Needlework Venders

In happier times hundreds of pleasure voyagers came ashore every day at Las Palmas, Gran Canaria, and eager salesmen rowed out in small boats to offer them exquisite linen tablecloths and colorful embroidery. Now ships call only for coal and oil. In 1937 this breakwater-protected harbor was entered by 4,087 vessels.

not only overlooks the Strait of Gibraltar from the south, but stretches eastward for some 200 air miles along the North African coast. Between England's Rock of Gibraltar and Spanish Ceuta, on the African promontory facing it, is a distance of some 15 miles. At its narrowest point the Strait is only about nine miles across. Long-range artillery has been reported in position along much of this coast.

Rio de Oro, by far the largest outlying possession of Spain, covers more than 109,000 square miles; near-by Ifni has less than 1,000 square miles. Both of these territories, however, lie along the normal pathway of some of the world's busiest sea and air lanes, which link the west coast of South America and Europe with the Far East around Africa.

A little to the northwest, the Canary Islands are directly opposite the coast of Florida, slightly more than 3,950 air-line miles away.

Rio Muni lies about halfway between trade routes stretching to central West Africa from eastern Brazil, Argentina, and Uruguay. The near-by Spanish island of Annobón, in the Gulf of Guinea, was named in news dispatches of last year as a potential German air base which the Reich was seeking to obtain from nationalist Spain. This island lies little more than ten hours away, in average bombing

time, from the east coast of South America.

Fifteen hundred miles north of the Cape Verde Islands another projection of Europe is found in Portugal's Azores.

These islands are in the latitude of Washington, D. C., and about equidistant (1,500 miles) from the Nazi-controlled French coast, St. John's, Newfoundland, and British Plymouth.

Any power equipped with modern bombers and submarines could threaten all North Atlantic shipping routes far more seriously than the Nazis now menace the waters west of the British Isles. While the distances involved are about equal, there is no intervening fortress for protection.

President Roosevelt has made pointed reference to the Azores Islands, emphasizing that this cluster of Portuguese islands lies closer to the Atlantic shores of the United States than the island fortress of Hawaii to the coast of California. Thus the President, who inspected United States warships based in the Azores during the World War when he was Assistant Secretary of the Navy, drew attention to the strategic importance of the group.

The Azores lie at about the eastern limit of possible naval operations of the United States Fleet from its existing bases on the

eastern seaboard of North America. New York is 2,395 statute miles west. From Bermuda and Newfoundland, where new United States bases are being constructed, the islands are only 2,065 and 1,430 miles, respectively.

Of the nine scattered islands, lying at an average distance of about 900 miles west of Lisbon, Portugal, the best known is Fayal. Horta, its chief city, is a busy center of transoceanic communications. The port is a stopping place for flying-boat service from the United States to Portugal.

Horta is an important junction point of transatlantic cables. One of its buildings houses six companies—British, German, Italian, French, and two American. Fifteen cables (three are inoperative at the present writing), can handle messages direct for stations in North America and Europe, for South Africa and South America via the Cape Verdes, and by interconnection for stations in every part of the world. The city is also a fueling station for ocean shipping, and has a powerful naval radio station.\*

Although Horta is the most famous (page 410), two other Azores cities surpass it in size—Ponta Delgada, on the island of São Miguel (page 409), and Angra, on Terceira. Other islands in the 400-mile-long archipelago are Corvo, Flores, Graciosa, São Jorge, Pico, and Santa Maria. The total population is about 254,000, mostly of Portuguese origin.

Like most regions of volcanic origin, the Azores are spectacular, with rugged, pointed peaks rising above verdant, intensively cultivated lowlands which support luxuriant vineyards and orchards (page 414). Farmers raise cattle, and the rich fields, with a wonderfully mild climate, produce fruit, corn, wheat, potatoes, tobacco, jute, tea, and pineapples.

Strong ocean winds turn the canvas sails of windmills which grind grain into meal and flour. Although trucks are becoming more numerous, many countrymen still haul their produce in "singing carts," which get their name from the squeaky sound of two wooden wheels revolving on wood axles (page 416). There are valuable fisheries of tuna, bonito, and mullet; and whaling is profitable.

Politically an integral part of the Republic of Portugal, the Azores are sometimes officially listed as "islands adjacent" to the European homeland. In Portuguese the name is Açores, which signifies "hawks."

On the island of Santa Maria, Columbus

\* See "European Outpost: The Azores," by Harriet Chalmers Adams, NATIONAL GEOGRAPHIC MAGAZINE, January, 1935.

† See "Ancient Iceland, New Pawn of War," NATIONAL GEOGRAPHIC MAGAZINE, July, 1941.

stopped in 1493 with the news of his discoveries to the west.

Transatlantic flights brought the Azores into the news as early as 1919, when the U. S. Navy seaplane NC-4 landed at Horta after a flight from Newfoundland and then took off on the last leg of the first transatlantic flight.

British, German, and French transoceanic planes have also used Fayal as a stepping stone on flights across the Atlantic.

Axis control of these islands would bring a potentially hostile power right into our lap, closer than the Hawaiian Islands on the west.

#### Why Iceland Is Strategic

Iceland, which has declared itself independent of Nazi-controlled Denmark, could be another point of danger to the security of this hemisphere. Since its separation from Denmark, it has been strongly garrisoned by British and Canadian troops.†

On June 20 President Roosevelt, in issuing an order affecting oil shipments, made it evident that the American Government considers Iceland within the defense scope of the Western Hemisphere. The order was given despite the fact that Germany had announced in April that it had extended its counter-blockade zone to include Iceland and its territorial waters to within three miles of Greenland.

Quickly suiting action to the President's words, the United States began landing troops in Iceland on July 7. Eventually they will replace British troops.

The position of Iceland is regarded as particularly strategic in the program of delivery of American aid to Britain. By placing United States troops on the island, the President served notice to the world that this Government intends to enforce to the full the American doctrine of freedom of the seas.

A timely feature of the map is the table of air-line distances. These represent calculation of 339 problems in spherical trigonometry.

New notes on the map highlight the exciting events which have been written into Atlantic Ocean history during the last two years.

Sinkings of the *Graf Spee*, *Hood*, *Bismarck*, and other fighting ships are located.

Other notes point out characteristics of certain oceanic islands which might or might not afford seaplane anchorage.

For instance, São Paulo, sitting astride the Dakar-Natal route, is a group of volcanic rocks, and the island of Trinidad near Rio de Janeiro is a rugged mass of rock with such a swell surging against it that landing is difficult.

This revised and up-to-the-minute map will better enable members to understand events in "the battle of the Atlantic."

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

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

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

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

In Mexico, The Society and the Smithsonian Institution, January 16, 1919, discovered the oldest work of man in the Americas for which we have a date. This slab of stone is engraved in Mayan characters with a date which means November 4, 291 B. C. (Spinden Correlation). It antedates by 200 years anything heretofore dated in America, and reveals a great center of early American culture, previously unknown.

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

The National Geographic Society-U. S. Navy Expedition camped on desert Canton Island in mid-Pacific and successfully photographed and observed the solar eclipse of 1937. The Society has taken part in many projects to increase knowledge of the sun.

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

The Society granted \$23,000, and in addition \$75,000 was given by individual members, to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California were thereby saved for the American people.

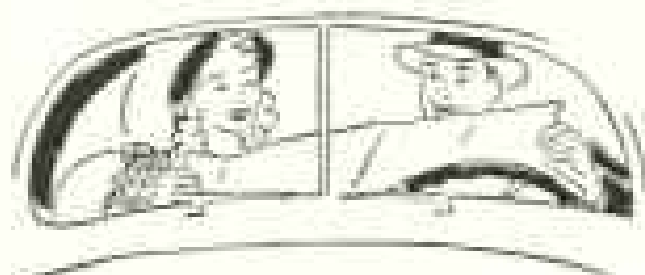
One of the world's largest icefields and glacial systems outside the polar regions was discovered in Alaska and Yukon by Bradford Washburn while exploring for The Society and the Harvard Institute of Exploration, 1938.





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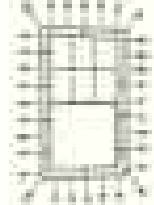
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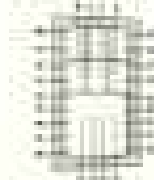
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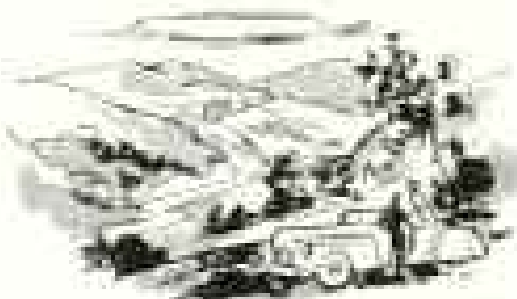
JAMESTOWN — where the nation was born, 1607



YORKTOWN — where our Independence was won



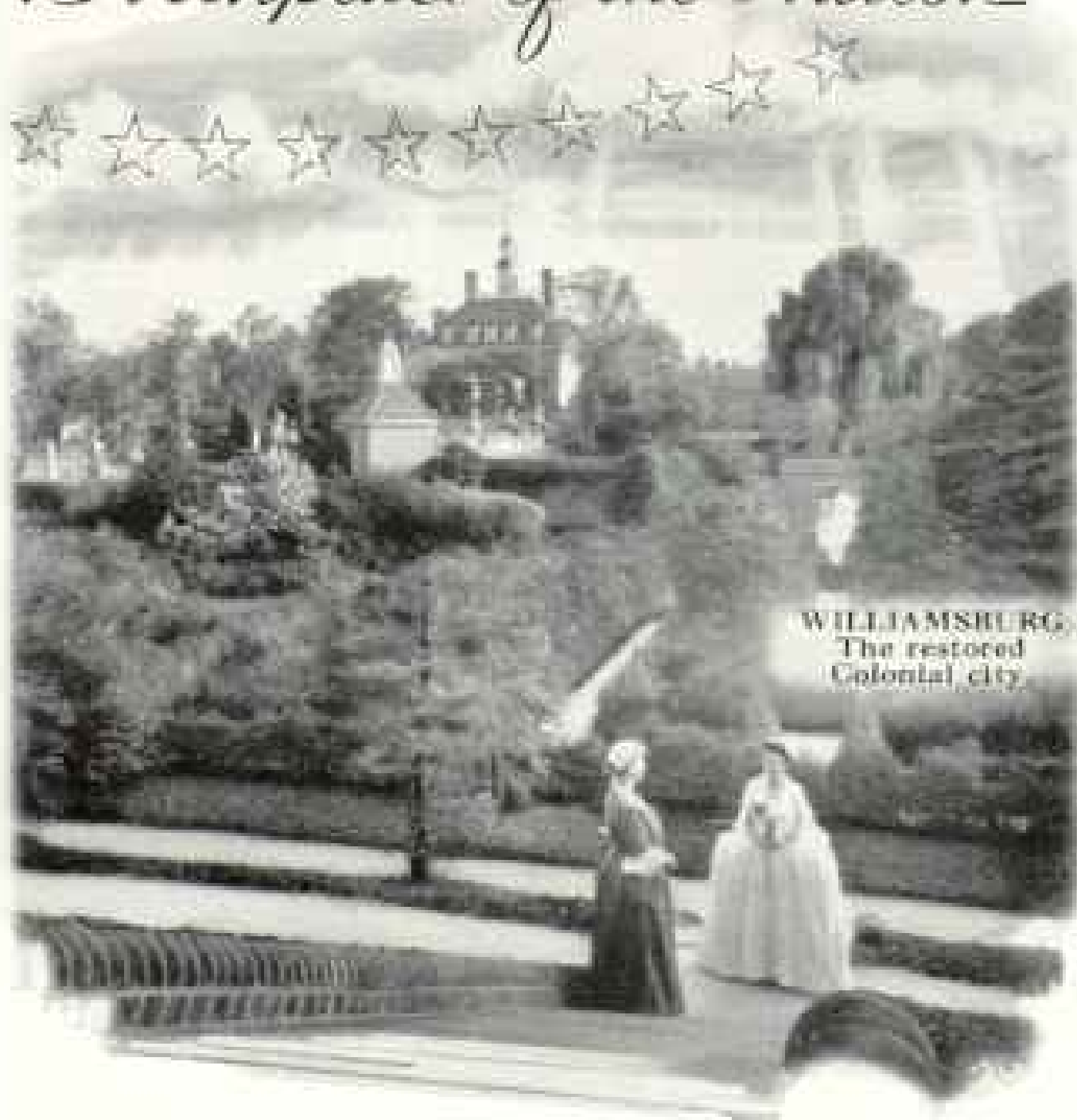
ST. JOHN'S CHURCH, Richmond, where Patrick Henry cried "Liberty or Death!"



SKYLINE DRIVE, Shenandoah National Park, overlooking historic Shenandoah Valley.



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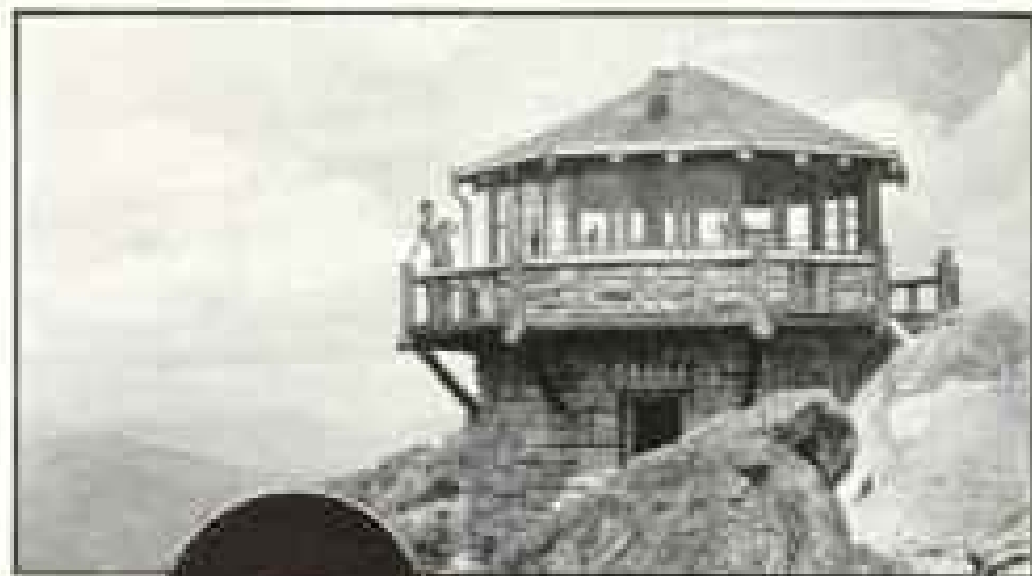
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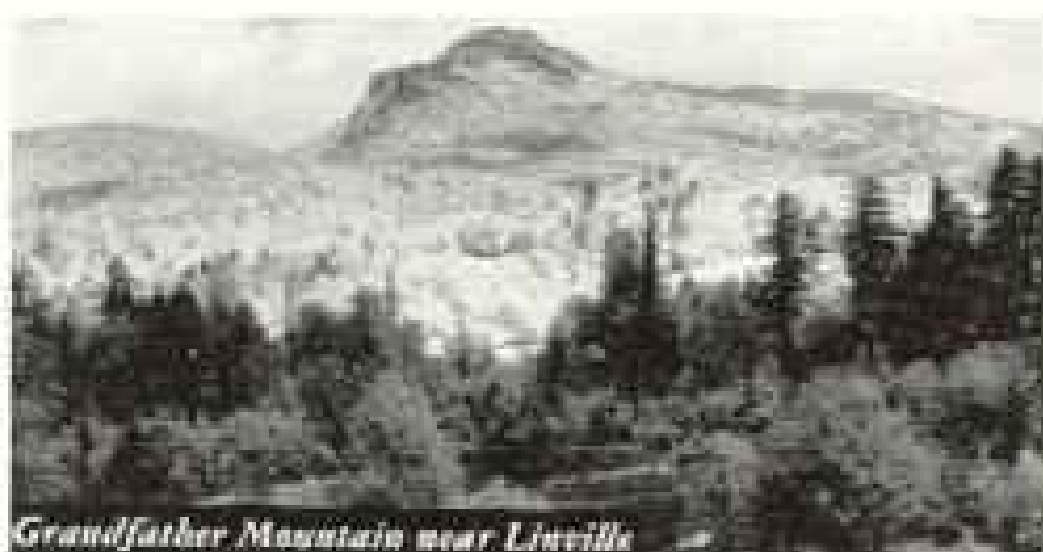


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NOW she's not ashamed of her

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THANKS TO  
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**A**RE you letting dingy false teeth destroy your smile . . . perhaps your whole charm? Does the very thought of unattractive plates make you self-conscious when you should be well-poised?

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*Grateful users praise it*

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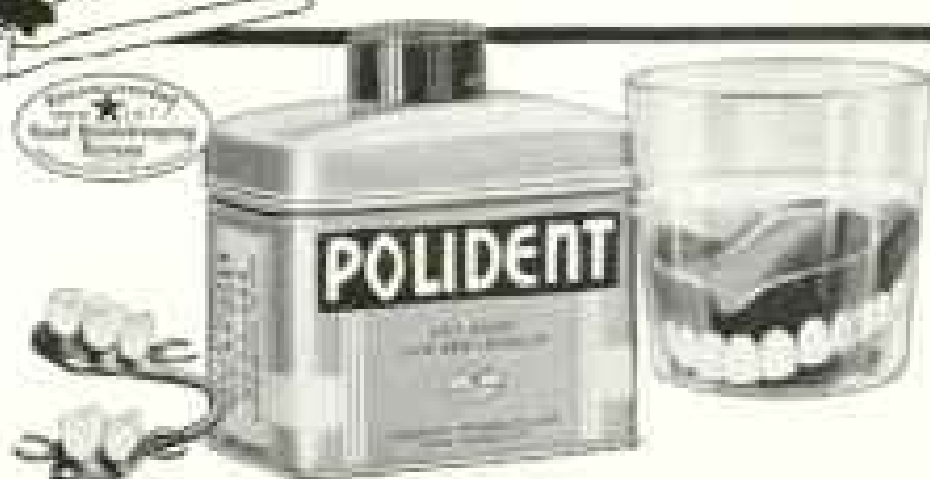


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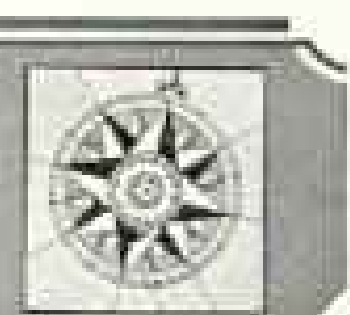
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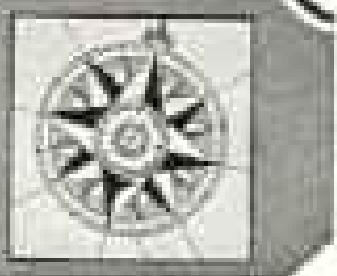
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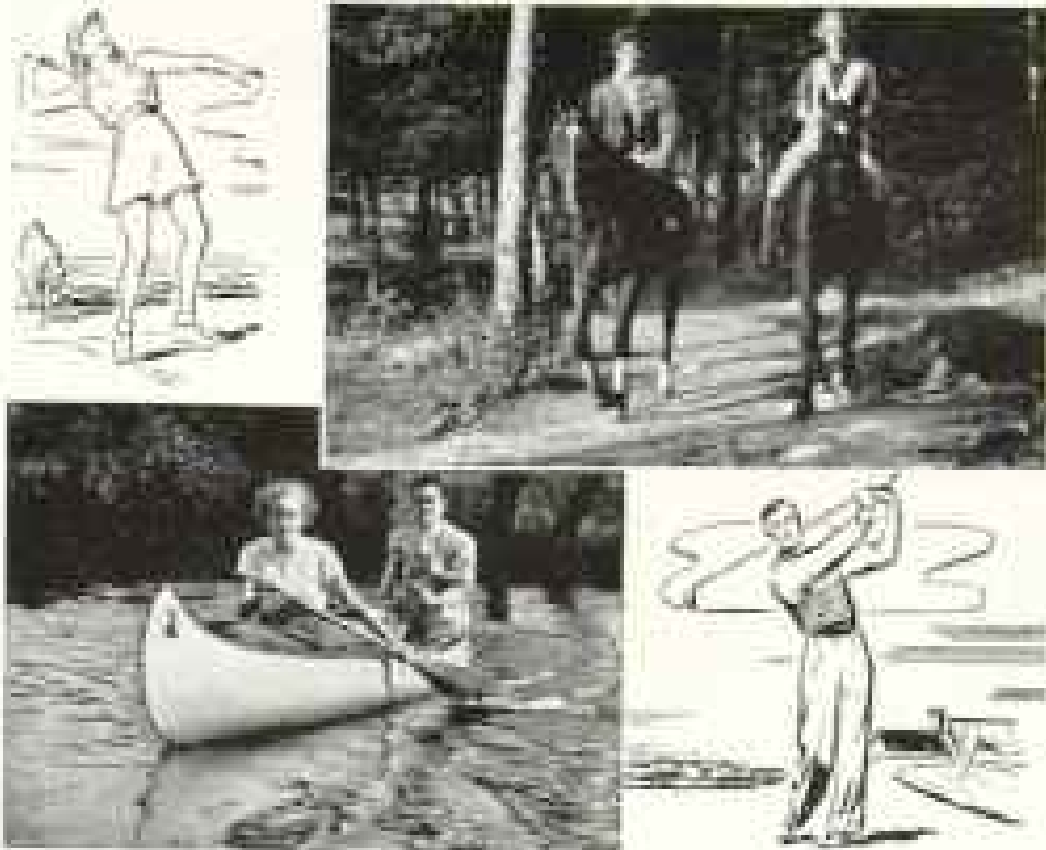
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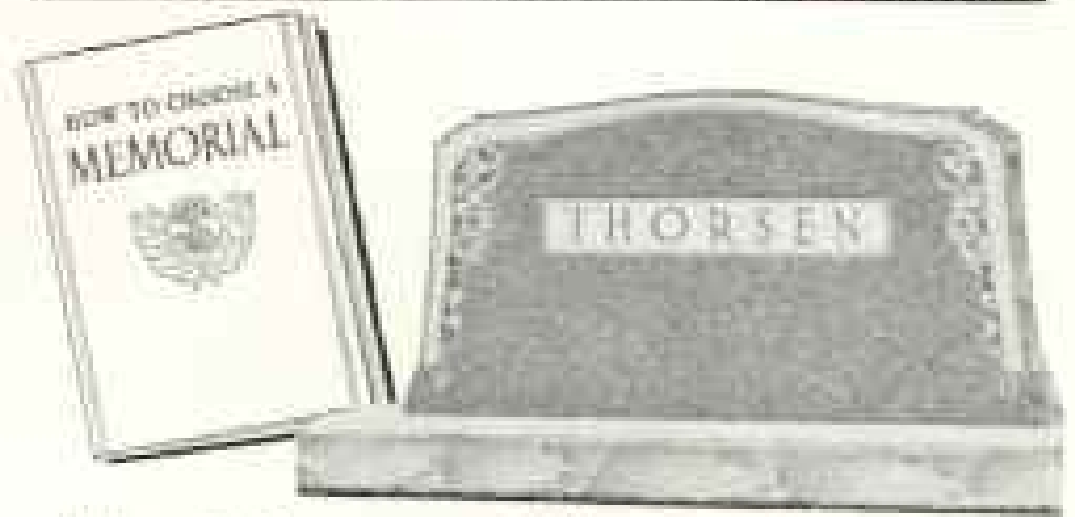
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►Rheumatic fever usually appears after a chill or exposure to inclement weather. It is often accompanied or associated with a sore throat, tonsillitis, or a cold. Symptoms of an attack, often so vague or slight as to be frequently overlooked, may be: rapid heart, fever which may be slight, pallor, loss of appetite, weight, and vigor, fleeting muscular aches. However, symptoms may be much more pronounced, such as: repeated nose bleeds, extreme nervousness, stiffness, swelling in joints and muscle, pain often traveling from joint to joint.

It is vitally important for parents to realize that a child with any of these symptoms may have rheumatic fever and needs immediate medical attention.

If your doctor determines that rheumatic fever is the trouble, he will probably point out to you the following important facts:

►Rheumatic fever is a serious and potentially chronic disease. Repeated attacks are common, and the heart is almost invariably involved. The seriousness of the heart damage depends largely on the severity and frequency of attacks. Consequently, continuous medical supervision during the illness and convalescence and periodic examinations afterwards are necessary.

Rheumatic fever may last many months; the patient must often stay in bed long after all fever and pain have disappeared—until the doctor gives permission to get up. Since rheumatic fever is apt to run in families, the doctor should be given an opportunity to examine



other children in the family at regular intervals.

►While the cause of the disease is unknown, and its cure as yet unfound, early detection of its onset and of recurrences, and prompt medical care, can often do much to lessen its severity and help children to live useful, happy lives. Many thousands of people who suffered attacks in childhood are today active and healthy.

To help parents further guard against the dangerous effects of rheumatic fever and its recurrences, Metropolitan offers two free booklets, 91-N, "Protecting Your Heart," and 91-NA, "Rheumatism."

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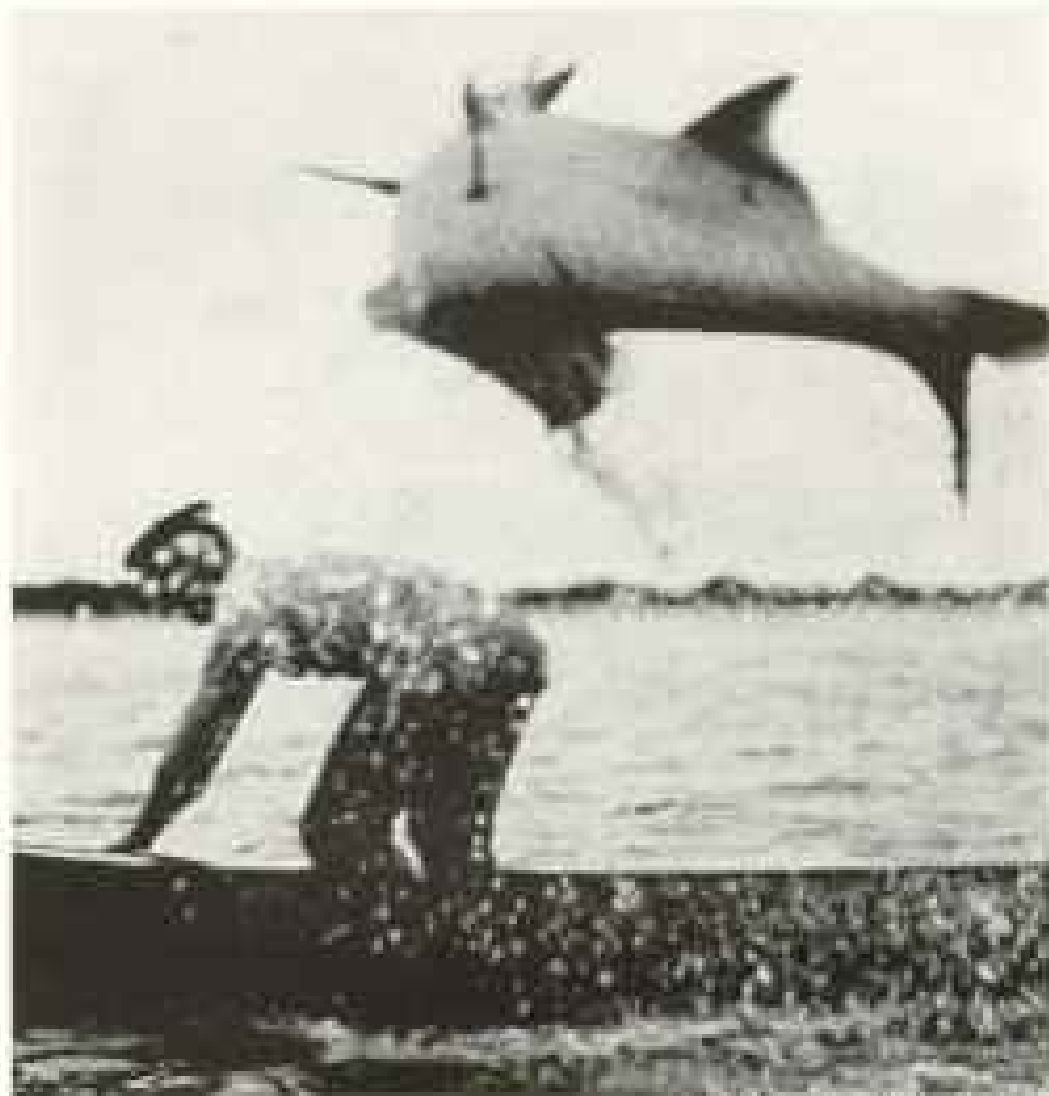
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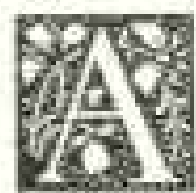
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Enclosed please find \$\_\_\_\_\_ for which send me \_\_\_\_\_ copies of "The Book of Fishes." (Price: \$3.50 in U. S. and Possessions; elsewhere, \$3.75 in U. S. funds. Postpaid. Presentation card if desired.)

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VISIT YOUR  
*Fledgling Flier*  
in

## ALABAMA

AND SEE THE OLD SOUTH  
AND THE NEW



HERE in Alabama—heart of the "Deep South"—thousands of our Nation's future pilots are in training now. Visit your fledgling flier and see the many interesting historic sites within a short drive of these six army flying fields:

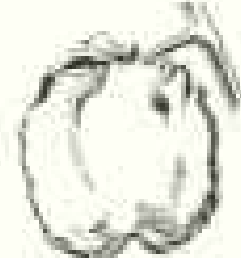
• **MONTGOMERY**, "Cradle of the Confederacy," site of Southeast Air Corps Training Center; Maxwell Field; Gunter Field; State Capitol; White House of the Confederacy and many historic old South buildings and relics.

• **TUSCALOOSA**, site of University of Alabama and its training school for army and British pilots; home of the "Crimson Tide"; many beautiful old mansions.

• **SELMA**, in heart of the famous "Black Belt"; site of pursuit training school; old Confederate arsenal and Naval foundry; noted for its beautiful homes and trees.

• **TUSKEGEE**, site of training school for colored fliers; home of Tuskegee Institute, world's largest normal and industrial institute for Negroes.

• **DOTHAN**, in the "Wiregrass" section, site of great peanut and livestock industry; near famous hot water mineral springs and 10,000 acre Pea River State Forest recreation area and wild life haven with a lake of 1,000 acres.



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**Never too busy  
to be  
Good Neighbors**

**T**HERE are a lot of workers in the Bell System—about 350,000 of them. That's a big family and it likes to be a friendly kind of family.

Whether it be the installer in the house, the people in our offices, the operators or the lineman on the roadside helping to rescue a stray kitten for a worried youngster, telephone

workers are close to the public and the tradition of the job is helpfulness.

Even in these days, when the needs of defense place so many sudden and increasing demands on telephone workers, they are never too busy to be good neighbors.

**Bell Telephone System**





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Who can know the joy little Tommy's mother feels today?

The months of anxiety are over. Now she knows her little boy won't have to face life crippled by infantile paralysis.

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And she won't have to depend on charity

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For men with young children, life insurance should do a *double job*. It should not only provide *permanent* protection for your wife—but also *extra, temporary* protection while your children are growing up and still dependent.

To fill this need, The Prudential offers a policy called the Modified 3-20.

**Q: Exactly what is a Prudential Modified 3-20 policy?**

**A:** It is a low-cost life insurance policy avail-

able in initial amounts of \$5,000 or more, and made up of two equal parts.

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**Q: And what happens after 20 years?**

**A:** You may convert the temporary half to permanent insurance if you wish. Otherwise it ceases and the premium rate is reduced.

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