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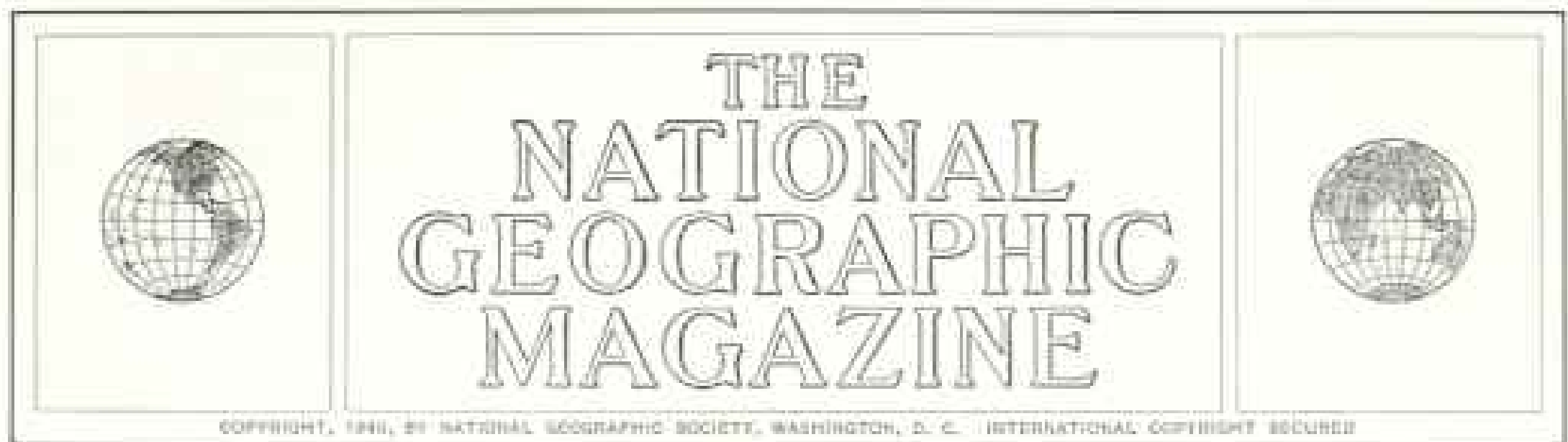
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## Indian Tribes of Pueblo Land\*

BY MATTHEW W. STIRLING

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**I**N 1540, just 400 years ago, Francisco Vásquez de Coronado led his band of gold-hungry explorers into the rocky country near the headwaters of the Little Colorado River in what is now western New Mexico.

Their imagination fired by the reports of Cabeza de Vaca and Fray Marcos de Niza, who had preceded them into the southern borders of Pueblo land, the Conquistadores were keyed to high anticipation.

Had not Fray Marcos himself viewed from a distance the very city the guides said they were now approaching, and stated that it appeared even more magnificent than the rumors had indicated?

Finally the great moment arrived. From a low hilltop across the shallow valley, Coronado and his fellow Spaniards viewed the first of the Seven Cities of Cibola, drab against a dull background of arid hills.

### A Crumpled Village—and no Gold

The Spaniards were not at all impressed. Says Pedro de Castañeda, chronicler of the expedition:

"When they saw the first village, which was Cibola, such were the curses that some hurled at Friar Marcos that I pray God may protect him from them. It is a little, crowded village, looking as if it had been crumpled all up together. There are ranch houses in New Spain which make a better appearance at a distance."

The Conquistadores were in search of gold. They could not see or understand the riches of another sort which lay behind those adobe walls, the wealth of a people who had intimate acquaintance with Nature and with Mother Earth, a people to whom religion and poetry

were as one. In the environment which looked so unproductive to the Spaniards, this race saw beauty and extracted it to build their arts and their ceremonies.

Wealth of a material sort these Indians neither had nor seemed to care about. In the turquoise which adorned the entrances of their houses they saw the depths of clear waters and the infinite space of the sky, and thus it represented pure beauty. That it might possess value of another sort had never occurred to them. Among their possessions was little else to attract the Spaniards.

This fundamental difference in viewpoint caused the Pueblos to draw aloof. The religion of the white man, built around totally different concepts, scarcely penetrated the Pueblo mind, and, though he temporarily accepted many forms of Christianity, his philosophy remained his own.

This, then, was the Pueblo of Hawikuh, predecessor to Zuni, in 1540 (Color Plate III). Wrote Castañeda:

"It is a village of about 200 warriors, is three and four stories high, with the houses small and having only a few rooms. . . . The people of the whole district had collected here.

"When they refused to have peace on the terms the interpreters extended to them, but appeared defiant, the Santiago [war cry] was given, and they were at once put to flight. The Spaniards then attacked the village, which was taken with not a little difficulty, since they held the narrow and crooked entrance.

\* This is the second in a series of authoritative articles dealing with "America's First Settlers, the Indians" (see NATIONAL GEOGRAPHIC MAGAZINE for November, 1937), illustrated with paintings which are products of careful study and extensive research. Others will appear in subsequent issues.



Photograph by Hugh S. Dyer

### A "Buffalo Hop," Modern Jitterbugs Would Call This Prancing Dance

Buffalo-head masks toss wildly and gourd rattles shake a brisk tattoo, in time with the throbbing drum, when Acoma dancers perform at Gallup, New Mexico (page 583). Being a pueblo people, the Acomas had no firsthand knowledge of buffaloes, and adopted this dance from a Plains tribe, probably the Kiowas. Frequently tribes would sell a ceremonial to other Indians, who had seen it performed by the originators.

"During the attack they knocked the general down with a large stone, and would have killed him but for Don García López de Cárdenas and Hernando de Alvarado, who threw themselves above him and drew him away, receiving the blows of the stones, which were not few. But the first fury of the Spaniards could not be resisted, and in less than an hour they entered the village and captured it. They discovered food there, which was the thing they were most in need of."

Coronado's expedition was a failure, so far as its main purpose was concerned. The other fabled "cities of Cibola" proved as disappointing as the first. No mines were discovered and no colonization resulted.

Because of the expedition's unfavorable reports, no further penetration was attempted for forty years, but eventually, in the wake of the later explorers, Spanish settlers drifted into the territory.

In the face of growing colonization of the Southwest, the Pueblo Indians rebelled in 1680 and killed or drove out all the Spaniards. However, the Spanish soon reconquered the region. The Pueblos in 1696 made one more determined attempt to drive out the invaders, but after much bloodshed the uprising was put down.

Realizing the futility of further resistance as the white population increased, the Pueblos, peacefully for the most part, have continued their native manner of living to the present day—remarkably unchanged after four centuries of white contact.

### The Setting, a Vast, Dramatic Land

Three major chapters unfold in the study of the Southwest peoples.

The prehistoric must be interpreted by archeologic research; the period of Spanish influence begins properly about 1540 with the



Photograph by Clifford Adams

### To Make a Navajo Blanket, She First Spins Her Own Wool

The Indian woman sits upon a sheepskin before her wood-framed, mud-domed house, or hogan, at Tuba City, Arizona, in the Painted Desert. Should anyone die in the dwelling, it would be abandoned and the family would build another. Furnishings consist chiefly of a bed and built-in bench, which serves as a shelf. A smoke hole pierces the center of the roof. Coyote pelts hang beside the doorway (pages 555 and 569).

Coronado expedition; and, finally, the period of American occupation opens about the middle of the 19th century.

The vast stage for the drama of these amazing people, herein called the Southwest, consists primarily of Arizona and New Mexico. It includes also southern Utah and Colorado and the northern parts of the Mexican States of Sonora and Chihuahua.\*

Generally speaking, the entire area is semi-arid, though it is only in southwestern Arizona that true desert conditions exist.

Because of its scarcity, water was highly important to the Indians. Its location determined the sites of their settlements, and prayers for rain constituted the most prominent

\* See the National Geographic Society's map, "The Southwestern United States," with pioneer trails and historical notes, issued as a supplement to the NATIONAL GEOGRAPHIC MAGAZINE for June, 1940; also the map "Mexico, Central America, and the West Indies," December, 1939.

feature of the religious ceremonies of the agricultural tribes (page 566).

Imposing ruins, marking the sites where the prehistoric inhabitants dwelt, early caught the imagination of white travelers. The Spaniards noted many of the remains.

When American occupation began, some of the ruins were mapped and first described in detail. Public interest was aroused by these descriptions, and "cliff dwellers" became a household term.

### Solving the Mystery of the Cliff Dwellers

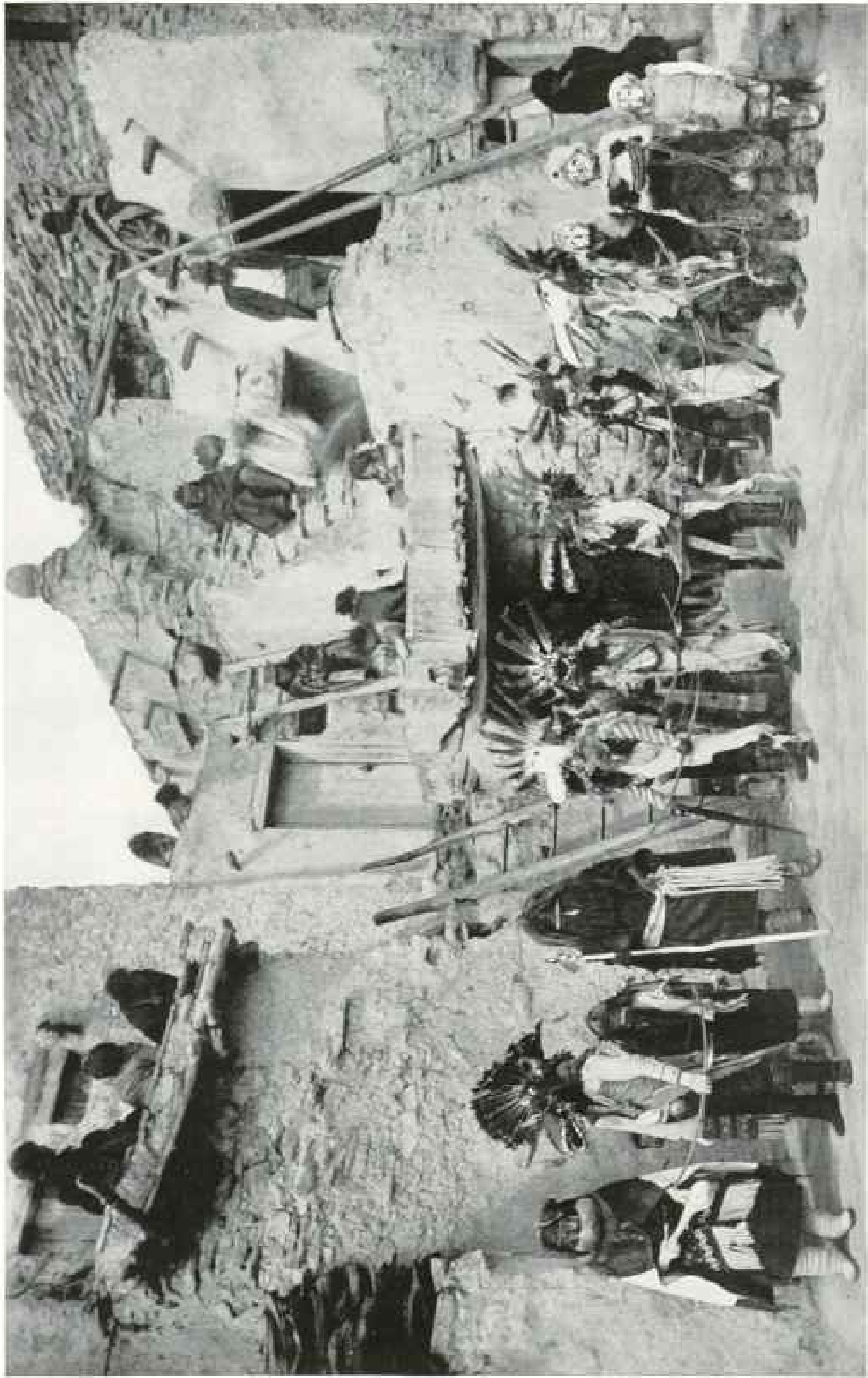
Up to 1880 there was relic hunting, but no systematic excavations were made until after that date. Even in this period the digging was primarily to obtain specimens, beautiful pottery being the principal lure. Not until the present century was well under way was any serious attempt made to determine the age and periods of the ruins.



Photograph from Fairchild Aerial Surveys, Inc.

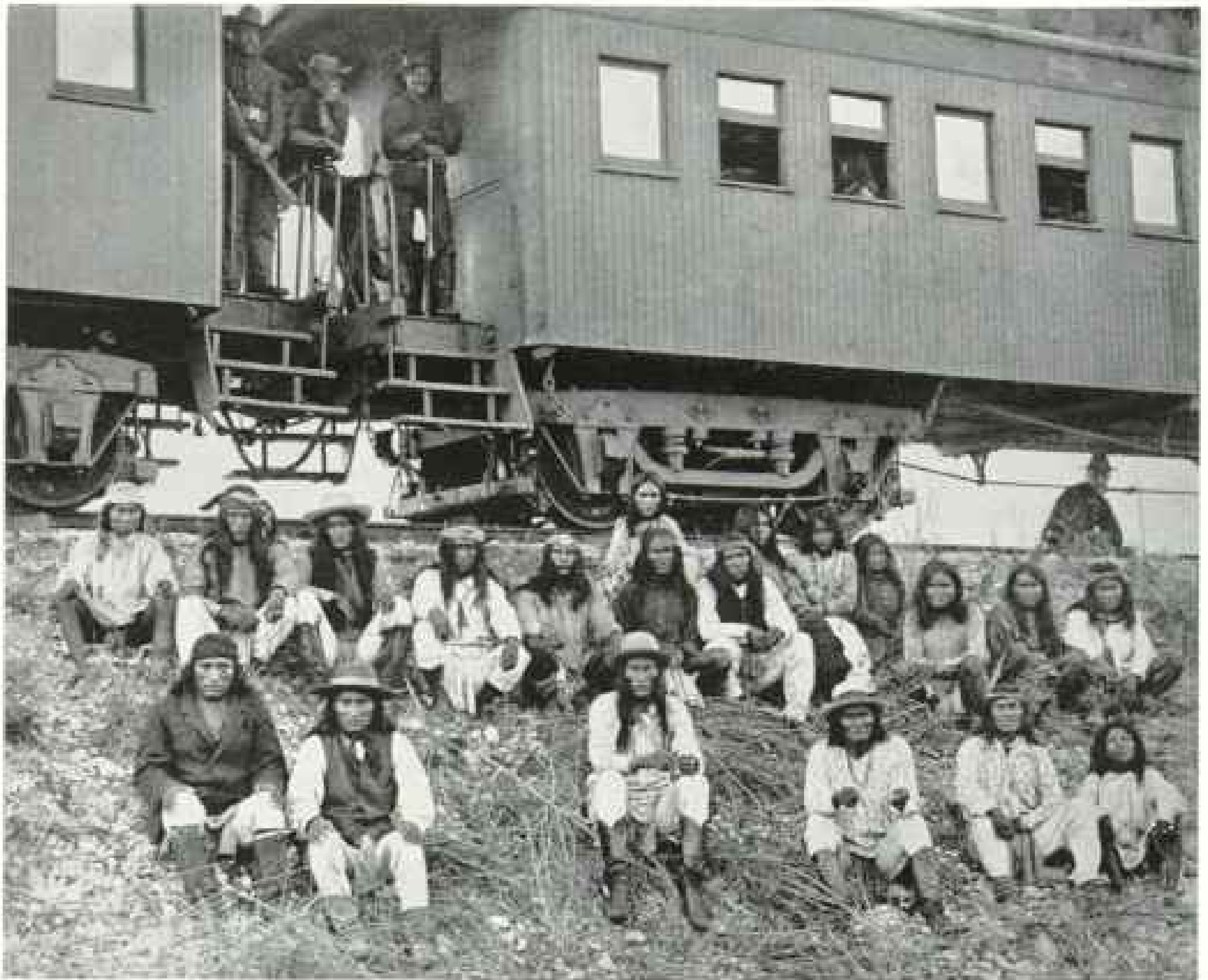
**On a Treeless Sandstone Mesa, High Above Surrounding Plains, Dwell the "People of the White Rock"**

A dizzy rock-cut trail leads to the pueblo, founded by the Accomias in pre-Columbian days (Plate XXIII). Building timber and stone were carried up the steep slopes by the Indians. Some heavy beams in the mission church, built in 1699, are 40 feet long. The rows of present-day adobe and stone houses stand on the foundations of the original homes of the early tribesmen.



**Giant Natackas, Asking Handouts from Walpi Villagers, Hoot and Whistle if They Are Turned Down**

During the 9-day Hopi purification ceremony in Arizona they go from house to house. The figure at extreme left represents Hahaiwuqti, Ancient Woman, Mother of Monsters. Beside her is a Natacka, one of her monster sons, and next is Soyoknamu, the Ancient Woman's attendant. Other Natackas beat time with their feet as they accompany the trio in its symbolic quest for food. James Mooney, of the Bureau of American Ethnology, made this photograph in 1893.



Photograph from Bureau of American Ethnology

### Farewell to the Warpath! Geronimo and His Warriors in Custody

The Apache chief, in the front row, fourth from left; Nachee, his principal lieutenant, third from left; and other devoted followers, are on their way to Fort Sam Houston, Texas. They are guarded by United States troops under Captain H. W. Lawton, who apprehended the band on the Bavispe River, Mexico, and persuaded their leader to surrender (Plate I). The photograph was made in September, 1886, by a United States Army Signal Corps photographer.

For many years the cliff dwellers were supposed to be a long-vanished race, distinct from the Indians. Some surmised that these structures might be 20 or 30 thousand years old!

Equally fantastic theories were advanced concerning the cliff-dwelling people. Some thought they had been highly civilized, but, becoming effete, had been vanquished by later barbarians. Some interpreted the small storage granaries as the dwelling places of dwarfs!

Thus fancy ran free until the spade of the scientific archeologist began, in comparatively recent years, to uncover for us the true pre-history of the region. We now know that the "cliff dwellers" were prehistoric Pueblo Indians who built their pueblos on cliffs for safety from hostile tribes.

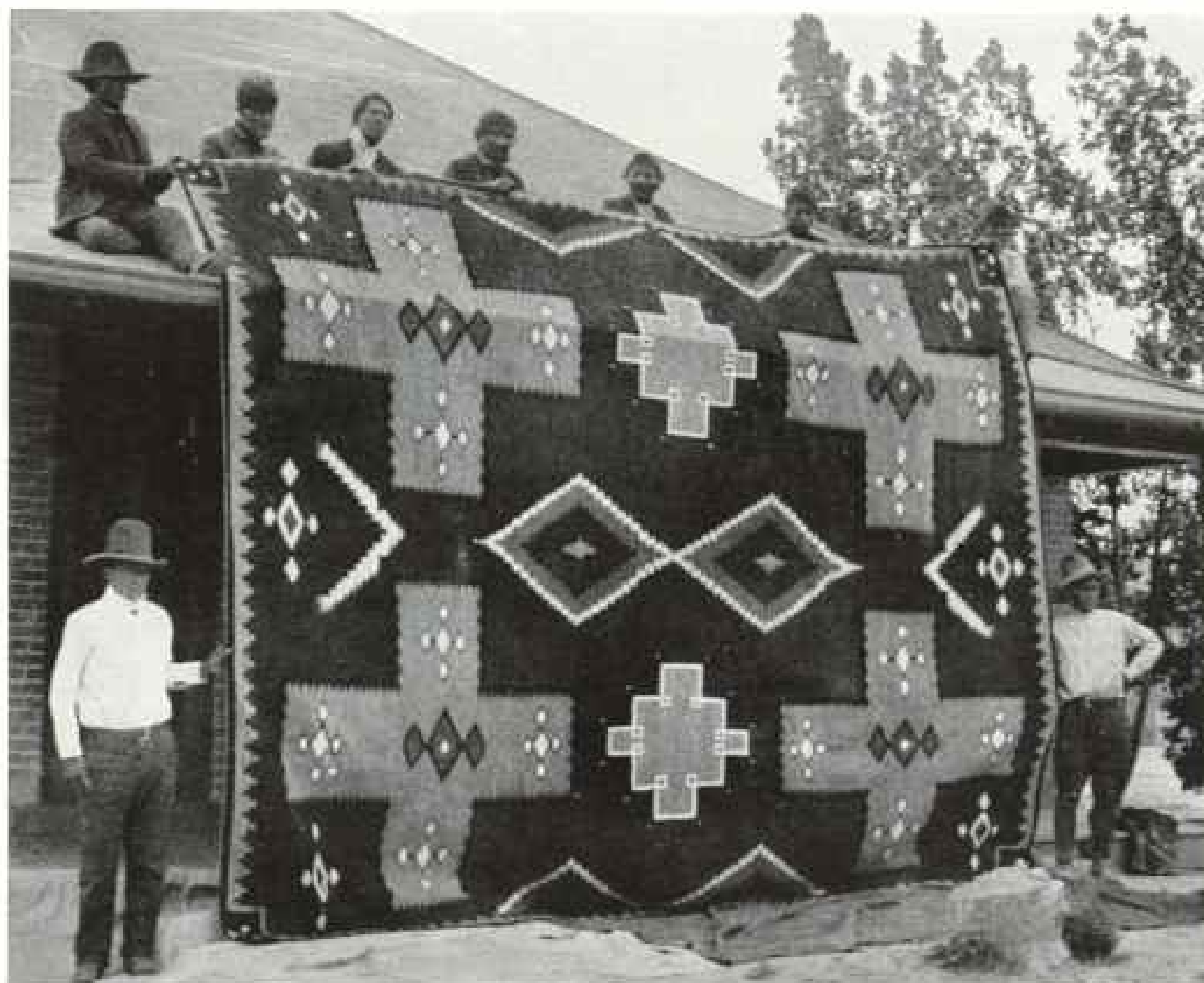
Knowledge concerning the area's prehistoric sites is probably now the most comprehensive

of any comparable archeologic area in the world. In the growth rings of the wooden beams of the houses, preserved in the arid climate, the investigator has a calendar which places his site more certainly than did the Romans when they carved a date in their cornerstone.\*

What, then, is the story of these people, now so clearly revealed to us, who lived here before Cabeza de Vaca and his companions first heard of the Seven Cities of Cibola?

The first human occupants of the area, of whom we have definite knowledge and whose culture we can reconstruct, were the so-called

\* See reports of National Geographic Society expeditions led by Neil M. Judd for the archeological explorations in Chaco Canyon, NATIONAL GEOGRAPHIC MAGAZINE, March, 1922; July, 1923; and September, 1925, and "Secret of the Southwest Solved by Talkative Tree Rings," by Andrew Ellicott Douglass, December, 1929.



Photograph by H. F. Barber

### Navajo Weavers Make Bigger Rugs to Supply the White Man's Demand

In years past the Navajos produced only poncho blankets. Traders found a ready sale for the colorful articles and encouraged the weavers to vary their output; thus a thriving business in blankets and rugs developed (page 569). Indians would have little use at home for this giant, 12 by 18 feet, which was a year and a half in the making, but it will find ready sale at a trading post.

Basket Makers.\* Their first arrival may have been shortly after the beginning of the Christian Era. They occupied the upland territory comprising most of present-day New Mexico and Utah and the northern part of Arizona.

#### Human Hair Used for Weaving

These pioneers were a long-headed people who used the spear thrower instead of the bow and arrow, and had no knowledge of pottery making. They lived in the numerous caves of the region and probably also in brush shelters erected in the open. They manufactured coiled basketry, made fine square-toed sandals of woven cord, and twined yucca-fiber bags with colored decorations. So precious was good textile material that they hacked off their own hair for weaving.

As time went on, these enterprising people either invented the art of pottery making or, more likely, learned it from their neighbors in

Mexico. The decorations on this pottery were simple lines and dots with sometimes a realistic figure. Their vessels were often painted with a red pigment after firing, so that the color was not fast.

In their simple agriculture, maize was the principal crop.

Eventually the bow and arrow made the spear thrower obsolete and displaced it as their principal weapon.

Ultimately the Basket Makers learned to make circular or rectangular pit dwellings. They dug out a kind of cellar, which they lined with mud plaster or stones and roofed with a conical structure of poles covered with mats, brush, plaster, and earth. A smoke hole was

\* From present consideration we are omitting the scattered and sparse stone artifacts of Folsom Man, that very ancient group of hunters who chased the mammoth, the camel, and the giant bison at the close of the last glacial period.



left in the center of the roof and the room was entered through a covered tunnel in the side. Living thus in an artificial cave, they were well protected from winter cold.

About 500 A. D. the country of the Basket Makers was invaded by a new people. Shorter in stature, these newcomers had round heads, made even broader by the custom of lashing their infants to hard cradleboards which flattened the backs of their infantile skulls.

#### First Families of the Pueblos

These were the people we now call the Pueblos. With the Basket Makers, among whom they apparently settled, they were the ancestors of the pueblo-dwelling people living in the Southwest today. They brought some new customs and borrowed others from their new neighbors. They wove round-toed sandals, made coiled basketry similar to that of the Basket Makers, and discovered or brought with them the use of cotton.

At first they lived in circular pit houses much like those of the Basket Makers, but gradually they began to build their structures mostly above ground with thick walls of poles and plaster. Occasionally several such structures were joined in the manner of connecting rooms.

In time these people started to build community structures of many rooms. Their agriculture became more intensive, their ceremonies more elaborate, and their arts more specialized and localized.

For several centuries before the coming of the Spaniards this progress continued, and the period from about 1100 to 1400 A. D. marked the climax and greatest flowering of the culture. During this era the Pueblos built the great apartment dwellings like Pueblo Bonito (Plate II) and Chetro Kettle of Chaco Canyon, and such imposing cliff dwellings as the Cliff Palace and Spruce Tree House of Mesa Verde (Plate XVII and page 584). Their structures are the most impressive ever erected by aborigines north of Mexico.

Just as these peaceful agriculturists were achieving their highest advance, warlike enemies appeared—fierce nomads from the north and east. This was why the apartment dwellers built some of their pueblos on the ledges and open caves of high cliffs.

Whether the raids of these hostile aliens produced a setback, or whether the natural decline that follows every period of rapid cultural development was the cause, there soon began a period of retrogression which continued until the Spaniards entered the country and produced even more profound changes.

About the time the Pueblos came into the

land of the Basket Makers, another people, the Hohokams, invaded from the south the semi-desert region of the Gila River in southern Arizona. Like the Basket Makers, they were long-headed.

These people lived in square houses of poles and brush held together by mud plaster. Their villages were surrounded by adobe mud walls. Expert farmers, the Hohokams built elaborate irrigation systems which made the desert bloom (Plate XIX).

Just as the prehistoric Pueblos were the direct ancestors of the modern Pueblo peoples, so were the Hohokams probably ancestors of the present-day Pimas, Papagos, and other farming or *rancheria* tribes.

The third great group of Southwest Indians consists of the nomadic tribes. Archeologic evidence of these is scant, and even during the Spanish period they form a rather shadowy background, being mentioned usually because of their enmity to the settled Pueblo peoples.

Most often named in these early accounts were the Comanches, Apaches, Navajos, and Utes. Warlike exploits of the Apaches extended into fairly recent times under their chief Geronimo (Plate I and page 554).

#### No "Vanishing Americans" Are Navajos

Largest of all tribes in the United States today are the Navajos, numbering about 50,000 and occupying a huge territory in northeastern Arizona and northwestern New Mexico (page 585).

Far from being "vanishing Americans," the Navajos are actually much more numerous now than when the Spaniards came. With the Apaches they make up more than half of the Southwest's entire Indian population.

Besides the Navajos, the principal nomadic groups are the Kiowas, Kiowa Apaches, and Comanches of northeastern New Mexico, who always formed a link between the Southwest peoples and the buffalo-hunting tribes of the Great Plains; the Jicarilla Apaches of northwestern New Mexico; the Mescalero Apaches of southern New Mexico; the Utes of the upper San Juan River region; the Paiutes of southern Utah; the Tonto, White Mountain, San Carlos, and Chiricahua Apaches of southeastern Arizona; and the Yavapais of western Arizona.

Virtually all of these peoples are primarily hunters and seed gatherers who live in temporary villages or houses. Most of them practice agriculture, in varying degrees, probably learned in early times from the Pueblos.

Of the ultimate origin of the varied tribes of the Southwest the anthropologist knows

## Red Men of the Southwest

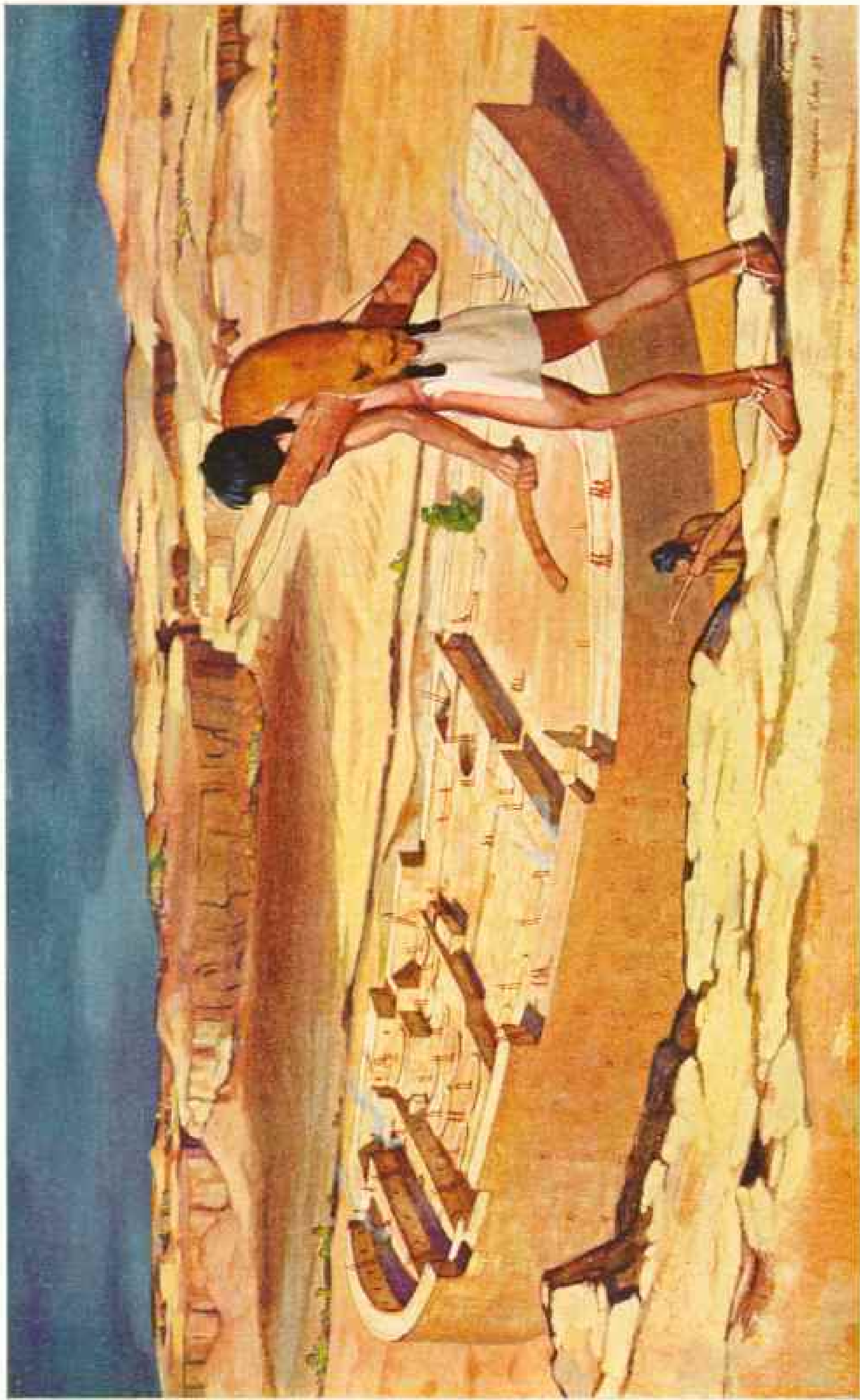


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Painting by W. Langdon Kihn

### Geronimo, Intrepid Apache Warrior, Defied Two Nations for 40 Years

The colorful chieftain led a dauntless Indian band, which emerged from rocky wastes and unexplored canyons to raid white settlements in Arizona and Mexico. He surrendered to General Nelson A. Miles in 1886. The hardy fighter died in 1909 at the age of 80 on a reservation at Fort Sill, Oklahoma. From the brush of W. Langdon Kihn comes this series of paintings, made exclusively for the NATIONAL GEOGRAPHIC MAGAZINE. Some of the paintings depict modern life and portray living models. Others represent prehistoric scenes. All are based on exhaustive study and research in New Mexico and Arizona.

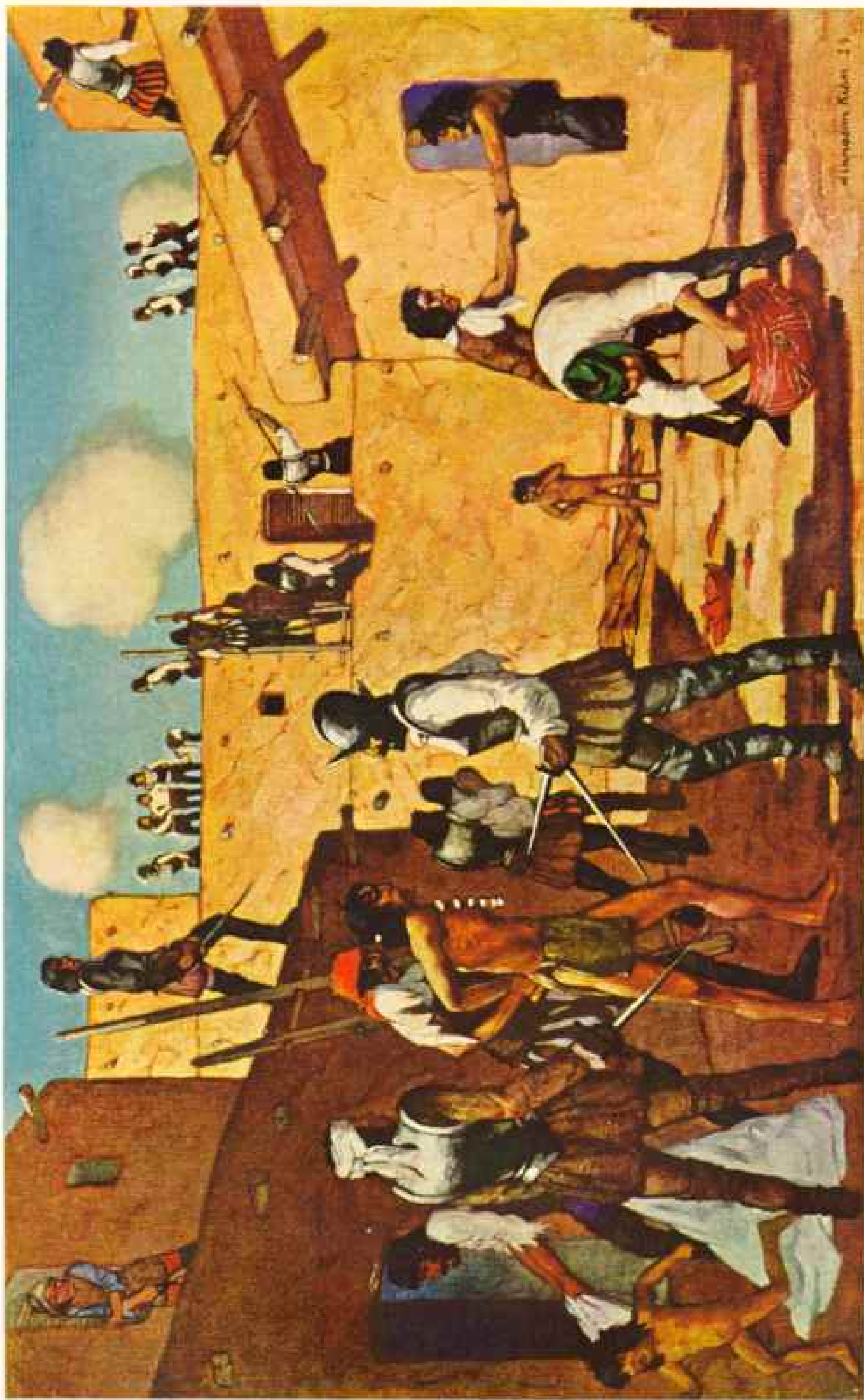


© National Geographic Society

Painted by W. L. K. 1911

### Pueblo Bonito, America's First Big Apartment House, Reconstructed from National Geographic Society Findings

Headed by Neil M. Judd, of the U. S. National Museum, Society explorers excavated the ruins of the massive prehistoric community center in Chaco Canyon National Monument, New Mexico, in the 1920's. The pueblo, reconstructed on canvas from Mr. Judd's sketches, is four stories in height, with 800 rooms. The original dwelling existed 500 years before Columbus discovered America. Ladders emerge from kivas, or ceremonial chambers.

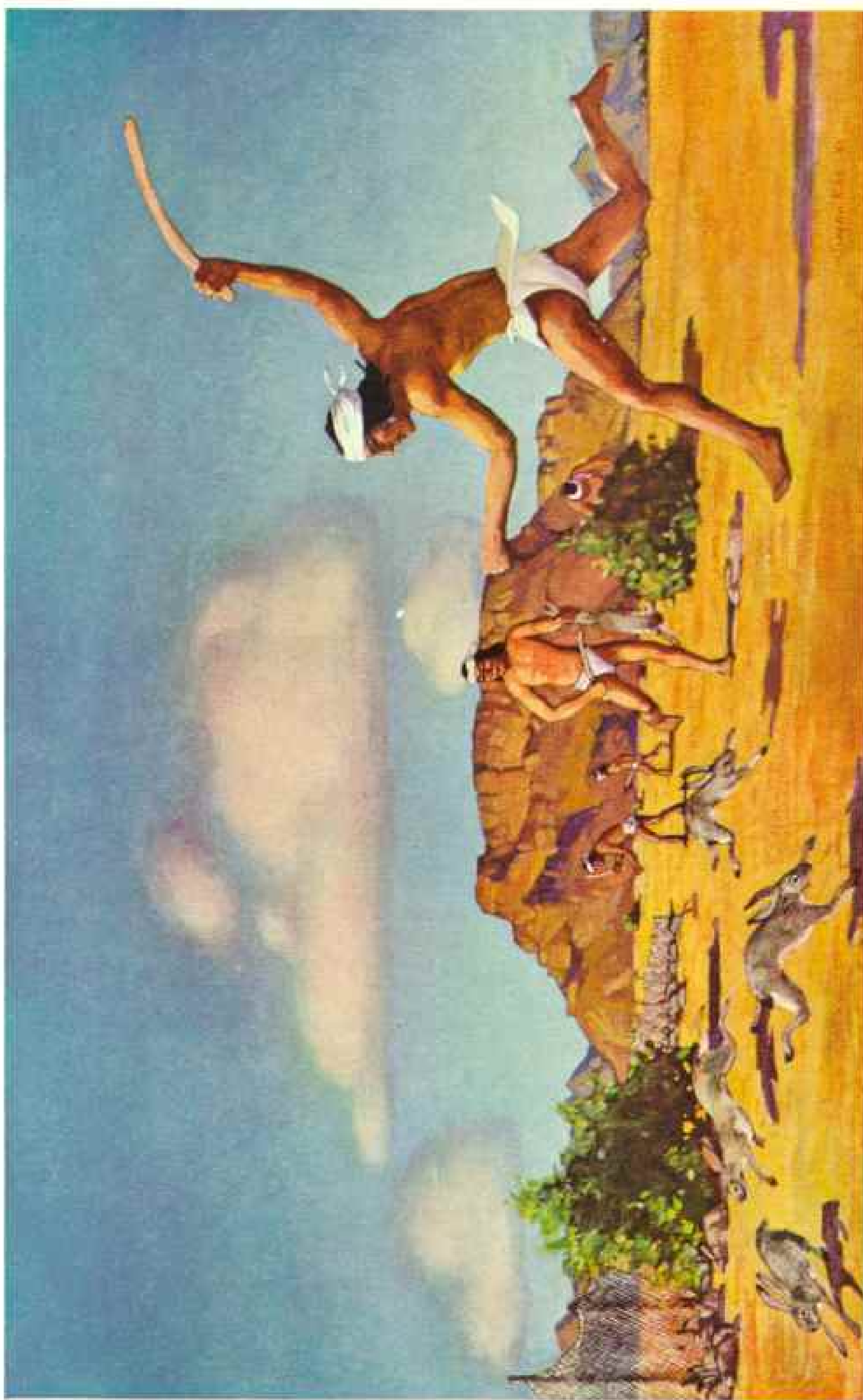


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### Coronado Enters Hawikuh, Pueblo of the Zunis, on His Search for Gold

The three-story structure housed 200 warriors and their families. When Coronado, Spanish explorer of the Southwest, arrived before the narrow gate in 1540, he was refused admission. After an hour of battle, his soldiers forced their way in. They found food but no precious metal, and the expedition was considered a failure. The troops departed and the Zunis remained unmolested for forty years.

Painting by W. J. Johnson, 1875



© National Geographic Society

#### Only Fleetest Hares Could Dodge Carved Rabbit Sticks, Hurled by Prehistoric Hopi Hunters

The Indians enclosed a wide area with nets (left) and then rounded up the animals in an intensive drive. As the rabbits converged on the nets, the hunters raced into the group, hurling the flat boomeranglike clubs. Hunting nets like this one have been found, well preserved, in northern Arizona caves. Drives for antelopes and turkeys were conducted in similar fashion. Hunting was not the chief source of food for the Hopis, who filled the soil industriously.

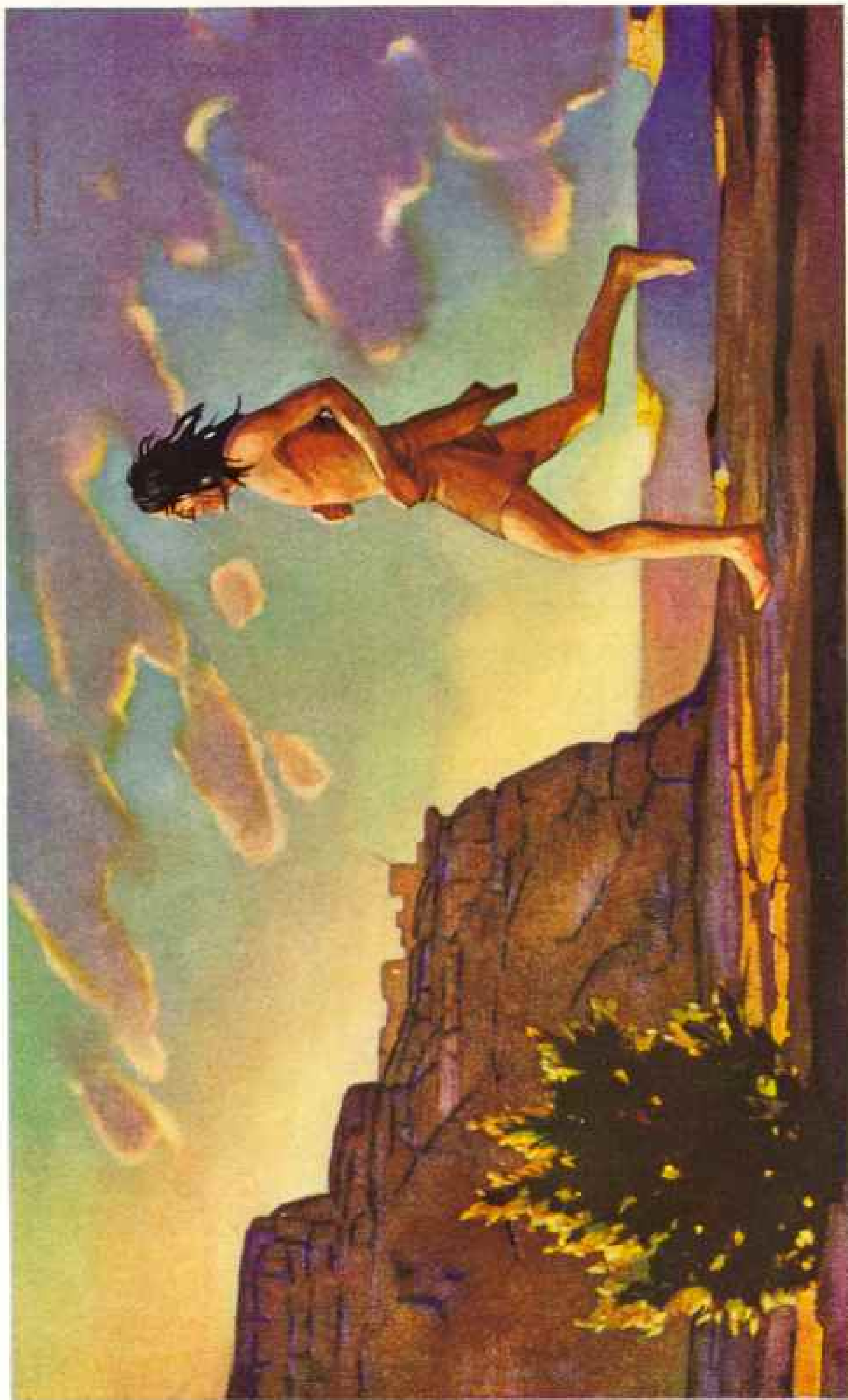
Painting by W. Langdon Kuhn



© National Geographic Society

**María Martínez (right), Artistic Modern Potter of San Ildefonso, Fires Bowls and Vases in a Primitive Kiln**

She makes polished black ware with dull background—her own creation. With a feminine assistant, this enterprising business woman operates a pottery not unlike those which the Conquistadores found, for manufacturing methods among the Pueblos have changed little through the centuries. Glass windows and the jewelry worn by the women add a modern touch, but the turkeys (left) do not. Turkeys were domesticated by the early Pueblos.

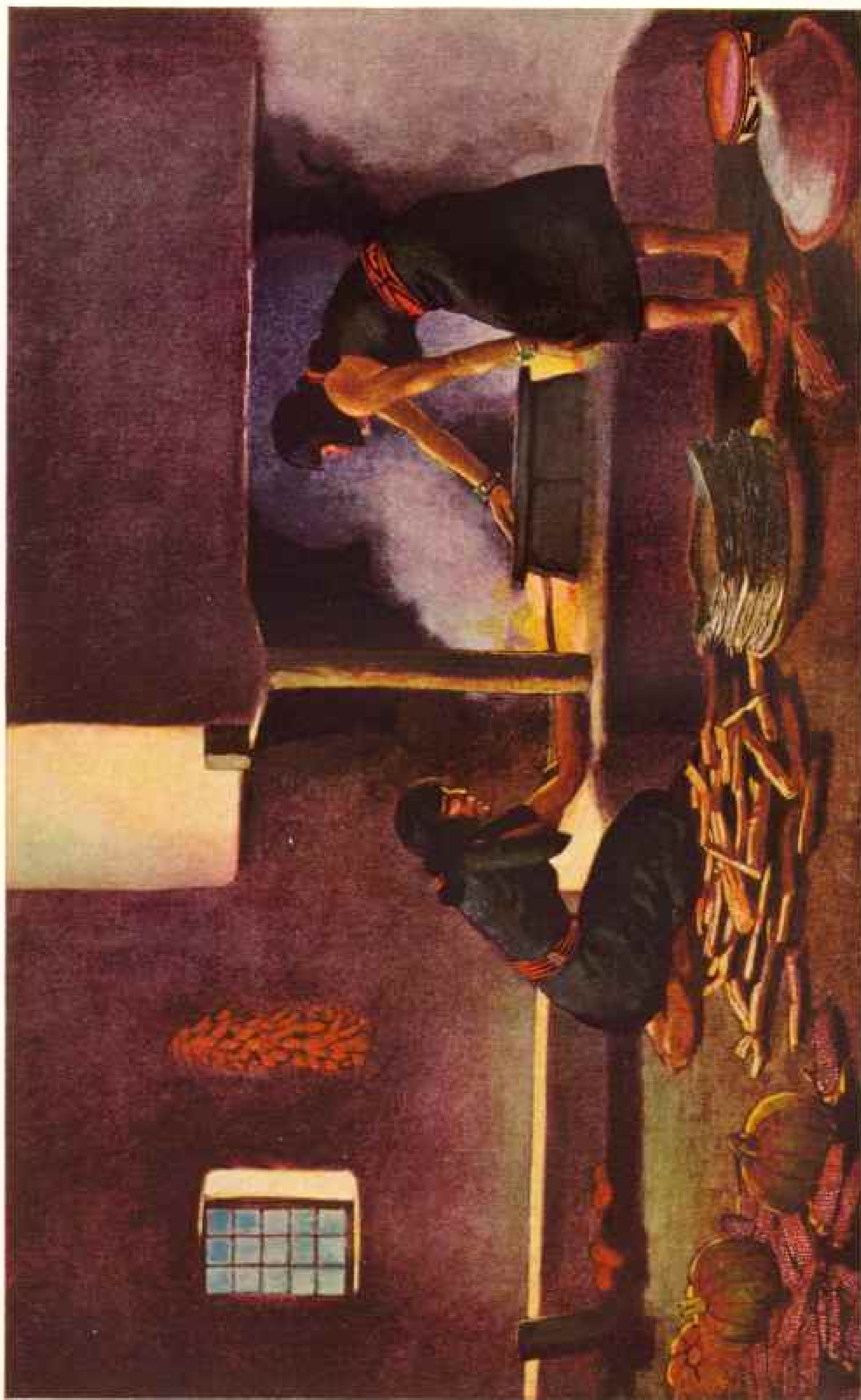


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### Success Crowns the Efforts of a Tireless Hopi Ceremonial Runner, for He Brings Rain Clouds in His Wake

The stouthearted youth returns to a prehistoric Hopi village on the mesa. He may have traveled 20 or 30 miles. Ablest long-distance runners of the tribe still are held in esteem. Ceremonial races to produce showers or otherwise benefit crops, common before the days of the Conquistadores, continue in vogue. Religion of the desert-dwelling, agricultural Hopis constantly expresses the supreme need for rain. (Plate XVI).

Painting by W. Langford Keller



© National Geographic Society

**On a Stone-topped Stove, Laguna Breadmakers Turn Blue Corn Dough Into Piki, Crisp and Palatable as Tea Wafers**

A thin paste of corn meal and water, with a dash of wood-ash lye, is spread over the hot stone slab. The plaster hood above catches smoke from the wood fire. Modern Indians of the Southwest make several varieties of bread and mush. They often concoct mixtures filled with meat, nuts, and chili. Except for glass windows and the women's jewelry, the scene could be prehistoric. Today many of the Indians use metal tops on their stoves.

Painting by W. Langdon Kille





© National Geographic Society

Painting by W. Langdon Kihn

**A Massive, Ornate Turquoise Necklace Marks This Zuni as a Man of Wealth**

He is a member of the most noted of all present-day Pueblo Indians. The tribe dwells on a plain near an arm of the Little Colorado River in New Mexico. Their ancestors peopled the famed "Seven Cities of Cibola," chronicled by the Spanish discoverers. The captive eagle at the Indian's side is kept for its feathers, which are plucked for use in ceremonials. Downy feathers embellish prayer sticks,

little, but the number of linguistic stocks represented indicates that they have come together from sources of great diversity.

Navajos and Apaches, for example, speak languages of the far-flung Athabascan stock—traceable to Canada—while the sedentary agricultural tribes living in the warm country of the headwaters of the Salt River speak dialects of the Sonoran stock, from Mexico.

Among the various tribes of Pueblos no single tongue prevails. There are several languages, of wholly different stocks. Zuni and affiliated villages, for instance, have one all their own.

The Pueblos today consist of 26 towns, with compact communal houses, made of adobe bricks, stones, or clay and rubble, rising two or more stories in a typical terraced or setback style of architecture. The total population is about 15,000.

These communities are primarily dependent upon farming. To maize, beans, and squash have now been added many introduced crops, such as wheat, watermelons, and various vegetables. Wild plants are used to some extent for food, and hunting adds variety to the diet.

Most of the present-day pueblos lie near the upper Rio Grande in New Mexico. This eastern group consists of Picuris, Jemez, San Juan, Santa Clara, Nambe, Tesuque, Santo Domingo, San Felipe, Santa Ana, Cochiti, Zia, Taos, Sandia, and Isleta.

West of these, but still in the Rio Grande drainage, are the pueblos of Acoma and Laguna. Still farther west, on the headwaters of the Little Colorado River, is the pueblo of Zuni.

In northeastern Arizona, also in the drainage of the Little Colorado, are the seven Hopi villages. In this same group is the pueblo of Hano, which was settled in early historic times by immigrants from the Rio Grande region.

Probably the most characteristic feature of the Pueblos, and that which was responsible for their name as given by the Spaniards, is their architecture.

Several methods of applying the typical terraced style of construction are followed. At Taos the structure consists of a terraced pyramid built by erecting a large rectangular building with five stories, each one smaller by the width of a room than the one below it.

Another way is to erect buildings on the four sides of a court, with each story receding in a terrace from the preceding one and ending with a perpendicular wall in the rear. Such buildings are found today at Santa Clara and Jemez. A prehistoric variant of this style of architecture is found in the great ruins of Chaco Canyon in New Mexico, where the

structure was terraced back from a semicircular court (Plate II).

### Skyscrapers and "Setbacks"

Today, Taos and Zuni are the skyscrapers of the pueblos, reaching a maximum height of five stories.

Sometimes buildings are terraced back from both sides of a street, as at Acoma (page 552). The upper tiers are entered by ladders projecting through holes in the roof, although now side doors are becoming more common.

Secret religious meetings are held in subterranean ceremonial chambers. In prehistoric times these were generally circular, but at present they are usually rectangular. A ladder through an opening in the roof is the entrance (Plate XVII).

In some pueblos there is an increasing tendency to build individual detached houses, after the European fashion. Much of the construction work is done by women. The walls, especially of adobe structures, usually are plastered with a mixture of burned gypsum, which helps retard erosion from rain.

In ancient times the Pueblos found a substitute for glass windows in slabs of translucent selenite.

Fireplaces usually are built in a corner of the room, and a hood over them carries the smoke to the chimney. In another corner, parallel with the wall, are the slab-lined meal-ing bins, with their stone metates for grinding corn. Recesses in the wall serve as storage places.

### "Sing While You Work"

From earliest times Pueblo women have worked over their meal-ing bins to the accompaniment of special "corn-grinding" songs. In 1540 Castañeda described corn grinding almost exactly as it is done today:

"They keep the separate houses where they prepare the food for eating and where they grind the meal, very clean. This is a separate room or closet, where they have a trough with three stones fixed in stiff clay. Three women go in here, each one having a stone, with which one of them breaks the corn, the next grinds it, and the third grinds it again.

"They take off their shoes, do up their hair, shake their clothes, and cover their heads before they enter the door.

"A man sits at the door playing on a flute while they grind, moving the stones to the music and singing together.

"They grind a large quantity at one time, because they make all their bread of meal soaked in warm water, like wafers."

Corn is usually parched before it is ground.



Photograph by O. C. Hayward

#### Polly's Tail Feathers Will Grow Again

When a dry spell threatens Zuni crops, the Indians pluck the macaw to decorate prayer sticks with which to ask the gods for much-needed showers. The bird was presented to a Zuni community in 1925 by Neil M. Judd, leader of the National Geographic Society Pueblo Bonito Expedition. The photograph was made in 1939, after three years of scant rainfall.

The flour is made into a paste by adding water and cooked in the form of thin tortillas, or flapjacks, by baking on a stone slab (Plate VII). Now sheet iron is often used instead of stone.

Cornmeal is also eaten in the form of mush. Formerly it was cooked in earthenware vessels, but nowadays these have been supplanted by metal utensils.

A picturesque adjunct of the Rio Grande pueblos is the earthen dome-shaped oven, an Old World invention which was borrowed from Mexico during early historic times. The material culture of the Indians has changed

much more during the American occupation than it did under the Spaniards. Factory-made stoves are now in general use, as are also window frames with glass windows.

Resistance to the introduction of farm machinery has been marked, because such devices interfere with aspects of life which form the basis of traditional ceremonials. At Jemez even today mechanized plowing is prohibited, although in 1921 one man who purchased a threshing machine was permitted to operate it.

At Isleta the newly erected town council house remained unfinished pending a long-drawn-out controversy as to whether an old-style or a tin roof should be used. Eventually the advocates of the tin roof won out. Many of the houses of the eastern pueblos now have tin roofs.

New ideas filter in faster as English replaces Spanish.

#### Pueblos Were Early Prohibitionists

The Pueblo Indians were among the earliest advocates of prohibition in this country, because the governing bodies of the pueblos saw the bad effect of alcohol on their people. Most pueblos banned it. While the regulations have now relaxed in many of them, in others, such as Zuni, strict prohibition is still in force.

The standard drink of Pueblo aborigines was *atole*, a thin gruel of cornmeal. Now coffee has become the universal beverage, while bottled carbonated drinks are sold in enormous quantities.

Sight-seers at such ceremonies as the Hopi snake dance find Indian vendors selling soda pop, chewing gum, and cigarettes, as at a baseball game.

The trading post has helped develop the Southwest. Here the Indian meets his friends, exchanges silver jewelry and gossip, and buys canned tomatoes and peaches. Here he views the latest creations of the white man. But "all prices plainly marked" take the joy out of a favorite recreation—bargaining.

In early times the pottery of the Southwest was so good it would hold water indefinitely and could be placed directly on the fire in cooking. The art degenerated after the introduction of cheap metal kitchen utensils, but the tourist demand for native art products brought about a revival.

In some instances, as among the Hopi, ancient designs were revived to the great artistic improvement of the ware. At Santa Clara a new decorative technique was invented whereby patterns of dull black were produced on a glossy black surface.

Frequently in artistic form and decoration



Photograph by J. Bayne Roberts

#### His Electric-lighted House, with Radio, Overlooks His Adobe Oven

The San Juan Indian builds a hot fire, then takes it off after the bricks have reached a high temperature. Next, he puts in the dough, and the hot bricks of the "fireless cooker" do the baking. Electric stoves and kerosene ranges have replaced many outdoor ovens in the Southwest. In center background stands a corn drier, where husked corn is kept until it is needed.



Photograph by O. C. Hoona

#### With Knife and Brush the Hopi Kachina Maker Pliers His Ancient Craft

The small figures represent supernatural beings impersonated by masked Indians in ceremonies (Plate XV). Despite their serious use, Indian children play with the kachinas as dolls (Plate XIII). They are made of wood, leather, cloth, or basketry. Many now are sold as curios to travelers (page 581).



© Roland W. Hall

### True Sons of Manuelito—Navajo Braves of a Vanished Day

About 40 years ago, the brothers posed for this photograph on a tableland in Arizona. Their father, a famous war chief, was defeated in 1859 by Colonel D. G. Miles. Thirteen years later, when the Navajos had turned to peace, Manuelito became commander of their police force. At one reservation they tell of a small eastern girl, familiar with postcard Indians, who watched tribesmen going about their workaday business, with evident disappointment. "Mother," she exclaimed, "don't these Indians ever go out and stand on the rocks?"

the modern ware compares favorably with the ancient products. The technical quality has so declined, however, that the ware of today generally can be used only for decorative purposes. Pueblo dwellers use it chiefly for ritual.

Pottery making is done by the women. After selecting her clay and removing impurities, the potter adds thinning materials and mixes with it sand or ground potsherds to help distribute the heat evenly in firing.

The clay is then rolled into long strips or pencil-like ropes and the vessel is built up by a coiling process on a base of basketry or wood. The potter's wheel was unknown in aboriginal America. Work must be discontinued from time to time to let the clay dry, since otherwise the walls would collapse.

As the pot is shaped, the coils are pressed together with the thumbs and forefingers and the inner and outer surfaces smoothed with a simple tool of shell or gourd. Water is continually applied to keep the texture of the clay right and to help bind it as the coils join.

When the modeling has been completed, the vessel is allowed to dry gradually, so that it will not crack. It is then coated with a thin clay slip. A brush of yucca fiber and a pointed stick are used to apply the mineral paints of the decorative design.

Usually several vessels are formed before firing. This is done by carefully piling around and over the inverted vessels a slow-burning fuel which retains the heat a long time, distributing it evenly and permitting the pots to cool gradually.

The famous black ware of Santa Clara and San Ildefonso (Plate V) is produced by adding fresh fuel at one stage and smothering the smoke, so that the carbon is fired into the clay slip. When polished this ware takes on a high gloss.

In Hopi pottery making, yellow and black are commonly used. At Zuni, black, white, and red pigments are employed.

#### Usually No Secret Meaning in Designs

Symbolism plays small part in decorative patterns, being confined aboriginally to ritualistic equipment.

The question is often asked, "What does this design mean?" Generally the answer is "Nothing." One might as well ask the meaning of the design on the wallpaper or a patchwork quilt.

True, names for identification are given to certain designs or design elements, but the Indian potter, weaver, or jeweler, except where ritualistic equipment is concerned, is thinking of the decorative value of his creation and not

of any secret meaning. Nowadays, however, the enterprising native artisans usually can oblige with a good explanation.

Basketry, practiced in the Southwest long before pottery making, is now practically a lost art among the Pueblos, except the Hopis. The best Southwest basket makers of the present are the Pimas (Plate XI) and Apaches.

#### Birth of the Rug-making Art

In ancient times cotton was cultivated generally throughout the Pueblo area and used for weaving. A coarser fabric was made from yucca fiber. The early introduction of sheep from Mexico added a new textile material which gave impetus to weaving and had a profound effect upon the culture of at least one tribe, the Navajo (pages 551 and 555).

When machine-woven textiles were brought in by white traders, weaving was virtually abandoned, except by the Hopis, Zunis, and Navajos.

The finest weavers in the Southwest today are probably the Hopis, whose methods are typical of the art as practiced by the ancient Pueblos (Plate XIII). Among the Hopis the men are the weavers. Likewise they card, spin, and dye the wool. Today, durable native vegetable coloring is supplemented with trade dyes.

In weaving blankets, ceremonial kilts, and women's dresses, Hopi men use the simple suspended hand loom. Belts, garters, and hair bands, all essentials of Hopi costume, are made on a small heddle loom. Both wool and cotton are used.

Most famous of the Southwest weavers are the Navajos, to whom the art has become an important economic asset and whose colorful rugs now have a world-wide reputation. Among the Navajos, unlike the Hopis, the woman is the weaver.

The Navajos probably learned weaving from the Pueblos in the early 18th century and made a specialty of it after the introduction of sheep. The finest Navajo weaving was done during the 19th century from yarn obtained by unraveling *bayeta*, a woolen trade cloth introduced by the Spaniards. These beautifully woven blankets were usually of two colors in simple broad stripes. Navajo *bayeta* blankets are now rare and in demand by collectors.

As the cash importance of blanket weaving developed, the Navajos increased the variety and complexity of their designs. Today, in accordance with visitor and market demands, they produce an infinite number of brilliant patterns, even including reproductions of the old sand paintings (Plate XIV), a thing



Photograph by Adam F. Hansen

### A Hopi Brave "Dances the Eagle" for Guests.

A modern innovation, the eagle dance is one of the most popular among travelers who visit the Indians of the Southwest. Undulating motion of the bird's wings in flight is simulated by the performer, in time with the beat of the drum.



Photogram from Bureau of American Ethnology

### Five "Specialists" Treat An Indian Boy's Sore Throat

The Zia ceremony, photographed in 1888 by Mrs. Mathilda Coxe Stevenson, of the Bureau of American Ethnology, employs ancient Indian treatment with chants, dances, and animal calls. The five healers are members of the Giant Society, medicine cult of this New Mexico tribe. The suffering patient sat before them on four successive days while they carried out their rites (page 582).

which would have been an unthinkable heresy to their forebears.

Much has been heard of symbolism in Navajo blanket designs. In the old days it was rarely that any pattern other than plain stripes was used, and no significance apart from decoration was intended. In modern times complex and bizarre figures are often used, most of which are introduced designs. Many of these have been woven at the instigation of traders and other whites, and successful patterns have been retained. The weaver, however, thinks of them only as decoration and not as symbols.

#### Designs Even Copied from Advertising

Now and then the Navajo weaver undertakes to copy some white man's design. Thus it is not uncommon to see on a beautifully woven rug the words "Ivory Soap" or "Kleenex," copied from a cardboard box!

The early Navajo weavers were much more skillful than those of the present day. Although color patterns were extremely simple, weaving techniques were much more complex and varied.

About 1850, American traders introduced vegetable-dyed yarn imported from Saxony. Laborious unraveling of woollen textiles for dyed thread was now no longer necessary, and blanket production greatly increased. About 1870 the Navajos began to produce rugs instead of the shoulder blanket or poncho, and this sharply spurred the demand. About 1880 came the brilliant and cheaper aniline-dyed Germantown yarns.

The modern era of Navajo weaving begins about 1890, when the traders introduced aniline dyes, enabling the weavers to use native wool almost exclusively and making the production of rugs much cheaper. As a result, the output now forms a major industry.



Most recently adopted of Southwest Indian arts is silver working. Except for a few scattered objects of copper received in trade from Mexico, the Pueblo Indians and their neighbors formerly knew nothing of metals or of metalworking. Silver was one of the articles the Spaniards were eager to acquire for themselves; hence it was rarely used for trade.

Finally, about the middle of the 19th century, a Mexican silversmith entered the Navajo country. The craft was learned by a few Navajos and gradually spread. Now it is practiced by several southwestern tribes, but notably by the Navajos and Zunis.

As might be expected of an alien craft, the pattern of the objects manufactured and the designs were also borrowed. The earliest Navajo silver products were buttons, buckles, and clasps. Later the circular or oval silver disks called "conchas" became popular and were used as belt ornaments.

In early Navajo silver work, simple designs were produced by scratching or engraving. Later, stamped designs made by iron punches or dies were introduced. These designs increased in complexity, until very recently a growing demand by discriminating white buyers has brought about, to some extent, a revival of the earlier chaste patterns.

Another popular type of silver ornament is the so-called "naja," or pendent crescent, an ancient form of Old World amulet. It was introduced as a trade object to the eastern Indians and was, like the concha, probably first observed by the Navajos as used by the tribes of the southern plains.

From the Mexicans the Navajos learned to make hollow spherical silver beads, occasionally elaborated into the popular so-called "squash blossom" bead. Actually this was originally a representation of the pomegranate, a fruit entirely unknown to the Navajos. Other articles made by the Navajo silversmiths were bracelets, earrings, bow guards, and saddle and bridle decorations. At present an endless variety of "gadgets" is produced to satisfy the ever-increasing tourist trade.

The first silver used by the Navajos consisted of coins obtained from Americans. Later, Mexican pesos—of a purer grade of silver and hence easier to work—were used almost exclusively. Silver in sheets or bars was not introduced until the present era.

#### Painted Land Peopled with Spirits

Native turquoise, found at several localities in the Southwest, was extensively used in aboriginal times for beads, pendants, earrings, and mosaics. The native silversmith, however, did not begin to embellish his handiwork

with turquoise until about fifty or sixty years ago, and not until the present century has it been commonly used in conjunction with silver (Plates VIII and XXIV).

The dramatic topography of the Southwest had a profound effect upon the religious ideology of the tribes who made the region their home. It is a land of tremendous distances, of fantastic formations, of red cliffs and square-cut buttes. The clear air is occasionally invaded by black storm clouds, the clamor of thunder, and the quick stab of lightning. The deep blue of the sky is painted at dawn and at sunset with colors which defy the brush of the painter.

As all of this appeals to the modern artist and poet, so did it stimulate the imagination and poetic instincts of the Indian. In the rising thunderclouds he saw the advancing forms of the kachinas (page 567), bearing rain for his cornfield. In the rumble of the thunder he heard the beating of the wings of a mythical bird; the whirlwind was a wandering spirit.

#### Rich Mythology Explains All

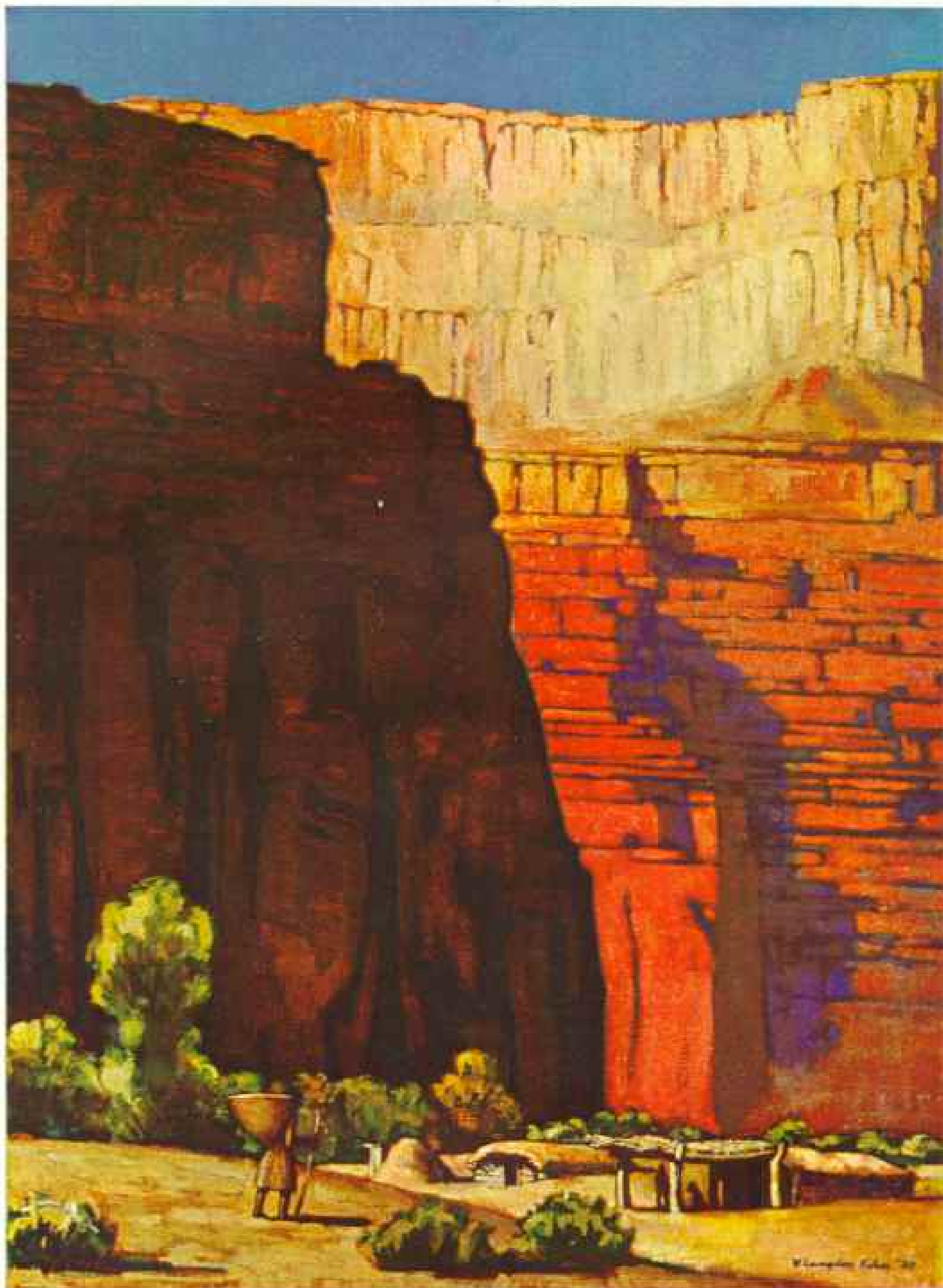
To the Pueblo Indian, his people lived in the center of the universe and all of this display of Nature was created for him. His rich mythology explained it all, and his complete belief produced in him a deep affection for those deities who made life pleasant for him. Particularly was this true of those who were directly concerned with his sustenance: the corn mother, the squash maidens, the rain gods who brought the life-giving moisture, the hunting gods who helped him find game.

A surprising amount of time was passed in ceremonies designed to please this multitudinous pantheon. Like most American Indians, the Pueblos believed these beings to be the custodians of a supernatural force or power which was in part transferable to men or inanimate objects.

When the Pueblo wears about his neck a small stone image of a mountain lion, it represents much more than meets the eye. The mere carving of the image is but the first step in the preparation of his fetish. The priest of the proper society must perform over it a long ceremony involving hours of prayer and offerings and the placing of the figure on the altar of the hunting society. Here amid sacred objects filled with supernatural power it becomes charged with the spirit of the Mountain Lion God, the master deer hunter.

When worn by the hunter, the fetish thus impregnated transmits its power to him. Whenever he starts out for deer, he prays over his little fetish, offering pollen and tobacco to the ancestral Mountain Lion.

## Red Men of the Southwest



© National Geographic Society

Painting by W. Langdon Kilmer

### Mighty Canyon Walls Isolate a Havasupai Village from Civilization

In a deep gorge about 6 miles from the Grand Canyon is Supai village, accessible to the outer world by two perilous trails. Huts on the canyon floor are summer homes. In winter the hunters move to the high plateau where game is plentiful. These Indians are experts in tanning deerskin, which they sell to the white man.

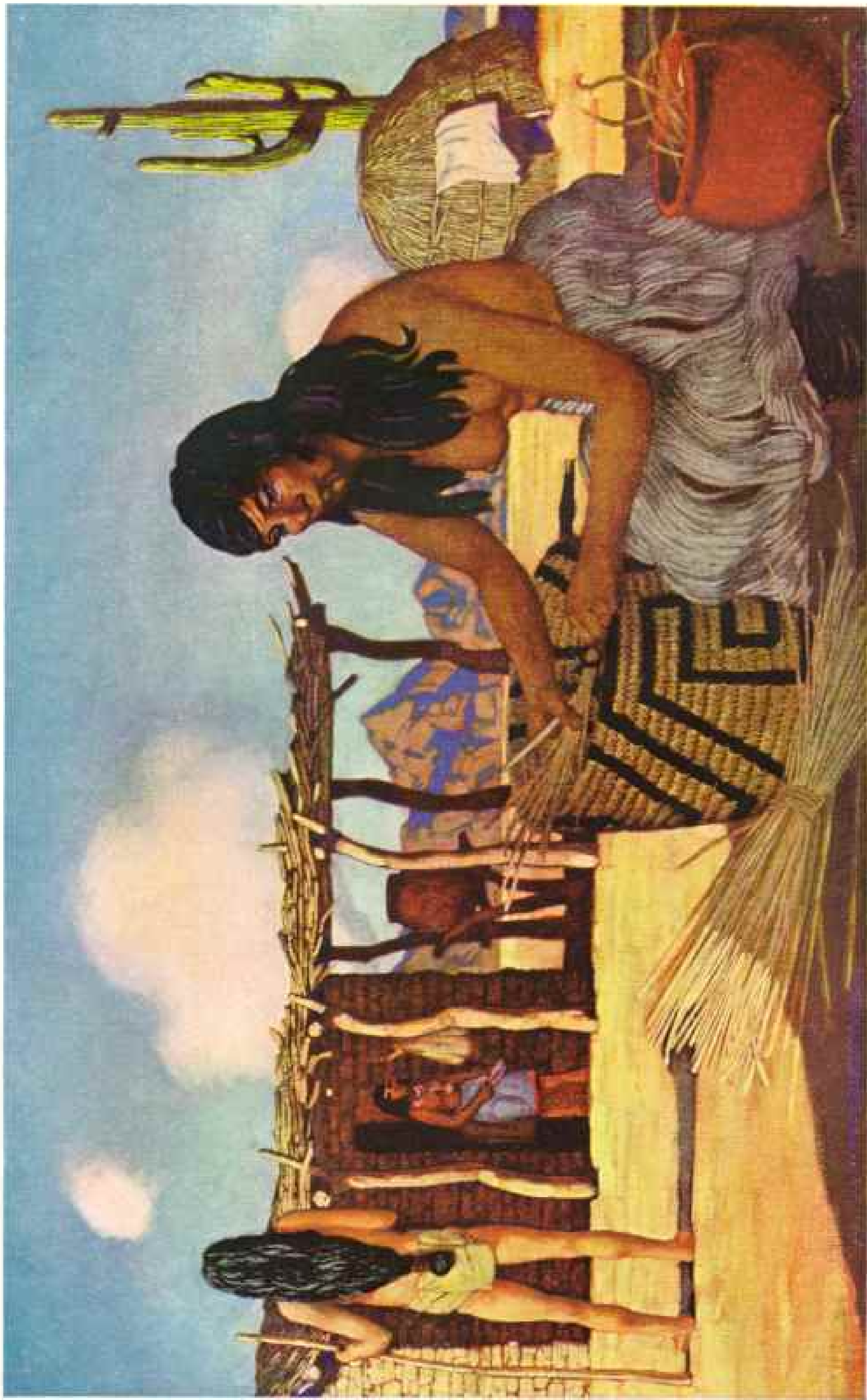


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Painting by W. Langdon Kirby

### Overlooking the Winding River, a Navajo Shepherd Pauses to Let His Flock Browse on the Cliff

Centuries ago his forebears learned sheep raising from the Spaniards. Out of this grew the blanket industry, important source of Navajo wealth today. Through the years success in weaving has radically altered the life of these desert Indians. Largest of the Indian tribes in the United States, the Navajos are scattered over northern New Mexico and Arizona.



© National Geographic Society

Painting by W. Lashlow Kilis

### From Willow Reeds and Cat's-claw Pods the Pima Woman Makes Her Baskets

Five centuries before the Pueblos came into the Southwest, their little-known predecessors in the region were Basket Makers. Pimas still are skilled in the craft. Tattooed stripes on the woman's chin were highly esteemed make-up in older days. The husband (left) wears his hair much longer than the women and ties it up at the end in a clublike knot. Pimas, unlike many of the Pueblos, live in one-family houses, some shaped like a flattened dome (right). Thatched roof and walls are supported by stout posts.



© National Geographic Society

Painting by W. Langdon Kilham

**Clowns Burlesque the Solemn Acts of Priests at a Modern Tewa Corn Dance in San Ildefonso**

The Indians appeal to the gods for bountiful crops and protection. Dance and ritual center about the sacred wand, decorated with feathers, sash, foxskin, and other sacred emblems. Principal function of the cornucopia is to relieve the intense seriousness of the ceremonies. Jesters have special costumes and their own grotesque designs in body painting. They scamper back and forth during the rites, playing jokes on members of the audience.

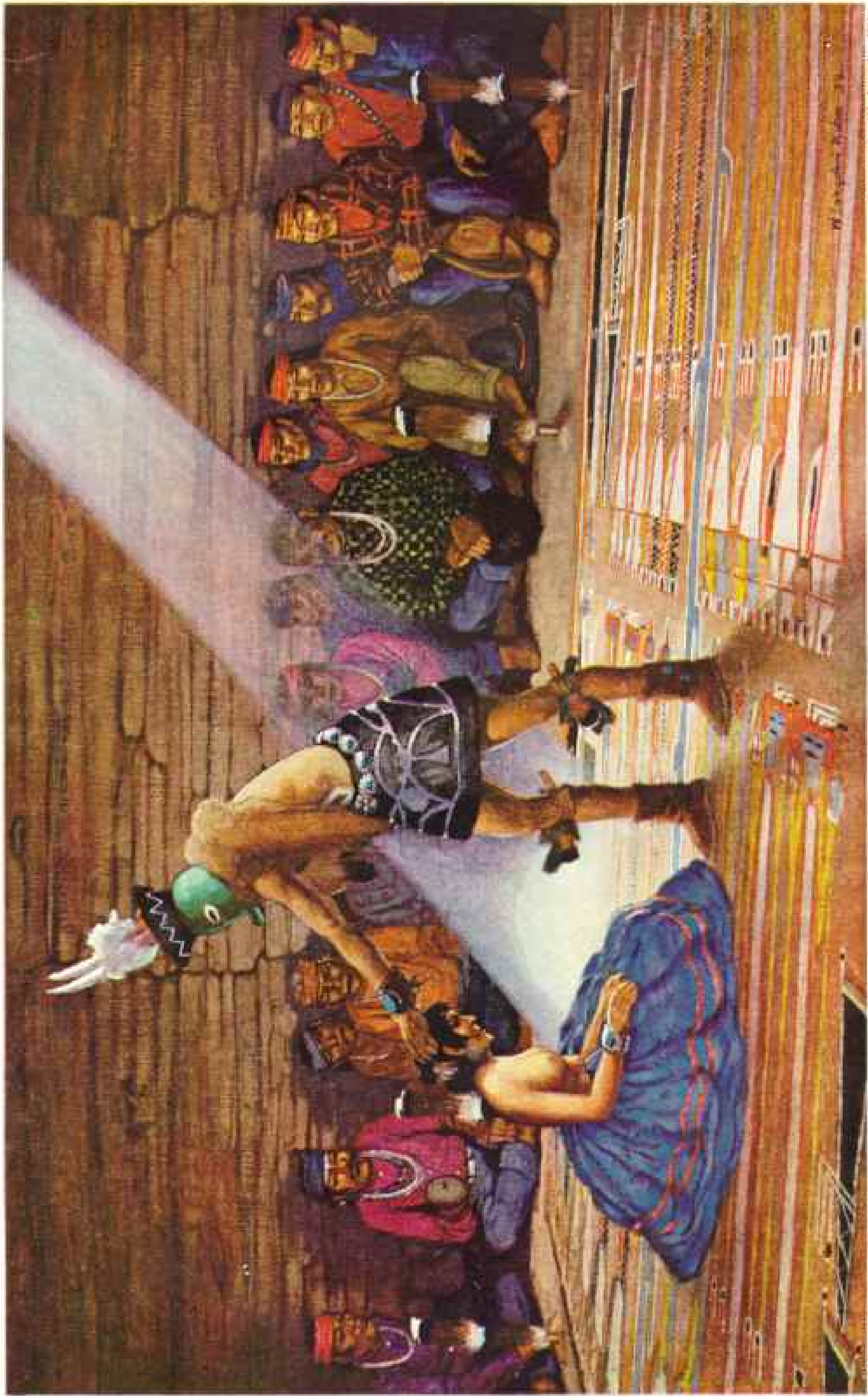


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**On a Loom Such as Their Ancestors Used, Modern Hopi Men Weave Belts and Sashes**

Painting by W. Langdon Kithi

Blankets and dress goods are made on larger, vertical looms. Grinding corn, at the mending bin (left) is woman's work. The small, high windows are the same as were used in prehistoric times. Chiff peppers hang on the wall to dry, along with a tanned skin, a kachina doll, and a silver necklace. A typical Hopi jar and a basket of corn meal stand in the wall niche which serves as a shelf. The child plays with a kachina doll, sometimes used in tribal ceremonies.



Painting by W. Langdon Kilian

**A Navajo Medicine Man Invokes Weird Ritual and Symbols in Sand to Restore a Woman's Health**

Tribesmen chant as a masked figure stalks to and fro in the hogan (tribal lodge), illuminated by a shaft of light from the smoke hole in the roof. He touches various portions of the sand painting, then places his hands on different parts of the patient's body. The chanting medicine man, holding a gourd rattle in his hand, is seated just beyond, and to the left, of the patient. The medicine man and his assistants prepare the sand painting underfoot in advance of the ritual. After each day's ceremony, the painting is erased. Next day a new and different one takes its place.



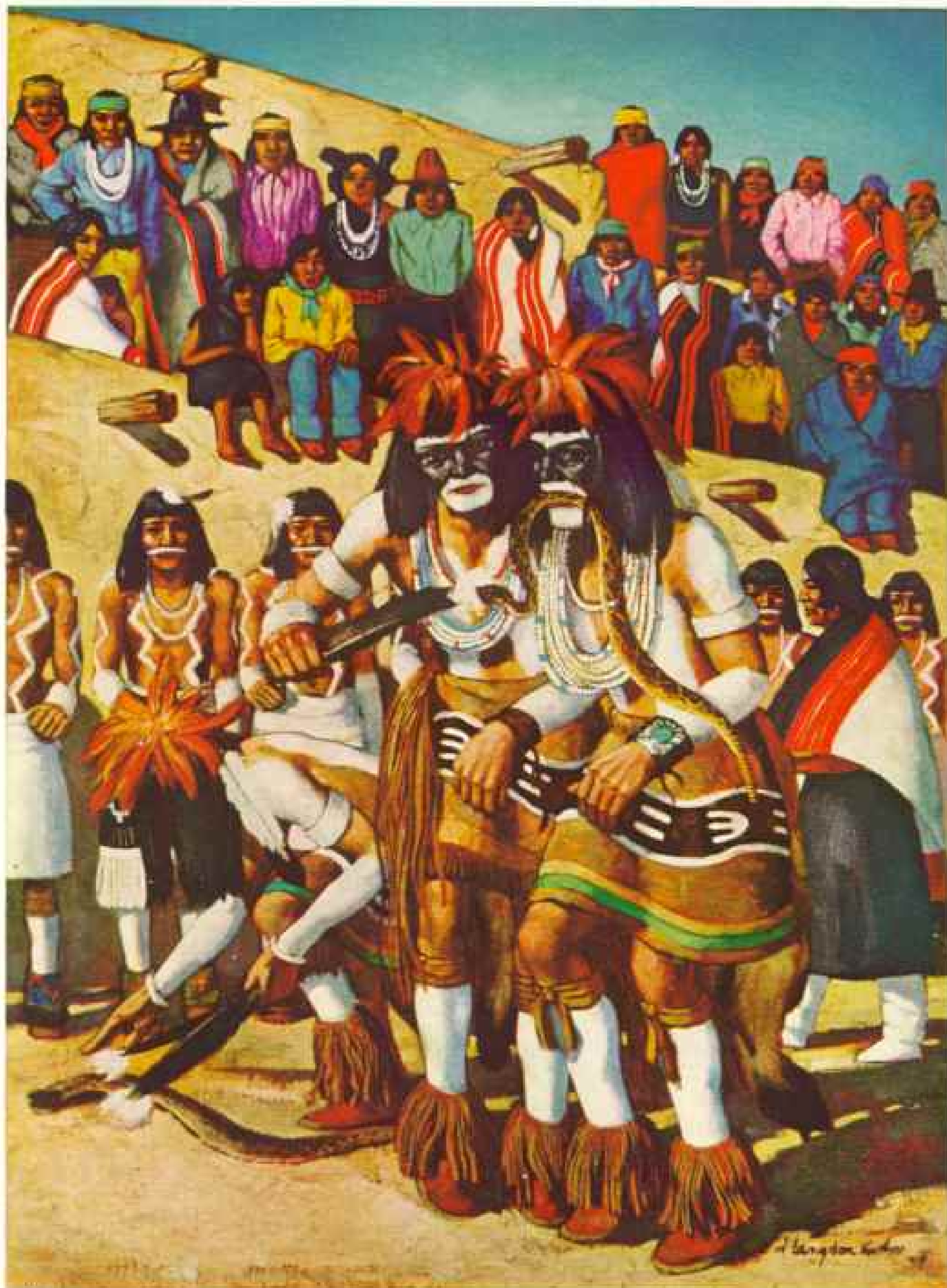
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**"Behold Us Married with Buffaloes' Dead Mimes and Beaked with Beaks Beyond Man's Memory of Birds"**

Painting by W. Langdon Elliot

The words, translated by Witter Bynner, are part of the chant of the giant kachinas in the famous Zuni Shalako, as it is held today. Spirits of long-dead ancestors are believed by the Indians to enter the images during the rites. From their age-old knowledge, the spirits dedicate the new, or renovated home in which they are guests, and grant numerous blessings.





© National Geographic Society

Painting by W. Langdon Kihn

### Rattlesnake Between His Teeth, a Modern Hopi Priest Dances to Bring Rain

A second priest waves a leather whip to distract the reptile's attention. Seldom are the agile Hopis bitten. After the dances, each priest flings his snake, usually a rattler, to the ground. A gatherer (left) places the castoff reptiles in a circle and sprinkles them with corn meal. Other priests then rush the snakes outside the village and release them. The Indians believe the snakes hurry to the rain gods and tell them of the ceremony (Plate VI).

Thus prepared, he sets forth with a confident spirit, sure that he has a powerful ally which will increase the keenness of his eye and make strong his arm.

When the hunter has felled his prey, more prayers of thanks and gratitude are offered to the ancestral lion. The heart and certain parts of the animal are removed and treated.

The religion of the Indian is intimate and omnipresent. He feels himself as much a part of the supernatural world as are the nature gods of his own creation.

To understand his activities and interpret his ceremonies, it is necessary to bear in mind always the aura of the supernatural which surrounds the individual and the complete faith with which he accepts the elaborate conceptions that are his heritage.

No crisis of life, no activity bearing on the welfare of the individual or tribe, is too trivial to have its place in religion and its religious rite.

Ceremony attends the individual at birth, at marriage, during sickness, and at death. It precedes planting and harvest. War expeditions, journeys—all are fitted into the religious pattern. Nothing is haphazard; nothing is left to fate. Moreover, all of this ceremonialism forms the warp and weft of an orderly concept of Nature with relation to man's place in the universe.

To the Indian the same deities act for good or evil, depending upon the way man conducts his ceremonies and fits himself into the religious pattern. Sometimes actions of good or ill are the result of mere caprice.

#### Kiva a Primitive Planetarium

Most of the ceremonies are dramatizations of mythological events dealing with the creation and legendary migrations of the tribe. The major part of the rituals is held with great secrecy in the underground ceremonial chambers, or kivas, with only the initiated present. Many rites, often lasting several days, end in public performances.

In the poetic mind of the Indian the kiva represents the universe, a sort of primitive planetarium. The roof and walls are the firmament and the floor is the earth. Around the walls are benches where members of the secret society seat themselves and beyond these are imaginary benches, "cloud seats," where the gods watch the ceremonies in their honor.

In the center of the floor is a small hole representing the *sipapu*, the sacred place of emergence of the mythical ancestral twins from whom all mankind descended. Near this is a larger opening covered with a plank, upon which the dancers stamp with resonant

tread to signal to the denizens of the underworld that a ceremony is under way.

Details of belief and methods of conducting rituals differ in all the pueblos, but this description is typical.

At present not all the kivas are underground and many are also used as a men's social club. When for religious purposes a man is undergoing purification, he generally retires to the kiva, where he can best abstain from contamination.

Most conspicuous among the Pueblos is the kachina cult, concerned primarily with the control of weather, particularly the bringing of rain. The kachinas are supernatural beings, usually said to have been created at the time the first ancestors of man emerged from the underworld.

Others say they represent the spirits of the early ancestors of man. Their residence is conceived as being in the west, usually in some prominent mountain.

There are many varieties of kachina, each having its own curious features and costume and each concerned with some aspect of Nature connected with the health and welfare of man. In some pueblos they are divided into summer and winter groups (page 567).

#### Clowns Are Cosmic Court Jesters

Associated with the kachinas are clowns who play a prominent part in the ceremonies (Plate XII). It seems strange indeed to the white man's mind to find comedians taking an active part in the most sacred rituals, burlesquing the solemn actions of the priests, obviously breaking the most rigid tabus, and performing obscene practical jokes on the spectators. Their most important function, the Indians say, is to relieve the intense seriousness of the ceremonies and keep the people from becoming too saddened at the sight of the kachinas.

The humor displayed by these clowns is usually clever, although ordinarily somewhat broad for the white man's taste. During the nineties Dr. J. Walter Fewkes, pioneer southwestern ethnologist, brought the first phonograph recording outfit to the Hopis, where he made records of native songs. Later another ethnologist attending a Hopi ceremony saw a group of clowns reproduce the incident.

One clown with whitened face, wearing a beard and dressed in a coat and big hat, represented Dr. Fewkes. The Indians made a "phonograph" out of a large box, with a big conical paper horn attached.

The "doctor," with much clowning, then induced reluctant Indians, one by one, to sing into the horn. As each finished, another per-

former, concealed in the box, sang the song back at him, imitating very well the discordant tones of the early phonograph.

Masks and other sacred paraphernalia must be meticulously cared for between ceremonies by special keepers, lest ill luck and death descend on the village. Because of this fear the Pueblo Indians have always been reluctant to part with any of their ritual objects. Duplicates can be made, however, and sold with impunity, since they acquire their power only as the result of elaborate ceremony.

#### Passing of the Scalp Society

An Acoma Indian described to the writer the passing of the Scalp Society, formerly one of the strongest and most important in the pueblo. To be eligible for membership, an Acoma had to kill an enemy in combat and secure his scalp.

With American occupation, intertribal warfare became less frequent and by the end of the last century had virtually disappeared.

Thus at Acoma it eventually came about that only a few old men were left to conduct the ceremonies of the Scalp Society. Finally, a single aged member remained to care for the sacred material.

The old Indian who gave me this story exhibited real emotion, and I give it with the same feeling with which it was told to me.

A grave danger threatened the community. Should the old man die with none eligible to take his place, the neglected objects of the society would bring disaster to the community. The headmen met in grave conference, and all agreed that since no young man under present conditions could go out and collect an enemy scalp and thus become eligible, the society itself must be brought to an end before it became too late.

Therefore, the old man, carefully purifying himself, spent many days in the kiva, praying, making the necessary offerings, and deactivating the sacred masks and other objects of the ancient Scalp Society.

At last, this exhausting task completed, the village remained indoors while the aged scalp priest in the early morning hours carried the emasculated equipment of his beloved society up through the door of the kiva where it had been stored since the years before the Conquistadores.

Three times he descended from the rock with portions of his precious load, the last time just as the rising sun cast its ruddy hue on the summit of the Enchanted Mesa to the north. Then, bearing his burden to a point in the desert known only to himself, he laboriously buried all beneath the concealing sands.

As the old man cast the sacred pollen over this unmarked crypt, well might he have reflected that it symbolized the end of an era, the beginning of a new régime.

As the sun rose well above the horizon, he returned and wearily climbed the age-old rock to enter an apparently deserted city. For him this was the end—he was unfrocked by his own will that his people might go on.

Returning to the roof of the kiva, he called to the people that all was done. Heads appeared from the doorways. The unnatural silence that had held the pueblo in its grip since the preceding night gave way to the chatter and laughter of women and the shouting of children, free to release their pent-up energies in the streets between the terraced houses. The interrupted life of the community resumed its normal way.

The old priest turned to the ladder of the kiva. By habit he entered in the old ceremonial way. The paraphernalia had always been stored out of sight, but now all was changed. Until this moment he had always sat in the presence of the gods. He looked across at the "cloud seats" around the painted wall. He felt nothing there. The kiva was empty.

#### Witches Blamed for Sickness

Next in prominence to the kachina cult are the curing societies, whose primary function is the cure of disease. The therapeutic ceremonies are performed over an altar which usually consists of a symbolic dry painting made on the ground with colored cornmeal and sand.

Sickness is often believed to be caused by a witch who has sent some foreign substance into the body. The medicine man must first diagnose the cause and then withdraw the object (page 571).

Itchings and skin diseases are supposed to be caused by the spirit of the ant, and one curing society deals only with ailments believed to have been produced in this manner. At Acoma a prominent figure on the altar sand painting is the horned toad, eater of ants.

The final important group of religious organizations comprises the war and hunting societies. Though the former have practically gone out of existence as warfare has ceased, some were prolonged by making a man eligible for membership through killing a mountain lion or bear instead of a human enemy.

The hunting societies are still fairly active. If a man intends to hunt deer, he calls on the spirit of the mountain lion for help. If he is hunting rabbits, he calls upon that expert rabbit hunter, the eagle.



Photograph by Ansel in Tribune

### Devil Crown Dancers Scare the Devils Out of Gallup

Auto traffic halts while Mescalero Apaches put on their spectacular costumes to drive away evil spirits, during the Intertribal Indian Ceremonial in the New Mexico town (page 550). Their garb shows Mexican and Spanish influence. Headdresses resemble altar candelabra, and swords are in the style of the Crusaders. Fringed dresses and leather trappings are strictly Indian.

Most interesting of the various offerings to the spirits are prayer sticks. These are small pieces of wood painted in various ways, usually with feathers or small bunches of leaves attached. Often faces are indicated on them, since they are supposed to carry the prayer or supplication to the deity addressed.

#### Dancers Hold Live Snakes in Mouths

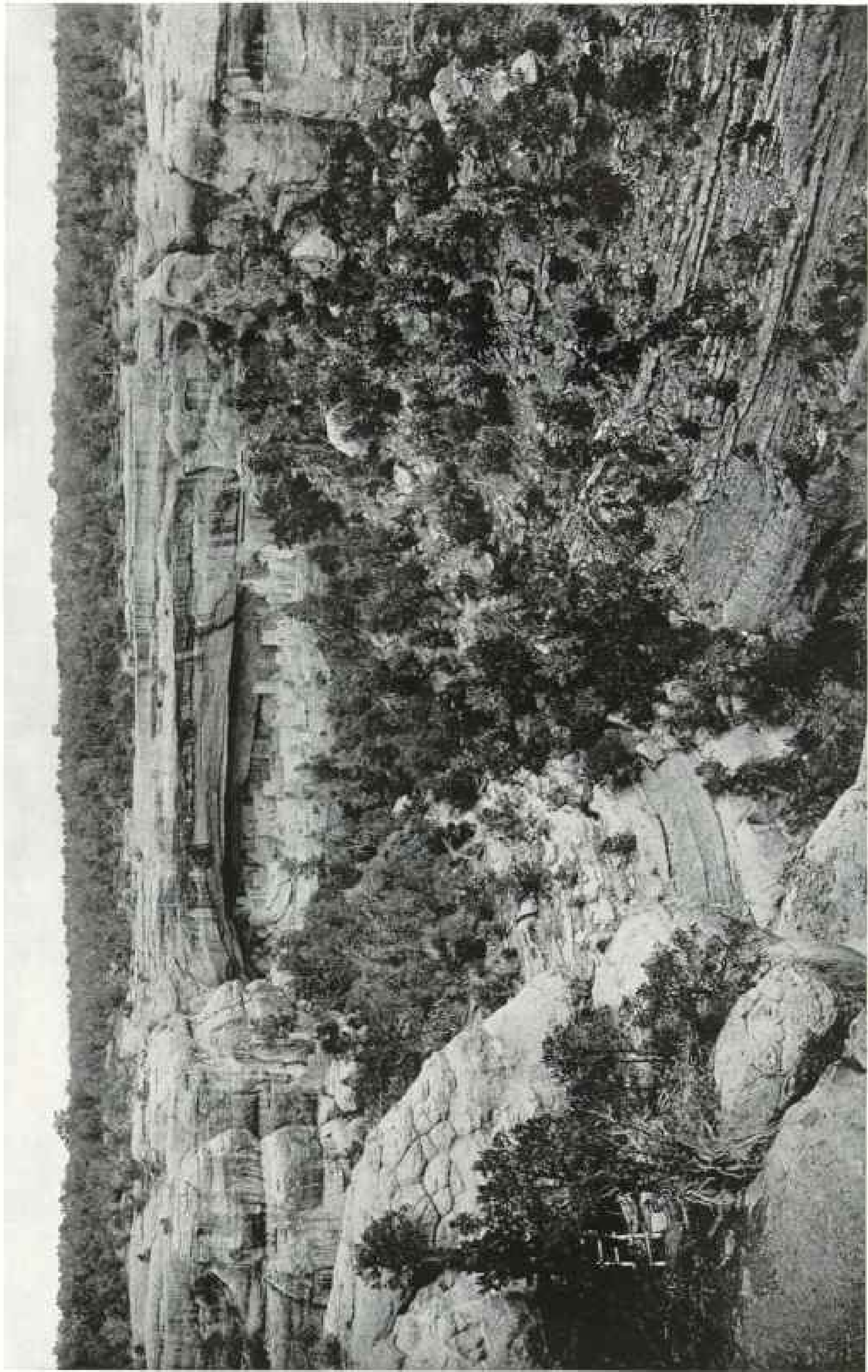
Undoubtedly the most famous of all North American Indian ceremonies is the snake dance of the Hopis, held in alternate years at most of the Hopi villages (Plate XVI).

This is a nine-day rain ceremony held under

the joint auspices of the Antelope Society and the Snake Society. Details differ in the various villages. The dance at Walpi is considered most authentic and certainly it is most colorful.

At Walpi the snakes during the public ceremony are held solely by the mouths of the carriers instead of being gripped also with the hands. At Walpi, furthermore, it is considered proper to hold the snake as near the middle as possible to allow it more freedom of movement for its head.

As the popularity of the snake dance has increased from year to year, the white



#### Early White Explorers Gazed in Awe upon the Spectacular Ruins of Cliff Palace

In 1888 two cowboys discovered the crescent ledge, about a hundred yards long, containing 146 rooms (Plate XVII). The deserted, long-lost Colorado community was named Cliff Palace by the finders. The Indians entered it through a secret crevice in the rocks. To preserve these early cliff dwellings and other near-by Indian ruins, the tableland and adjoining territory were set aside as Mesa Verde National Park in 1906.

attendance has picked up, until now it is scarcely possible to crowd everyone into a point of vantage on the mesa. Many old-timers have become regular attendants and never miss a snake dance.

The ghosts of the ancient priests probably roll over in their graves if they bother to view the framework surrounding the modern ceremony. Visitors converge on the mesa. Indian vendors sell soda pop and chewing gum. Native policemen are busy impounding cameras and laying down the rules of conduct to visiting Indians.

Previously the snakes have been gathered by members of the Snake Society. They go out from the village in pairs, the first day to the north, the second day to the west, the third to the south, and the fourth to the east. All snakes encountered are collected, but rattlesnakes are most numerous.

When captured, the snakes are put in buckskin bags and transferred to pottery vessels in the kiva, where they are used in various secret rituals during ensuing days.

On the eighth day the first dance is held outside the kiva. On the ninth day the snakes are taken from the kiva and placed in a bower erected on the plaza. The members of the two societies, properly painted and costumed, then make their public appearance.

The Antelope priests emerge first from their kiva and parade four times around the plaza, stamping on the foot drum in front of the snake bower at each circuit to notify the gods of the underworld that the ceremony is under way. After the fourth circuit they line up in front of the snake bower.

The Snake priests then go through a similar performance, ending up in a line facing the Antelope priests.

After further ceremonies the Snake priests go in groups of three to the bower and the most spectacular portion of the performance takes place.

#### Spectators Threatened with Snakes

One dancer in each group is given a snake, which he grasps in his teeth. Snake in mouth, he starts dancing down the plaza. The second member of the group distracts the serpent's attention with a feather whip.

Before long the snake is dropped and picked up by the third member of the group. As each dancer drops his snake, he returns to the bower for another and the performance is repeated. Sometimes when the hands of the gatherer are full of snakes, he passes them over to the Antelope priests to hold.

Now and then the gatherers lash out at a spectator with their snakes for such acts as

kicking at a loose snake to drive it back or simply for encroaching too far upon the ceremonial ground. Episodes such as this sometimes create more excitement than the dance itself. On the whole, the dancers have no regard for the presence of the spectators and so far as possible ignore them completely.

Finally, when all the snakes have been danced with, the head of the Snake Society pours cornmeal on the plaza in a circle divided by six radii, which represent the four world quarters, the zenith, and the nadir. The snakes are quickly thrown into this circle, where they form a writhing mass, and a group of women throws cornmeal over them.

At a given signal the Snake priests rush madly up to the circle and grasp with each hand as many snakes as they can hold. Then, with their burdens twisting and squirming, they rush down the trail from the village to the level ground below, where the snakes are carried toward the four quarters of the compass and released as messengers to bear the news of the ceremony to the rain gods.

Thereupon the white visitors get into their cars and hurry back to civilization in order not to be marooned by the cloudbursts which are expected to follow (and which frequently do).

#### Teamwork Helps Avoid Bites

Amazed white observers often ask how venomous reptiles can be so freely handled without fatal or at least serious results. Many theories have been advanced, ranging from the idea that the Hopis have discovered a secret method of making themselves immune to snakebite, to the notion that the poison glands or fangs are first removed from the rattlesnakes.

Neither of these is true. The success of the dancers in avoiding unpleasant results is probably due to two principal factors. One is skill in handling, combined with teamwork by those whose duty it is to distract the attention of the snakes. The other is the fact that during the several days preceding the public performance the snakes have become accustomed to being handled and most of the edge has been taken from their aggressiveness.

In the kivas, during captivity, the snakes are allowed to strike, thus draining their poison glands of most of the venom. It is not at all unusual for dancers to be bitten, but I have never known of serious results.

Among the many so-called nomadic tribes of the Southwest the most interesting is the Navajo.

When the Navajos first appeared in history, in the 17th century, they formed a



Photograph from H. ARNOLD'S BOOKS

### Now They Teach English-speaking Indian Boys To Read Navajo

The tribe never converted its speech into writing, so scholars devised an alphabet with Roman characters, expressing all Navajo sounds. Tribesmen who read English find little difficulty in understanding written Navajo.

small and unimportant group. Living a semi-nomadic life, they built their substantial one-room hogans in winter on tops of mesas where they could best defend themselves from their enemies, the Comanches and Utes, and whence they occasionally raided the Pueblos.

They practiced agriculture, but hunting also formed an important means of subsistence. In summer they lived principally in shelters covered with brush or green boughs.

#### Lo, the Far-from-poor Navajo!

When the Spaniards arrived, bringing sheep and horses, the Navajos quickly adopted them and turned to a more pastoral life (Plate X). Wool production greatly stimu-

lated weaving and the horse increased the natural desire of the Navajo to travel.

Already workers in turquoise, the Navajos took readily to silversmithing. Thus, through quantity production of the two articles most in demand by outsiders, blankets and jewelry, they eventually achieved an economic status unusual among Indian tribes.

The great expanse of territory in which they live is largely undesirable for agriculture. It contains no oil wells or rich mines. Hence the Navajos did not feel strongly the pressure of white competition.

Industrious, keen traders, they expanded rapidly, and their herds of livestock increased. Today they are not only the largest U. S. tribe but also top all others in wealth derived from products of their own industry.

Although a shrewd trader and practical business man, the Navajo is also a dreamer and a poet. He has a deep affection for the colorful canyons and massive mountains

among which he makes his home, and perhaps because of this his artistic instincts frequently find expression in concrete forms.

Almost as evanescent as the songs of beauty which leave his lips is the most interesting and possibly the earliest of his artistic achievements. This is the famed art of sand painting, which forms an important feature of Navajo curing ceremonies (Plate XIV). The art was probably borrowed from the Pueblos but elaborated upon by the Navajos.

These symbolic pictures, done in dry sand of different colors, represent scenes in a myth. The curiously elongated figures of mythological beings are beautifully formed, only to be destroyed in the ceremony, as thus is

carried away the illness of the patient for whom the ritual is held.

No more impressive spectacle is to be seen on the North American Continent than the Night Chants of the Navajo.

Held under the stars, usually in some distant, picturesque setting, they combine the gaiety of a social gathering, the solemnity of a religious occasion, and the spectacular feature of a drama.

The many dances, acts of jugglery, prayers, and songs are climaxed by the weird fire dance, when a group of men, their naked bodies painted with white clay, apply burning torches to one another as they dance wildly around a blazing bonfire (Plate XX).

Here, as among the Pueblos, clowns burlesque the priests, imitating the acts of sleight of hand so awkwardly as to expose them, dancing out of step, and jesting with the spectators.

All in all, the Navajo, fortunate in his environment, has managed more successfully than any other American Indian to adapt to his needs such traits of white culture as would most benefit him, while sacrificing little of his own basic culture, so essential to the expression of his ego.

Typical of the more primitive groups of the Southwest are the Havasupais (Color Plate IX). Probably the most isolated Indian settlement in the United States is their village on the floor of Havasu Canyon, a precipitous gorge cutting through the western end of Grand Canyon National Park.

#### The Havasupais Dwell in a Gorge

At the widest point of this narrow gorge, about six miles from its junction with the Colorado River, is the Havasupai village,



Photograph by Hugh Stevens Bell

#### Portrait of a Happy Warrior

The Navajo infant is bound hand and foot to his traditional cradleboard, but the march of time has replaced a buckskin coverlet with a bath towel.

hemmed in on all sides by mighty red sandstone cliffs and accessible only by a steep and perilous trail. Here the Havasupais till their fields and live during the growing season. In winter they move to the high plateau where firewood is plentiful and they can gather piñon nuts and hunt.

Living in a region where game is fairly abundant, the Havasupais are good hunters. Venison forms an important food, and dressed deerskins bring revenue.

In tanning, the brain of the deer, with marrow from the spinal canal, is worked into the skin by hand, usually to the rhythm of singing.

The primitive fire drill, once almost universally used by American Indians, may still be



seen occasionally among the Havasupais. The drill, a round piece of dry mesquite wood, is rotated vigorously between the palms of the hands, with as much downward pressure as possible. An expert with this type of drill can produce fire in less than 30 seconds.

In cooking, the Havasupais use virtually the same method described by Cabeza de Vaca in 1535 when he first reached the Apaches in western Texas:

"Their method of cooking is so new, that for its strangeness I desire to speak of it; thus it may be seen and remarked how curious and diversified are the contrivances and ingenuity of the human family.

"Not having discovered the use of pipkins, to boil what they would eat, they fill the half of a large calabash with water, and throw on the fire many stones of such as are most convenient and readily take the heat. When hot, they are taken up with tongs of sticks and dropped into the calabash until the water in it boils from the fervor of the stones. Then whatever is to be cooked is put in, and until it is done they continue taking out cooled stones and throwing in hot ones. Thus they boil their food."

When a Havasupai wants a wife, he gives her parents presents considered of more or less equivalent value—for example, a horse priced at about \$60. The husband lives with his parents-in-law until one or two children have blessed the union, after which he sets up a home of his own. If the marriage fails, the presents are returned.

The tribes of the semidesert region of the Gila and lower Colorado Rivers present an interesting contrast both to the Pueblos and to the nomadic peoples. Culturally they stand midway between the two. Like the nomads, they live in single-family houses, but these are clustered together in true villages. Agriculture is practiced, as among the Pueblos, and irrigation is generally used.

In spite of this, domestic crops are supplemented with many wild plants. A surprising number of desert plants of the region can be utilized for food. Among the most important are the mesquite bean, screw bean, yucca, and agave. The fruits of several species of cactus are eaten, that of the giant saguaro cactus being of great importance.

#### A Primitive "Fireless Cooker"

The agave, or mescal, a variety of century plant, is made edible by 24 hours of roasting in a primitive "fireless cooker," a large pit containing hot stones. Remains of these mescal ovens are often seen in the lower Colorado region.

By cooking the mescal for a longer period, the juice may be extracted and fermented, making an intoxicating drink.

The ceremonial life of the village-dwelling tribes is much less elaborate than that of the Pueblos, but they place much importance upon interpretation of dreams, about which most of their religious ideas are constructed. This is particularly true of the western tribes, such as the Yuma, Cocopa, and Mojave.

All of the Yuman tribes cremate the dead. The spirit is believed to remain in the body until it has been burned. Formerly, when an individual died in a house, the house and all his personal property was burned. Even today this custom is still practiced.

The actual cremation, held in the open, presents a wildly barbaric scene. As the flames of the funeral pyre rise, mourners and visitors wail and cry, tearing their hair and scratching their faces. Women rip off their dresses and throw them in the flames. Others throw in offerings, often including money, requesting that the departing spirit take them to the spirits of their own dead relatives and friends. Mourners are required to fast for four days after a cremation.

Several village tribes hold a strange memorial service for the dead. In one of these, the annual *Károk* of the Yumas, the climax consists in the public burning of images of the dead and also their personal belongings. Afterward the names of the dead are never again spoken.

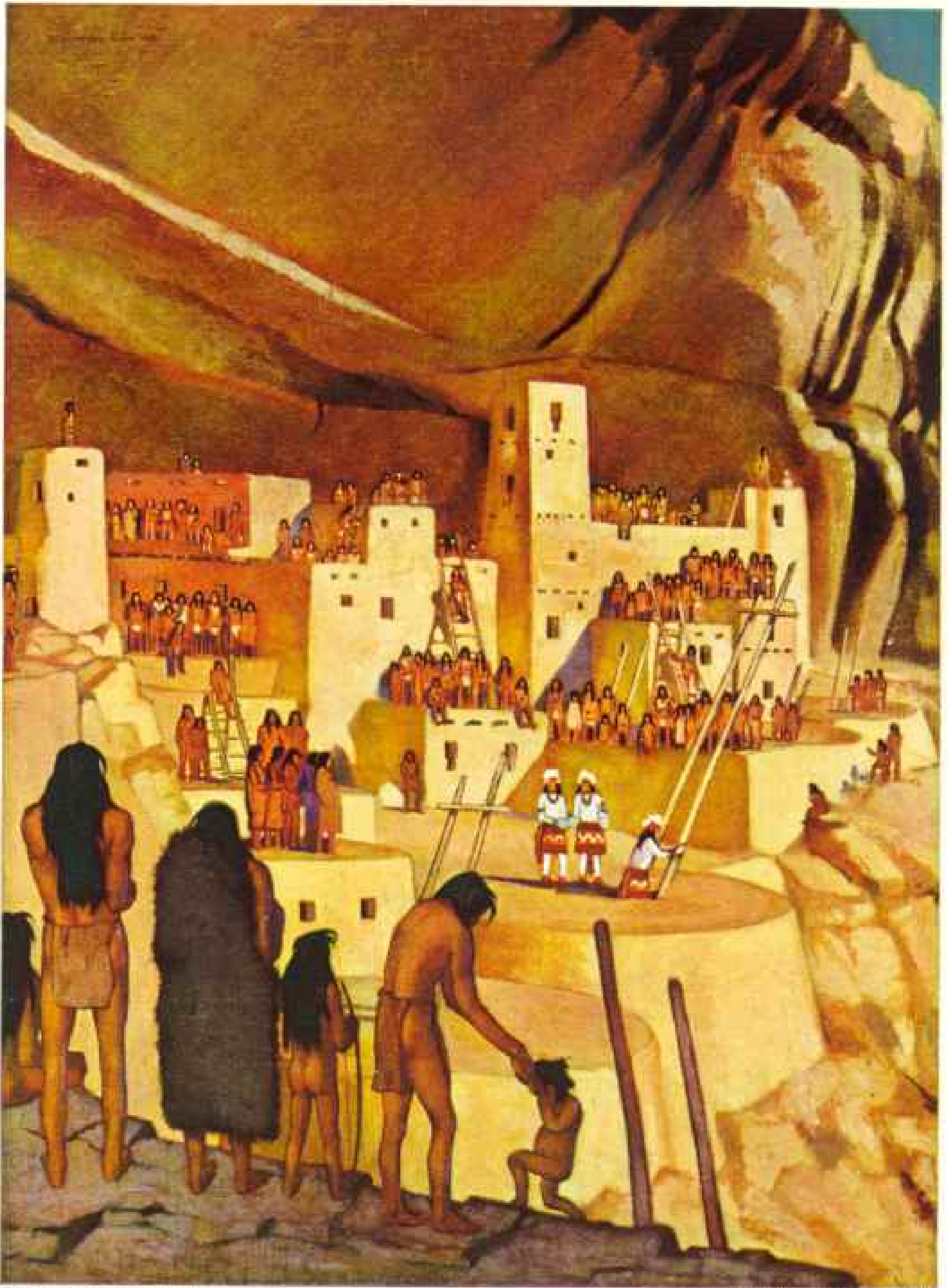
#### Beyond the Roads Life Is Little Changed

In these pages has been presented, at best, but a fragmentary picture of the manner in which many different groups of Indians have adapted themselves to an interesting and unusual environment.

Today the iron rails of the white man bisect the great American Southwest. Paved highways invite the automobile, but behind these narrow ribbons the great canyons remain unchanged from the day of the Basket Makers. The thunderheads rise with the same magnificence they displayed when Pueblo Bonito was in flower. The Machine Age has come to the desert, but it has touched the Indian more lightly than many realize.

The rain priests still make their elaborate calculations; the masked dancers perform their age-old ceremonies. When the rainstorm follows, soaking the parched cornfields with moisture, the Indian, gazing through and beyond the gasoline haze of the highway, offers his quiet thanksgiving, serene in the knowledge that above and below and in the four world quarters his own gods still rule.

## Red Men of the Southwest



© National Geographic Society

Painting by W. Lamson Kilmer

### Mesa Verde Cliff Dwellers Mass on Rooftops to Watch a Tribal Ceremony

Masked dancers emerge by ladder from the sacred kiva, circular chamber where secret rites have been held. The scene is the artist's conception of ancient Pueblo ritual. The kiva represents the universe. The ceiling is the sky, the floor the earth. A hole in the center of the floor symbolizes the mythical passageway by which the Indians believe man first came from the underworld to the earth.



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A. Yaqui Ceremonial Dancer Pushes His Mask Aside



Paintings by W. Langford (S. 10a)

Coiled Hairdo for Hopi Maids—Braids for Matrons

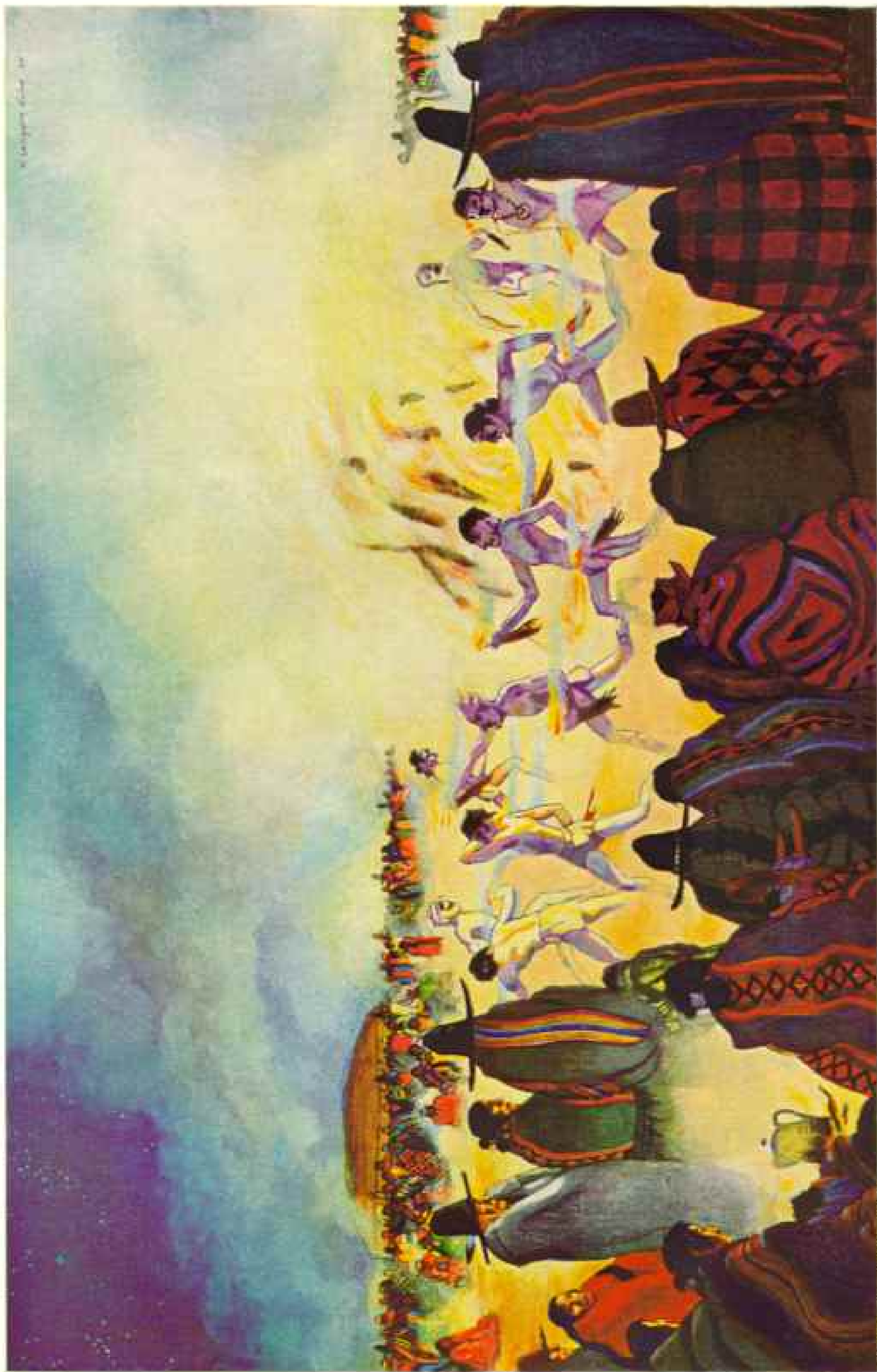


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Painting by W. Lamson Gibb

**Diligent Hohokams Built Irrigation Canals for Their Parched Soil Long Before the Coming of the Spaniards**

In the desert country along the Gila and Salt Rivers in Arizona, these predecessors of the Pima Indians lived comfortably in prehistoric times only because they learned to irrigate. Archeologists have found ruins of one large city nine miles from the Salt River, which received its water supply through a canal 7 feet deep, 4 feet wide at the bottom, and 30 feet wide at the top. The entire canal system is believed to have watered about 200,000 acres. Recently some of the old canals have been cleared and restored to use.



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Painting by W. Langbein 1944

### Clutching Burning Brands in Their Hands, Frenzied Navajo Five Dancers Circle Closer and Closer to the Leaping Flames

The performers paint their naked bodies with clay, which helps ward off the intense heat. As they run faster and faster, each man strikes the back of the Indian ahead of him with his fiery torch. Today the spectacular dance is a climax to impressive tribal Night Chants. Tribesmen come from far and near to attend these festive gatherings, held under the stars. Some of the onlookers wear store blankets. The ones they weave themselves they sell for high prices.

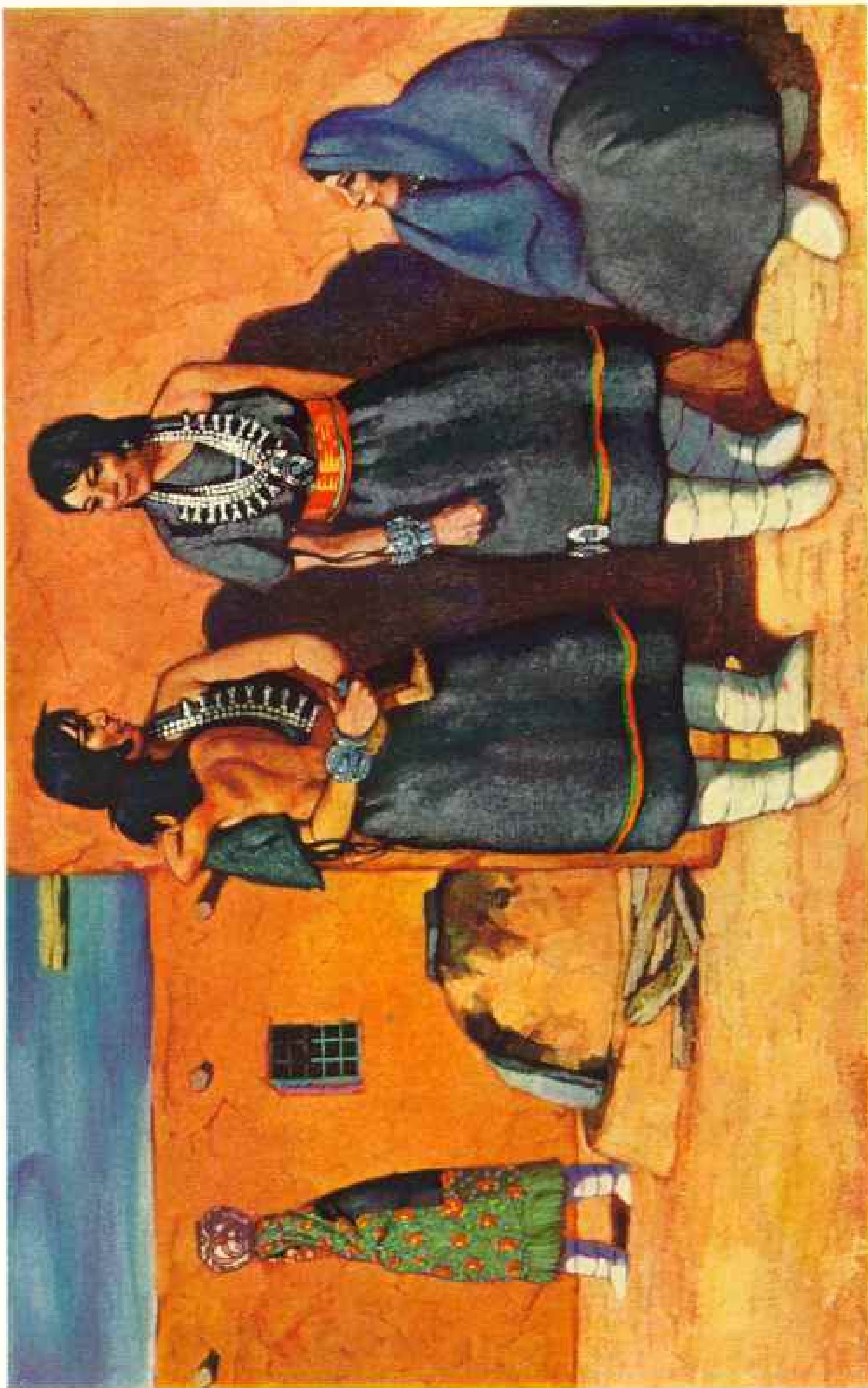


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**Yuma Tribesmen Still Burn Images to Honor Their Dead in the Solemn Annual Károk Ceremonial**

When Yuma Indians die, their bodies are cremated and their families go into mourning until the day of the Károk. Then images, made by skilled artisans to look as much like the dead tribesmen as possible, are clothed and carried to the scene of the sacred observance (right). After formal dances, the images and other offerings are burned. This ends the period of mourning. After the ritual, the names of the dead persons never again are spoken in the tribe.

Painting by W. Langford Károk 24

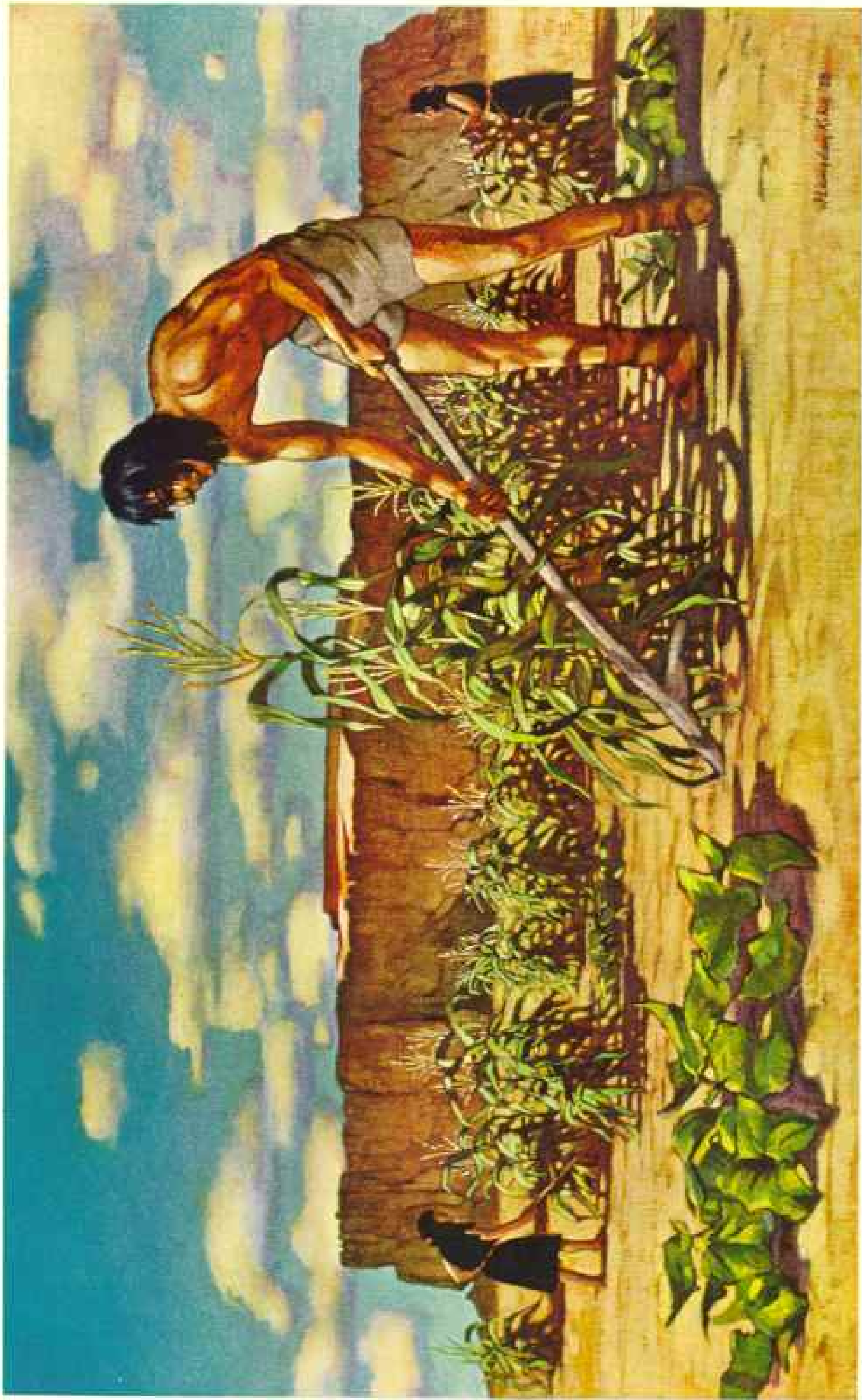


Painting by W. Lamelas (1906)

**Zuni Girls Cling to Black, Hand-woven Dresses Popular Since Pre-Columbian Days**

They believe the design with which their necklaces are fringed looks like the squash blossom, common in the Southwest. Actually, it is a representation of the pomegranate, which the early Indians never had seen. The design was copied from the Mexicans, who got it from the Spaniards. The dome-shaped oven also was borrowed from the Mexicans. The woman in left background wears a shawl purchased from a trader.

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Painting by W. Hamblett Kuhn

### With Wooden Digging Sticks Prehistoric Acomas Cultivated Fields of Maize and Squash

Acomas today use more modern implements. Corn, squash, and beans were raised before the coming of the Spaniards, who introduced other crops and cattle and sheep. In the background rises the famous Rock of Acoma, sandstone mesa 357 feet above the surrounding plain. Built upon it is Sky Village, oldest continually occupied settlement in the United States. This tribe was lying here when Coronado visited them in 1540.





© National Geographic Society

Painting by W. Langdon Kirtu

### Heavy Jewelry Adds to the Proud Navajo Mother's Burden

Bedecked with turquoise set in hand-wrought silver mountings, the family has come from its distant home by covered wagon to attend a tribal ceremony. The woman prefers her fringed store blanket to the native Navajo blankets worn by the men. When she tires of carrying the baby in her arms, she will sling the cradleboard on her back.

# Saba, Crater Treasure of the Indies

BY CHARLES W. HERBERT

*With Illustrations from Photographs by the Author*

WITH the dawn came the light and with the light a background to distinguish that cone-shaped speck of land, Saba, standing proudly apart from the other islands on the long bow of the Caribbean chain (map, page 621).

Saba is apart and different. Its sheer, steep rock walls, lashed by waves from all sides, discourage casual visitors and limit commerce to providing bare necessities for modern Sabans.\*

Steamers plying two major lanes and planes of the Pan American Airways and of the U. S. Navy's neutrality patrol pass Saba almost daily. Their passengers look across sky and water and see clusters of doll-like houses hanging tenaciously to rocky ledges.

The real thrill of navigation comes when, after you have laid down a course from the map, followed it for an extended time, you see your goal dead ahead at the figured time. This thrill is heightened when the course has carried you across a choppy cross sea, fanned with a stiff northeastern breeze, through the long night.

We left St. Thomas in the Virgin Islands at five in the afternoon aboard the *Hardtack*, a 35-foot ocean-going cruiser owned and captained by Larry Pond of Norwalk, Connecticut.

Saba is 100 miles southeast of the U. S. Virgin Islands and we dropped anchor at nine in the morning off Fort Bay Landing. Within a half hour, the harbor master, customs officer, boatmen, and porters had made their way down to the landing to receive us. Attracted to Saba by an article I had read in the NATIONAL GEOGRAPHIC MAGAZINE,† I had come to make a documentary film.

After clearance formalities are over and you have received the official welcome, it's time to be all set for the dash ashore.

Luggage and supplies (in my case 24 boxes of film and equipment) were loaded from the *Hardtack* into a sturdy Saba surfboat (Color Plates II, III). There is no wharf on Saba—only a ragged, rock-bound coast that is continually buffeted by the mighty waves rolling in from the open sea all around.

There is a way in, and only the Saba men know it. They point their bow to a 20-foot opening between two treacherous rocks. The ease with which they maneuver through the billowing waves allays fears as

you see the foaming water rise and recede around the rocks.

You think you are going in for a landing, but quickly the key man in the boat swings her broadside into the trough of the waves with scant clearance from the right-hand rock. At this point the boat surges back and forth with each succeeding wave, but never comes too near the rock, as sure hands steady her.

"Let's Go! Now!"

You wonder what to expect next. The skipper has his hands on the tiller oar and his eye on the sea. You think you are there for the rest of the day until suddenly he lets forth an excited jabbering which, condensed, means "Let's go! Now!"

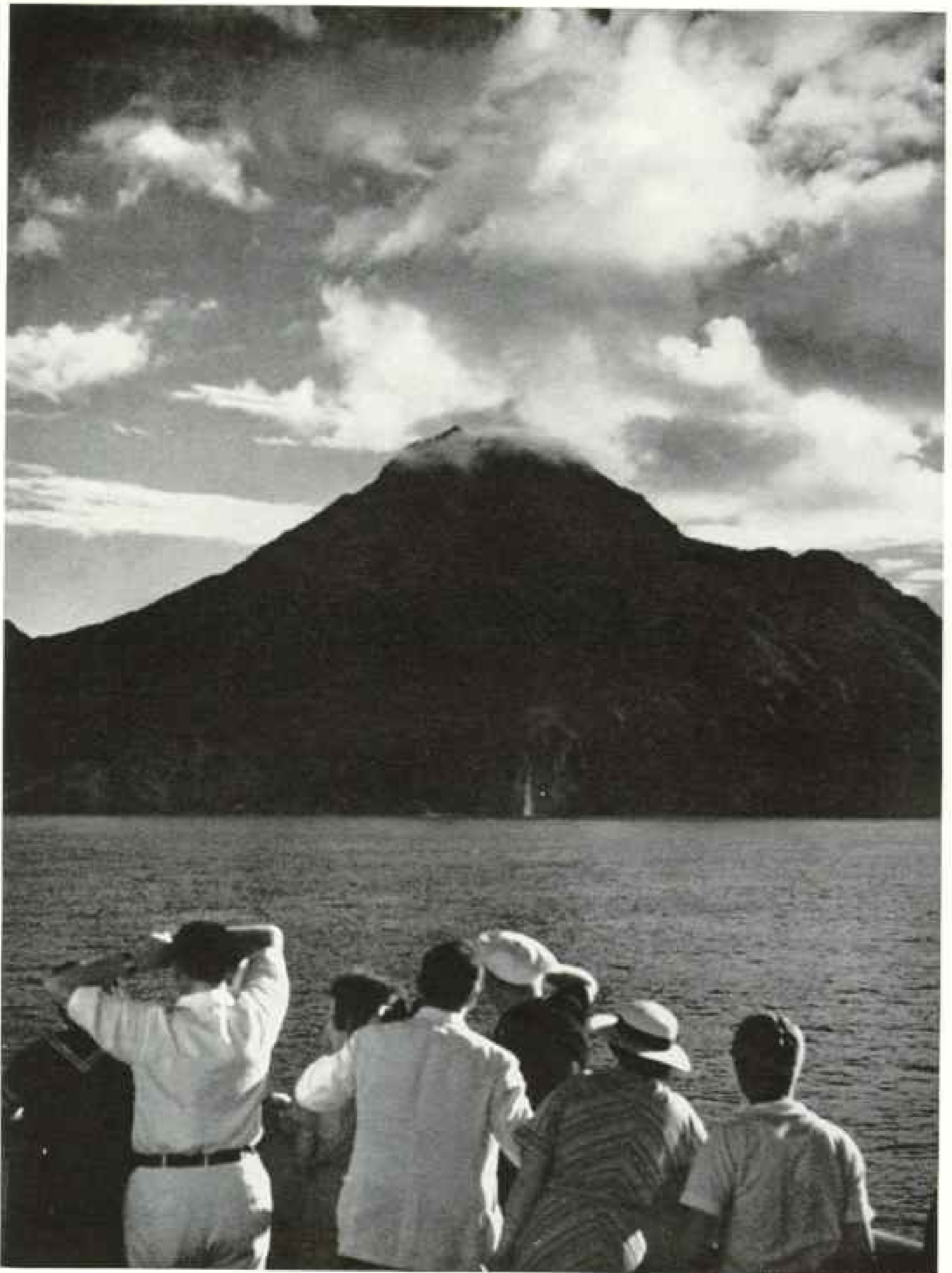
Things really begin to happen. The two seamen in the bow pull with powerful strokes and the skipper himself works his short oar double quick as he swings the nose shoreward, bellowing commands to the men at the same time. The little boat now has a decided tilt forward. There's a big wave crowding close behind it and you are riding the crest. The crew is still pulling like mad and you are passing the rocks with a narrow margin.

Suddenly the boat strikes hard bottom with a grind. You look up to see what the seamen will do, but they are already waist-deep in the surf, steadying the boat and tugging away shoreward as thunderous waves break behind (page 600). Willing hands from the shore now join in, and with several synchronized "heave ho's" the little boat is high and dry, with a big adventure swallowed up in the pounding surf just behind.

You are glad to set your feet on solid ground and glad, too, that you are among the few outsiders who make this short but adventurous trip each year.

\* Note: Saba retains its status as a part of the Netherlands West Indies under the Act of Havana, 1940, which also provides: "That when islands or regions in the Americas now under the possession of non-American nations are in danger of becoming the subject of barter of territory or change of sovereignty, the American nations, taking into account the imperative need of continental security and the desires of the inhabitants of the said islands or regions, may set up a regime of provisional administration."

† See "Skypaths Through Latin America," NATIONAL GEOGRAPHIC MAGAZINE, January, 1931, and "Southward Ho! in the *Alice*," March, 1938.



Photograph by F. E. Lumsden

#### Visitors See Why Saba Is Nicknamed "Napoleon's Cocked Hat"

The steep volcanic cone, with its hatlike high crown and cloud plume, seems to offer no landing place. Not until a ship is near shore can a small, half-sheltered cove be seen. Saba was occupied by the Dutch early in the 17th century, but most of its 1,600 inhabitants today speak English.



The Lady on Horseback in Saba Is the Schoolteacher

Because this instructor has a long ride to class every day, one of the few horses on the island has been assigned to her. Saba has both government and parochial schools. Classes are conducted in English, but the Dutch language is also taught. In the background rise the houses and a church of Windward Side (Plate VI).

Fort Bay Landing is at the mouth of the mile-long Gap that winds down from Bottom. Geologists attribute this gap to the overflow passage of lava from the crater 1,500 feet above.

Man has selected this passageway as the line of least resistance and built for his convenience a trail which has remained the main artery of commerce. Every foot of lumber, every pound of nails, every sack of plaster and cement, every piece of furniture, every ounce of medicine, every pound of food, every yard of cloth that built and sustained Saba has been carried up this Gap to the settlements on the heights above either on a Saban's head or a donkey's back.

#### Donkey an Innovation

Until fifteen years ago there were no donkeys. When the first ones were brought to Saba, the porters who made their living carrying supplies were almost in the frame of mind to start a revolution as they visualized the donkeys eventually depriving them of their livelihood. Now the donkey carries many of the loads. The owners draw the pay and spend a lot of time and energy packing grass on their own heads to feed their donkeys.

Through the years that have passed, the trail has been improved by the Government from irregular rock steppingstones to well-made steps which decrease the grade as much as possible. One portion in the middle is relatively flat and steps are not needed. The upper end has recently been graded and cemented with a hard, smooth, yet steep surface.

Sabans dream that some day there will be an automobile road, but that time may be years distant and it will take a good car fortified with a special low gear to make the grade.

When a cheerful porter asks you, "Head de bags up de Gap, sir?" you wonder. And you wonder still more after you reach the top almost exhausted, without carrying any load yourself. The fortitude of these men is amazing. One man thinks nothing of "headin'" up a load that requires four men to raise up so that he can get under it (Plate VIII).

With loads on their heads, the men start up the trail in twos and fours talking as they go, hardly pausing for extra breath until they make the top. Most of them carry a stick to help steady them across the rough places.



**A Trim Dutch-style Home Welcomes Visitors to Lofty Bottom**

Bunker Hill Cottage, with its scrollwork and picket fence, stands at the entrance to Saba's capital.



**Every Landing at Saba Is a Thrilling Adventure**

Even on days of comparative calm, such as pictured above at Fort Bay Landing, a dash must be made through the surf between treacherous rocks (page 617). To guide the craft safely, boatmen jump into the water as it nears the shore. Others drag it high and dry as quickly as possible (map, page 621).



Photograph courtesy Pan American Airways, Inc.

### Crumpled Saba Takes On a Formidable Appearance in an Aerial Close-up

The rugged little island is the result of comparatively recent volcanic activity. The steep sides of the 2,887-foot cone are ribbed with old lava flows and dotted with craterlike fissures. The settlement clinging to the brow of the cliff (right center) is called Hells Gate.

A porter receives from 25 cents to a dollar for a load he carries on his head up the Gap, depending on its weight and destination. They spent a little time looking over and feeling the weight of my lot and made me a price of \$10, compromised on \$8, and we were on the way.

The first 200 feet is just about straight up, with switchbacks to make the going easier; then the way flattens out somewhat. On the way we passed an extensive slide which had buried the first settlement on Saba in 1640.

#### Friendly Bottom, at the Top

Farther on, the precipitous cliffs above silently guarded their secret of how the early Sabans successfully drove off an attacking party of French by rolling rocks and boulders down upon the soldiers as they attempted to advance up the Gap.

Vegetation is scarce in the Gap and rocks of all sizes abound, the trail dodging the larger

ones. There's a forbidding silence along the way, which makes you wonder just how friendly Saba is.

This doubt is quickly removed when you reach the rim of the crater. There you see the houses of Bottom, smiling a friendly greeting from an abundance of trees, bushes, and flowers, their freshly painted faces assuring you of the pride and contentment that is Saba.

Sabans mind their own business. There are no curious faces peering at you from windows or front yards. Anyone you pass on the road has a sincere way of welcoming you, and you will be completely amazed at the trimness of the houses and the cleanliness all along. This, of course, is a typical Dutch characteristic.

There is something about the houses in Saba that makes them stand apart. They are different, as Saba is different. I have never seen such religious application of paint. The



#### A Bulletin Board Serves as the Island's Newspaper

In law-abiding Saba one of the duties of a policeman is to keep this glass-enclosed case for notices up-to-date. Government orders and money exchange rates are the chief items posted. Although there are no banks in Saba, the daily rate of the dollar, pound, franc, guilder, and mark are conscientiously written on a slate. As in other West Indian islands, residents get news of the outside world by short-wave radio.

inside is homelike, too, spick-and-span with varnished floors always waxed. I saw modern furniture, curtains and covers fashioned by the women of Saba, as well as cherished knickknacks.

In one home, which houses two attractive marriageable girls, there is a complete smoking-stand set with briarwood pipe, ash tray, match box and tobacco container, waiting hopefully in a prominent place in the living room. Radios and automatic iceboxes are scarce in Saba. There are two pianos—packed up by twelve strong men—and numerous phonographs. The Governor's house has the only electric plant.

Our first call in Saba was on the local Governor. His house, a spacious colonial type, had all the appointments of a city home. He received us with a warm handshake and a gracious welcome in perfect English.

After refreshments we were sent to the Guest House (page 614). My room had a four-poster large enough to sleep three people. There was a living room with many chairs, a bath with running water, a dining room, kitchen with kerosene refrigerator, and Alberta the cook, thrown in for good measure.

Errol Hassell, recently returned to Saba from a fifteen years' stay in the United States, was appointed by the Governor to guide us around the island and help us with arrangements for taking pictures.

First, Errol took us on the rounds to see Bottom, make contacts, and select locations. Our most difficult task was to keep moving and turn down the many friendly invitations to come in and visit awhile. Everyone we met was eager to talk to someone from "the outside." When they learned we were from the States, their interest increased. Almost without exception they proudly told us of their stay in the States or of relatives there.

#### A One-Policeman Capital

As a necessary official formality, we called on the Brigadier, who holds eight official posts of duty—chief of police, fire marshal, harbor master, justice of the peace, and bailiff are those I remember. He gave us many valuable suggestions.

Bottom is the seat of government. The streets are barely wide enough for two loads to pass, and are paved with flat Saba rocks, cemented in place and lined with neat rock



#### Saba Knows No "Blackout," Except on Moonlit Nights!

Ornamental iron lamp posts, brought to the island years ago, have never been wired for electricity. On moonless nights the island lamp tender puts a modern gasoline lantern in them at sunset. When there is a moon the lamps are not lighted (text below).

walls. Three churches—one mission, one Roman Catholic, one Anglican—serve the community (Plate VI).

The police station stands in the middle. There's one man on duty all day until 10 o'clock at night. His most exacting duty is to strike the hour and half hour on the bell which serves as a timepiece as well as an alarm in case of fire or emergency. The police department keeps busy without being troubled to make arrests. Crime is almost unknown in Saba. Each night (except when moonlight) the officer in charge carefully prepares fourteen gasoline lanterns for street lighting.

#### A Veteran Lamplighter

Old "Uncle," a faithful darky, carries these lanterns out four at a time, places them in old-fashioned stands before 6 p. m., takes them down three hours later. Rarely does one have reason to be out after nine; most folks are already tucked in their snug beds before the lights go out.

A Government-sustained doctor makes headquarters at Bottom, where there is a hospital. He is subject to calls anywhere in the island, rides a horse at a trot, and has a fleet-footed boy carry his grip at an even pace with the

horse. Birthdays, deaths, weddings, struggles, and tragedies come to Sabans as to those of us anywhere. Down one street we met two servant girls, each carrying a tray decorated with brilliant flowers, sweets, and packages. They turned into a yard, up a flower-lined walk to a friendly porch where they were met by the lady of the house, smiling in genuine birthday radiance.

These servants performed their errand of happy greeting in a proud, serious manner, conveying the respects of their mistresses to their friend.

Next turn of the road brought us face to face with a sad group. A tall, lanky man carried a limp bundle. His drawn face told of the tragedy that had struck down his last-born. Behind came the mother, hiding her grief with a close-drawn shawl. Death had claimed a young victim too frail to put up the winning fight that has been Saba's heritage.

Up the street, full-cheeked children were playing with a homemade wagon, unmindful of life's struggles.

A man passed by with a gun on his shoulder, triumphantly bringing in a hawk that had been raiding his chickens.



Two neatly dressed elderly ladies stood by a gate talking. They willingly posed for me.

Next came the Brigadier riding one of the six horses in Saba.

In the afternoon we got under way and had cameras set up after lunch shooting some road-building scenes. Errol was in charge of the work and took pride in his accomplishment to date of laying down the first section of the concrete road to connect Bottom with Fort Bay Landing. His crew, recruited mostly from farmers of the Windward Side who needed an opportunity for a cash job, certainly could be rated as the world's most willing construction gang.

#### Their Day Begins at 3 A. M.

These iron-muscled men rose at 3 a. m., climbed up the mountain to their garden patches, worked them, gathered grass for their livestock, came back to their homes for breakfast and chores, swung lunch pails over their shoulders, and then spent an hour and a half over an up-and-down mountain trail to get on the job.

Their work is pick and shovel plus for eight hard hours. No modern road-building machinery aids them, and the end of the day leads to a long, hard trail home where the chores of the early morning are repeated.

Four years will be needed to complete the task. That is the way Saba has been built.

To get a comprehensive view of Bottom, we climbed up to the "Shoe" by a winding trail. Here, over 500 feet above, we looked down on the capital, at the bottom of an extinct volcanic crater. The walls of the crater outlined a nearly perfect circle around the town. Two definite breaks were visible in these walls—one the gateway toward Fort Bay Landing; the other, leading to the Ladder Bay Landing, infrequently used, although a shorter but steeper way to the sea.

The road, light-colored, ribbonlike, twisting to Fort Bay, well traces the course of hot molten lava which once flowed to the sea.

From this high perch the whole of Bottom was visible. Distance dwarfed the buildings until the whole set looked like a miniature.

On the heights to the right of this lookout point, clusters of houses make up the outline of St. John village. Some houses barely retain a foothold on the steep cliffs that break away 1,500 feet almost straight down to the sea.

Down in Bottom again, we were invited to an ice-cream feast. Ice made in St. Kitts, brought 38 miles by the regular steamer to Fort Bay Landing, then headed up the gap to Bottom, cost \$3.25 a hundred laid down on the freezing scene. Saba has a few milk

cows, so canned milk and canned peaches made up the mix—truly a novel luxury.

There are no wheeled vehicles on Saba. Almost everyone walks. Anywhere you want to go you must climb up or down.

The trails are hard, age-worn, steep, and ragged. Sabans go up and down them like mountain goats, usually carrying some load on their heads for balance. I was almost ready to give up the job after the first day, but with a little perseverance I soon became acclimated and turned out to be a pretty good mountain goat myself. Fortunately a donkey was pressed into service to carry my 150 pounds of camera equipment.

Next day was steamer day. Everyone knew it and everyone had been looking forward to it for two weeks. There was excitement like the night before Christmas, with farewell gatherings in many houses. Letter writing was at its semimonthly high. Last-minute mail-order blanks were being filled out fervently, some for a new pair of shoes or a hat, some for a piece of furniture, others for a long-sought knickknack.

Dawn brought pressure on the trails from all corners of the island as a hundred souls made their way toward Bottom and Fort Bay Landing. Soon there was a crowd around and inside the post office. Donkeys already packed to capacity with mail sacks waited impatiently; others were held in readiness for a late post.

Eager eyes kept turning toward Signal Hill on the ridge high above Bottom. Here an old watchman keeps his weather eye peeled for approaching craft. Despite his age he rarely makes a miss. Few boats come each year besides the regular steamers. As soon as a boat is spotted, he runs flags up the signal mast to designate the kind of craft and the direction from which it comes. The signal to announce the approach of the regular steamer is put up in time to allow all hands to reach the landing before she drops anchor.

#### Landing Through the Surf

When the regular steamer is in, the landing through the surf is repeated over and over by several surfboats till all passengers, baggage, and cargo are shuttled to or from the steamer. Each steamer brings mail, supplies, and a few passengers, mostly Sabans going to or coming from neighboring islands.

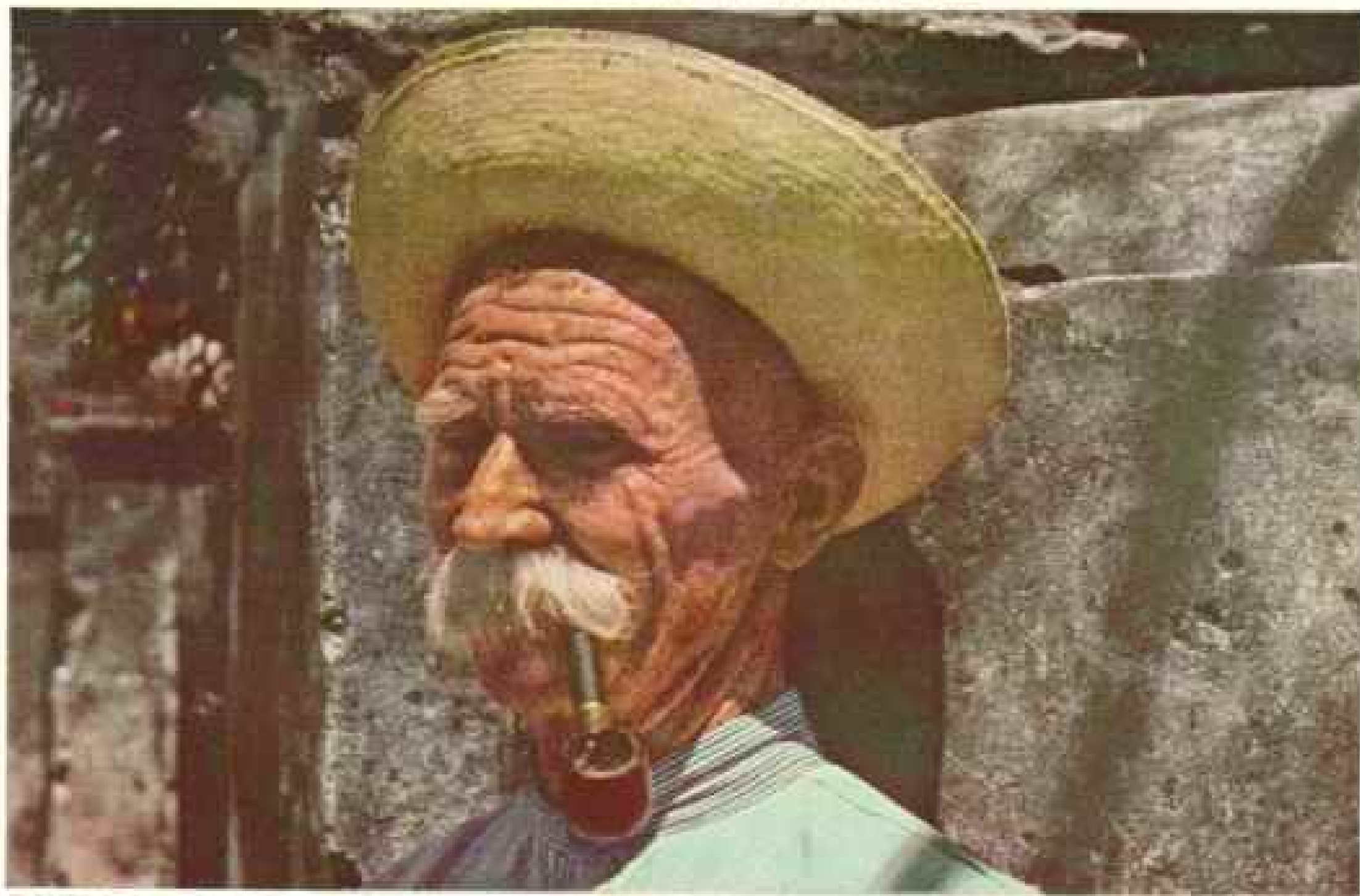
A look at the landing place from the heights above gives you an impression of a busy port, but most of the people who crowd the narrow strip along the shore have either come to welcome a returned relative or else to bid godspeed to a departing one.

## Up and Down on Saba



### Water, For Man or Beast, Must Always be Rationed

Saba, like Bermuda, has no streams; hence drinking water must be caught on roofs and stored in cisterns. Lack of forage also restricts raising of livestock.



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Kolorchroms by Charles W. Herbert

### Sturdy as His Rocky Home Is This Weather-beaten Saba Boatman

Heading the graceful curve of the Leeward Islands, only 100 miles east of the U. S. Virgins, Saba rises from the Caribbean to an altitude of 2,887 feet. Because of its peculiar cone shape and cloud plumes, the tiny island is sometimes known as "Napoleon's Cocked Hat."



**A Moment's Rest, Then Over the Cliffs She Goes!**

Despite a lack of beaches or sheltered coves for shipyards, Sabans are master small-boat builders. The craft are put together far above the sea and guided by steady hands down steep paths.



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**Strong Arms Make Light Work of the Long Haul Upgrade**

When a Sabu boatman leaves the island for any considerable time, his neighbors help him drag his rowboat from the sea to his back yard for safekeeping until his return.

## Up and Down on Saba

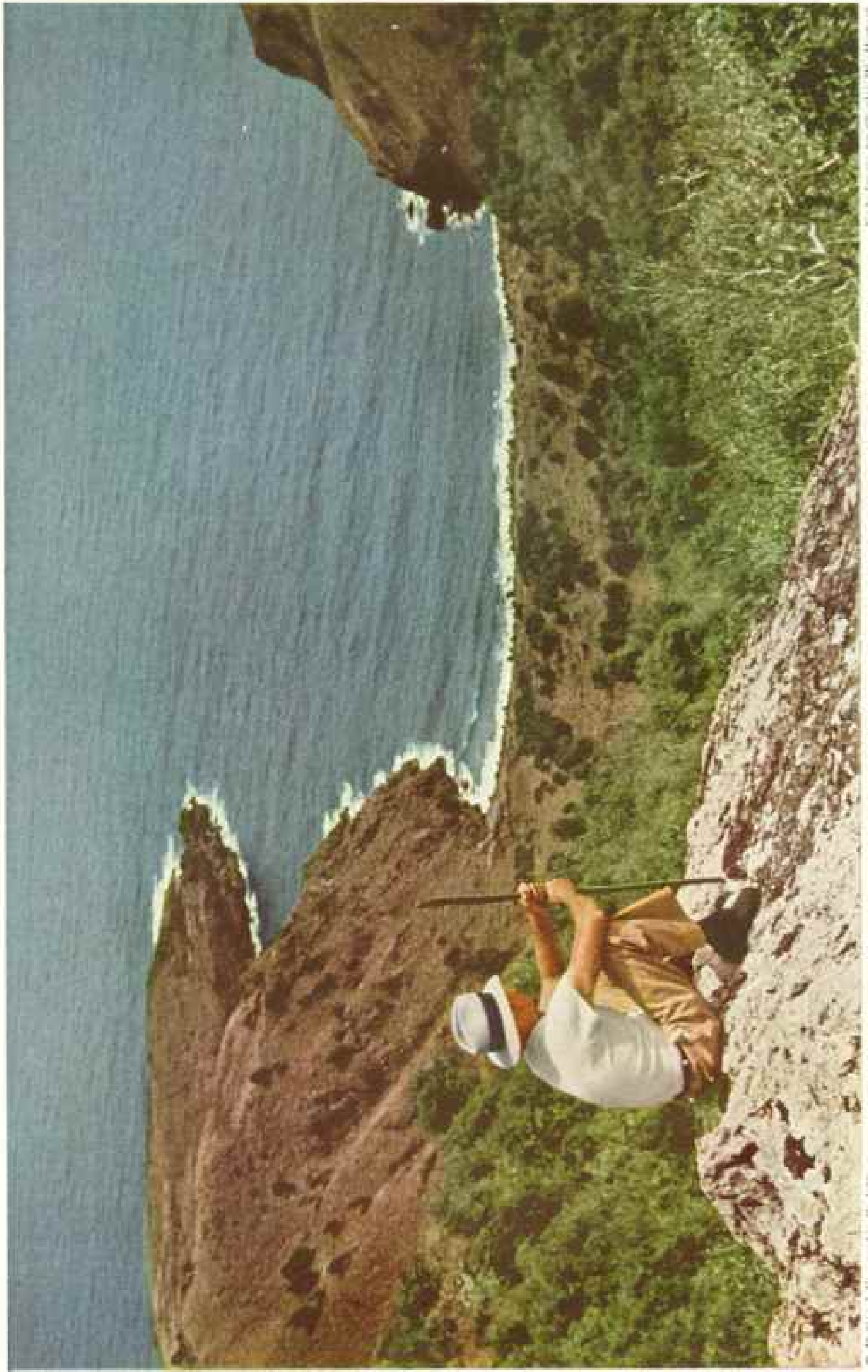


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### "The Sea Was Two Miles Away, and 1,500 Feet Down!"

A stout line, snubbed to an anchoring post (Plate VIII, lower), eases the boat bow foremost down the steepest embankments on its way to the water. The barren, volcanic nature of most of the island is clearly revealed in this photograph. Only at Windward Side (Plate IV) is there moisture enough to support much vegetation. Even in the dry season, cool, damp nights bring heavy dews.



© National Geographic Society

### On the Moist Green Slopes of Windward Side Early Colonists Raised Sugar Cane

A well near the foot of this surf-bashed cove was once the only source of drinking water for people living on this face of Saba. Many a man today remembers the tedious daily trips he made back and forth carrying water on his head for his family. Cement cisterns now store rain water.

Photograph by Charles W. Herbert



© National Geographic Society

Reference by Charles W. Harbert

### Fine Drawn Work, Made and Marketed by Saba Women, Is a Source of Island Income

Each girl must create her own "mail order business" by sending her sewing to women's clubs and other organizations in the outside world. Some pieces are lost, and some are refused or stolen, yet many find ready buyers. Practically every girl over sixteen in Saba helps to support herself and her family in this way.



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### Dressed in Their Best, Sabans Head for St. Paul's Church

When there is a funeral, nearly everyone on the island attends. Women predominate because they outnumber men on the island nearly two to one. Most of the males early in life get seafaring jobs or work in oil refineries of Aruba or Curaçao. At the right is one of the little rock-bordered fields in which food crops are raised at Windward Side. The walls are built of stones cleared from the thin layer of rich red soil.

## Up and Down on Saba



### Donkey, Horse, and Man Power Are Saba's Means of Transport

Everything from pianos to flour, lumber, baggage, stoves, and matches are brought up the steep cliffs by animals or men in this wheelless Eden.



© National Geographic Society

Kidnappers by Charles W. Hornet

### Social Amenities Are Graciously Preserved in Tiny Saba

On her way to extend birthday greetings to a friend, this kindly lady pauses to bid good morning to one of the Dutch Government agricultural agents. In her hand she carries a bouquet of bougainvillea.





**In Saba You Must Climb 900 Feet to Reach Bottom!**

The principal settlement, called Bottom, rests in the crater of an extinct volcano. "Headin' a load up de gap from de landin'," hardy island folk seldom pause to rest.



© National Geographic Society

Kodachrome by Charles W. Horner

**Rock and "Elbow Grease" Drive the Heavy Stake Home**

When tools are lacking, men of Saba make the most of the simple materials they find at hand. The stake will secure the line used to lower boats down the cliffs to the sea (Plates II and III).

There are only a few families on Saba—the Hassells, Simmonses, Johnsons, etc. Rare is the passenger who doesn't rate 50 or more relatives to see him or her on or off the island. Few traveling salesmen come to Saba. Occasionally a missionary arrives to change posts, a roving Dutch judge to hold a quarter-annual court, and once or twice a year a man brings a portable motion-picture projector with numerous programs. Each winter sees several pleasure yachts stop by long enough for the owner to see Saba, and every year one or more writers and photographers include Saba in a swing around the West Indies.

In peace times the regular steamer *S. S. Baralt* leaves its home port, Curaçao, fortnightly, sails to Aruba, and straight across the Caribbean 600 miles to St. Martin, then to Saba and St. Eustatius, terminating its run at St. Kitts. It doubles back to St. Eustatius, Saba, St. Martin, Bonaire, and Curaçao. This schedule allows a layover in Saba of two and a half days. You can see Saba in this time, as its total area is only five square miles, but you can't know Saba in that brief stay.

It was almost sundown when the *Baralt* blew its departure whistle.

After the last surfboat pulled out with its load of passengers, the stay-at-homes made their way up the tortuous trail toward Bottom. From the first level they saw the *Baralt* disappear behind the point. Boatmen pulled their boats high and dry to security, headed a load of cargo, and made their weary way up the Gap. Through the island Sabans filtered into their homes.

#### Over on Windward Side

Soon we were besieged with invitations to come over to Windward Side. Everyone assured us that it was more beautiful, more healthful, and more friendly. The pressure became so great that we had to yield and postpone further operations in Bottom (Plate IV).

One morning before sunup we were on the way. Four donkeys were loaded with our baggage, equipment, and provisions that Alberta had gathered up. Alberta assured us that she could do much better when we got to Windward Side, as the stores there carried many more different foods for her to choose from. On the way she told us that she had always wanted to travel. She assured us that we would not make a mistake if we took her along as cook when we left Saba for other islands.

It took us a good half hour to climb to the first ridge. Frank, the donkey boy, pushed along with "Charlie" in the lead, the other

donkeys following readily. Down a steep incline, along a level ledge, then up a long, steep grade we went before the outskirts of Windward Side came into view.

There was still a half mile to go, but as soon as we got to the first house it was really different. The road ducked under a bower of tropical vegetation and there were healthy-looking bunches of bananas almost in reach as we passed along. There were more houses. Some were closer together in places, while others stood apart inside neat picket-fenced enclosures and a few rock walls.

When we walked along the streets in Bottom, we met nearly as many negroes as whites. On the streets of Windward Side we hardly saw a negro.

The house that Errol had arranged for us to live in was in the center of activity, directly in front of one of the best stores. As soon as our baggage was unloaded, Alberta went on a buying spree, emerging with a gleeful display of her finds—fresh carrots, beets, pigeon peas, cassavas, and bananas, backed up with a can of imported fish roe and a package of prepared custard pudding. Like all commodities, foodstuffs are high in Saba.

There was a gathering of village folk in front of the Central Store. Down at the corner there was another general store and across from it the Bulletin Board (page 602).

Here we filmed the local police officer as he chalked up the latest money exchange for guilders, francs, dollars, pounds, and marks. We couldn't reason why, but this was a task that he did punctually each day with figures received from headquarters at Bottom.

All Sabans speak English and nearly all business in Saba is transacted with United States money, but the Government pays off its employees with guilders, which the natives refer to as "Dutch money."

#### Arranging a Sewing Bee

We met Maisie Hassell at her store at the turn of the street. She was a leading light of the community, always busy about housework, running the store for her fiancé (one of the few marriageable bachelors in Saba), supervising Girl Guide activities, going to church, being the official welcomer to strangers, and doing fancy drawn work when she had time for a stitch. We needed her help, which she readily gave, in arranging for a sewing bee and tea for us to film.

Windward Side is high and cool, conducive to sound sleep. Early next morning I was awakened by a blast of "Roundup Time in Texas" coming from a house on the side street. We went over and found that it was the school-



#### Hospitable Saba Provides a Guest House for Visitors

Because the islanders have few callers, Saba has no hotels or boarding houses. The Government equipped this furnished dwelling for traveling officials, writers, photographers, and yachtsmen, who make up most of those who come to Saba from the outside world. Guests pay only for their laundry, food, and for the hire of a cook, the latter being 50 cents per person per day.

teacher playing the phonograph. She rode horseback daily to teach all grades to thirty children in a one-room schoolhouse (page 599).

By 9 a. m. Maisie had assembled twenty girls with their fancy drawn work. They would have looked in place in the average American city. Some of them had applied lipstick and rouge with a masterful touch. Their dresses, trim cotton prints, were either last-boat mail-order-house buys, or copies which they had made from pictures in American fashion magazines. The peasant scarf was much in evidence—and becoming, too.

Saba women, unlike the men, stay indoors. Their complexions are clear and healthy-looking, though lacking the outdoor coloring. But they fooled us when we went on a traditional Saba picnic later on.

From childhood, girls learn drawn work. When they are 16 they can work intricate patterns. From then on they devote a large part of each day to hemstitching collar and cuff sets and dresser combinations. Each girl must create her own market for her work (Plate V).

Very few pieces can be sold on the island, as potential buyers are few and far between.

The girls must look outside of Saba. They make contacts through the mails by writing to women's clubs and organizations and by getting names from Sabans living outside. Most of their pieces are sent through the mail on speculation.

Once a girl gets a customer, her list of possibilities fast expands into a chain from names given her by the last customer. Practically every girl in Saba helps support herself in this way and some even take care of their families with this outside money.

Often they find men customers. Romance through the mail is common. While there have been offers of marriage from the mainland, Saba girls usually are too proud to venture away from the rock. They hold on steadfastly, waiting for someone who will come for them.

Saba has always had a surplus of women. Today there is scarcely a chance for even the most attractive ones, especially with most of the young men of Saba going away and no men coming in from the outside.

Many, many years ago, the iron men of Saba recognized the hopelessness of being able to provide modern comforts and opportunities

for their families from the receipts of their toil on the island. They went forth and became seamen on sailing vessels, particularly the Yankee clipper ships.

Today many are captains and mates on American vessels and others hold down harbor-master posts. Most of the houses on Saba have been built and families supported by the monthly checks sent back home by these seamen.

The advent of steam, tightening of maritime regulations, labor laws, and unions have closed the door of seafaring to Saba men today. Yet the men are still going away, now for cash jobs in the oil refineries of Curaçao and Aruba, and leaving the women home as before. Thus Saba is still predominantly a women's land.

Saba women are born to accept life as it is. They can always draw a thread and make a stitch. Their bloom may fade but not their courage. They share this characteristic quality with the men.

#### "Heading Up" Windward Side Heights

To the east and west of Windward Side there are hills that slope up to lofty heights above. Man-made rock-walled plots dot the hillsides with irregular patterns. The trail up is tortuous, dodging enormous boulders here and there. A donkey can't make the grade with a heavy load.

We engaged three men to head up the equipment. At seven there was a heavy traffic. Men, old and young, augmented by boys, led up cows, donkeys (without loads), and sheep.

All livestock is taken up to the farms in the morning and staked out to graze while the men and boys work the garden patches and gather firewood and grass. At night the animals are brought back to the homes in the village. The men, boys, and donkeys always bring back enormous loads.



A Burro Goes Ashore by the Aerial Route

With a special humane sling the patient animal is lowered into a waiting rowboat. Only in recent years have donkeys been used as burden bearers on Saba. When the first ones were imported there were vigorous protests from men who depended upon carrying freight up to the villages for their cash income.



A Favorite Island Picnic Spot Is the Shingly Beach at Spring Bay

With rocks and camera boxes for seats, a hiking party makes a day of it to the boat of booming surf. The cook (right) welcomes an opportunity to go along and show her skill over an outdoor fireplace. Going home will be a long hot climb back up the mountain (Plate IV and page 618).



This "Pocket Handkerchief" Beach at Fort Bay Landing Is the Main Portal to Saba

With the departure of the semi-monthly steamer, and valuable cargo neatly stacked, the boatmen help each other drag their craft out of reach of the waves. Packages and bundles not taken up by the regular porters are carried by the boatmen. No one climbs back home empty-handed when there is a chance to make another quarter or half dollar, depending upon the size of the load.



#### Second-growth Cabbage Looks Like a Freak Plant

In her backyard garden patch on the mountainside a Saba woman has a convenient source of vegetables. Saba's tropical climate, tempered by cool breezes and clouds on the upper slopes, gives it a year-round growing season. The "leggy" appearance of the cabbage results when the plants are not frozen back or the heads pulled up by the roots.

Each farm is outlined by a rock wall. Inside are a few acres of tilled soil where ragged rows of potatoes, beets, carrots, and cabbages twist around defiant rocks. Behind each farm lie the toil and sweat of several generations. Here and there unkept farms attest to the decreasing trend in Saba's farm population.\*

Men of Saba with bared forearms grasp short hand-cultivating tools, bend in body-breaking toil to nurse along their precious crops. Rain is scarce in the dry season, but cool, damp nights bring heavy dews, keeping the plants alive.

There are no running streams or springs on the heights of Saba. Thirty years ago fresh water was packed up on heads from Spring Bay 2,000 feet below the village at Windward Side. Today every home of consequence has a large underground cement cistern, fed with rain water from the roof of the house during the rainy season.

For the next day there was arranged for us a picnic in Saba style. When the sun came over the mountain, we were set up in front of

\* See "Hunting Useful Plants in the Caribbean," by David Fairchild, in the NATIONAL GEOGRAPHIC MAGAZINE, December, 1934.

Maisie's house to film the start. Two donkeys were just leaving with cans of fresh water and heavy provisions. In the house six girls ran around gathering up baskets, bathing suits, and bundles, and putting on hats.

#### Home Girls Stalwart Hikers

The camera outfit was stripped down to bare working necessities so that men could "head" it for us. No sooner did we leave the village than we took off for sure—not up, but down, down to Spring Bay (page 616). The trail was truly a hardship.

The knowledge that we must retrace our steps was enough to discourage even the strongest heart. It was almost unbelievable, after seeing these girls sitting at home sewing, to watch them negotiate this trail. Along the same path 30 years ago, men and boys had packed water from this only usable fresh-water supply at Spring Bay. If they could do it then for life necessities, Saba girls could do it today for the movies.

We stopped several times for a picture and all of us were glad for the rest. The farther down we went the hotter it got, reminding us of the delightful cool breezes up at Wind-



#### Bananas Are 25 Cents a Bunch on Windward Side

On the cool semitropic heights of Saba, potatoes, beets, pumpkins, onions, and cabbages also flourish. Along with cassava root, from which bread is made, and imported dried fish, these vegetables are the staple diet.

ward Side. Certainly the invigorating climate atop the rock was one of the deciding influences which led early Sabans to build on the heights instead of nearer the coast as in the other West Indian islands.

When we reached sea level there were no sandy beaches or waving palms—only a quarter-mile crescent-shaped area studded with black rocks varying in size from bowling balls to tank cars. The sun was beating down with burning force intensified by the glare from snow-white foam in the churning sea.

Behind a boulder, in its thin strip of mid-day shadow, Alberta had set up her camp and quickly signaled that the stew, a sort of chicken gumbo, was ready. The girls busied themselves unpacking baskets and spreading out sandwiches, pickles, cheese, pies, cakes, beer, and soft drinks.

When young people go on a picnic to Spring Bay they always take along their bathing suits. There's really no suitable place for comfortable bathing, but it is a novelty and relieves the everyday monotony. To keep a footing on the rocks was a task, but to hold their own against the waves required nerve and determination. These girls took their parts in a do or die determination to show the world that Saba has bathing girls, too.

The way up was hard; it took twice as long as the way down. We were tired out when we reached the village.

Anyone who has heard of Saba remembers tales of early Sabans. Most widely broadcast is that fantastic story of shipbuilding. Almost without exception, when Saba is mentioned, they will say, "Oh, yes! That is the place where they build schooners on top of the mountain and lower them over the cliff by ropes, down into the sea."

The catch is that Saba has no native lumber suitable for building schooners and, if the material were imported to Saba, it is hard to believe that men would struggle to carry the massive timbers 1,500 feet up to the top, to be faced with the colossal task of getting the completed schooner down to salt water. Launching a boat at the base of one of the cliffs would be impossible. If schooners were ever built in Saba, they were built on one of the narrow strips of shore close to the sea.

We did learn, however, that small 15- to 20-foot surfboats are built up in the settlements and that they are carried down to the sea by manpower. Fortunately one had just been completed at Windward Side. We arranged to film the launching.

The boat was built by a Johnson. He was





#### In a Crude Press, Juice Is Squeezed from Sugar Cane

Although less adapted to the cultivation of sugar than Puerto Rico, the Virgins, Barbados, or Martinique, Saba yields a usable crop of cane. Some of it is peeled and eaten like stick candy by children. Leaves and tops are fed to the stock. Here the sweet juice is being extracted for drinking.

just painting "Blue Bell" on her stern as we started shooting. From then on we had action aplenty as 20 strong men gripped the gunwale and headed for the sea two miles away and 1,500 feet down.

From Johnson's yard they clambered over the rock wall into the street and started through the settlement. The news spread, and by the time they reached the center of the village both sides of the way were lined with onlookers.

With a burst of strength, the men carried the boat for a few hundred yards and then took a breather. As they progressed, the crowd enlarged and followed. A half mile out of town they left the road and crossed a field strewn with rocks. Not far away they came to the top of a cliff which dropped down into a deep ravine, a short cut to the sea. Almost the whole village was on the sidelines now.

Four stout hands raised a large flat rock, forming a human pile driver as a heavy anchoring post was set for rigging. A heavy rope was fastened to the stern of the boat and around the post with two hitches.

Easily the little craft slid over the top, down the cliff safely to the bottom 200 feet below (Plates II, III, and VII).

The men scrambled down the hillside, took hold again, and continued to the sea.

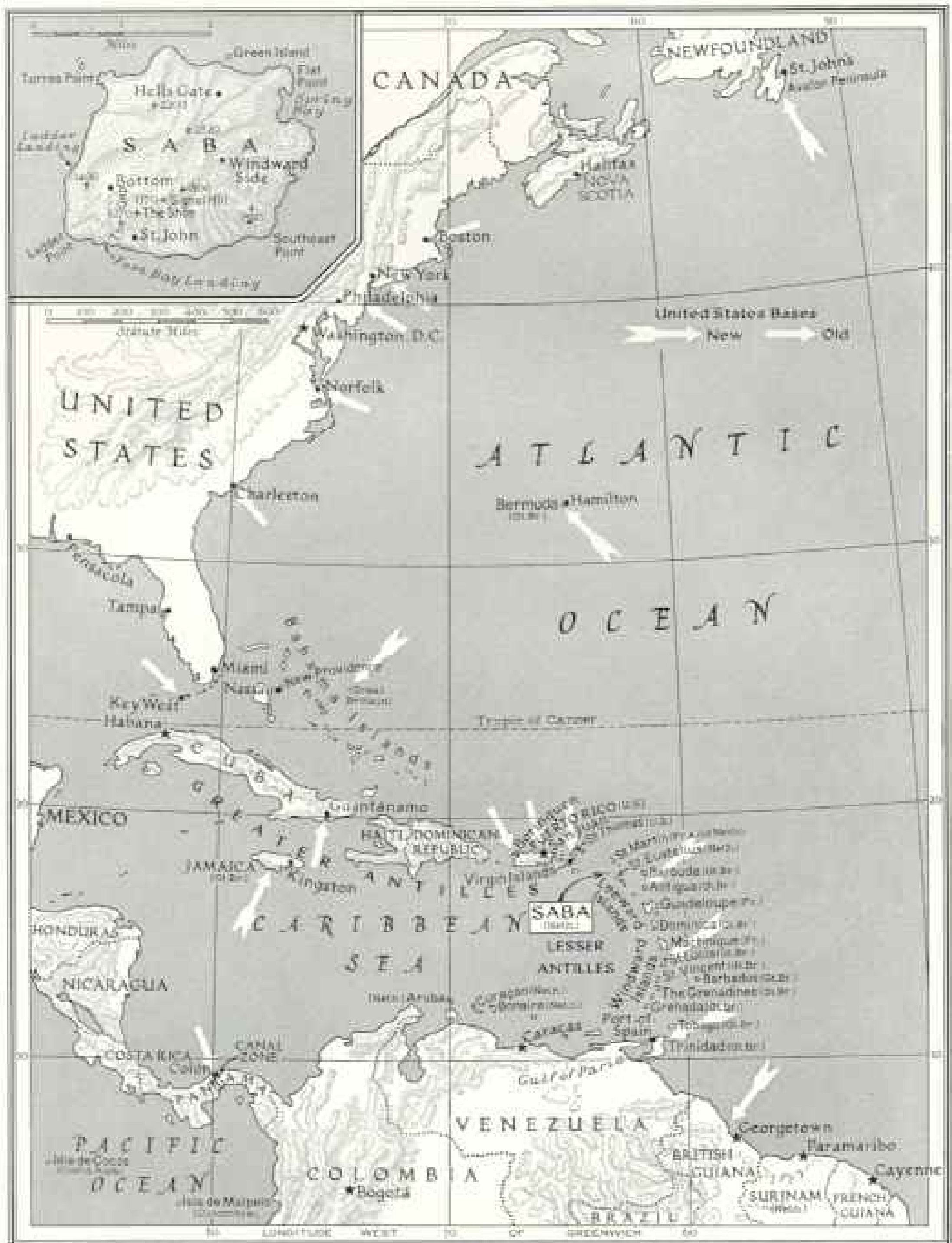
By the time she was touching the beach below, the extra hands were down there waiting with shoes off and trousers rolled up to their thighs. With superhuman force they slid the boat into the water, manned the oars, and pulled for the open sea. No champagne was broken to send this craft on its way, but childish joy burst forth from these hardened men as they watched her take the swells.

Our time to leave Saba was drawing near. The *Baralt* came again on the way to St. Kitts, making its fortnightly call at Saba. We completed the sequence at Bottom with a few more street scenes.

Down at the landing we felt like real Sabans as a host of friends gathered around to watch us load our equipment into a surfboat and shove off.

Looking toward the island over the stern of the *Baralt*, I knew that the lure of Saba was not wrapped up in any single spectacular shipbuilding achievement, but in the strange fascination that held those living there apart, yet in complete satisfaction and relative comfort despite the natural handicaps of their extinct volcanic crater home.

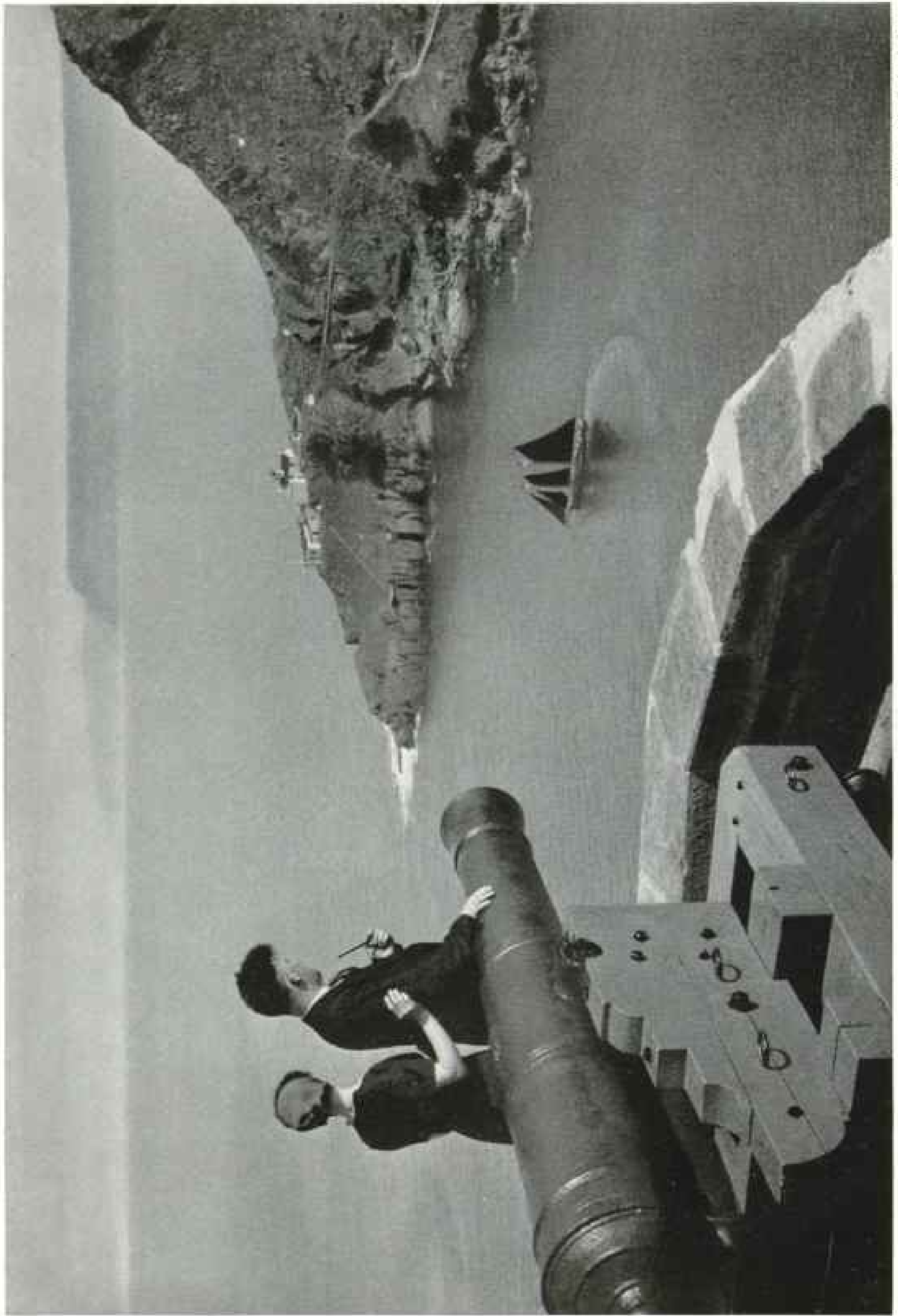
## America's New Crescent of Defense



Drawn by Ralph E. McAlear

### Military Outposts Leased from Britain Put New Teeth in Uncle Sam's Defenses

In trade and as gifts, the United States has acquired the right to develop eight new air and naval bases in Newfoundland, Bermuda, the Bahamas, Jamaica, Antigua, St. Lucia, Trinidad, and British Guiana. Newfoundland dominates the vital northeastern approaches to Canada and the United States. Bermuda lies within a few hours' flying time of important maritime cities of the continent. The new bases in the south will provide defenses for the all-important Panama Canal. Guarding the Caribbean area at present are United States bases at Guantanamo, Borinquen, San Juan, and St. Thomas. The inset shows Saba (page 597), smallest of the strategically located Netherlands West Indies.



Photograph by Gustav Ascherson

An Old Gun Points Across "The Narrows," Harbor Entrance to the Capital City of St. John's, on Newfoundland's Avalon Peninsula



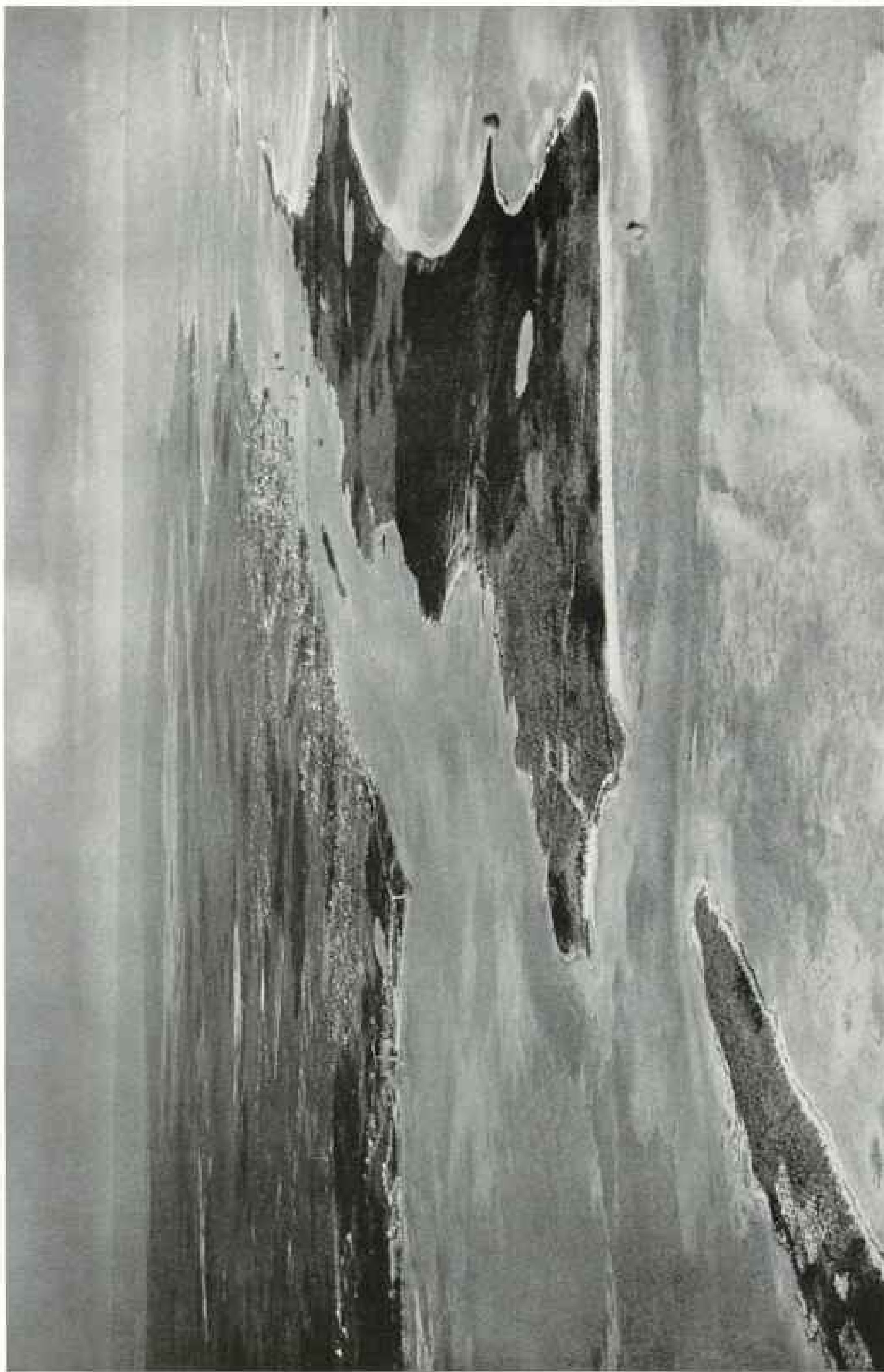
Photograph by J. C. Gregory

**Bomber Seaplanes of the U. S. Navy May Take Off on Patrol from Bermuda's Great Sound, Steamer Approach to Hamilton (Foreground)**  
Because Great Sound is comparatively shallow, only smaller warships can be stationed here. However, the waters provide an ideal site for patrol bomber operations. The present British base is at the tip of Ireland Island (upper right). The United States may also lease territory on the island's east coast.



**Cosmopolitan Port-of-Spain, Capital of Trinidad, Has Twice Risen from Ashes a Finer City**

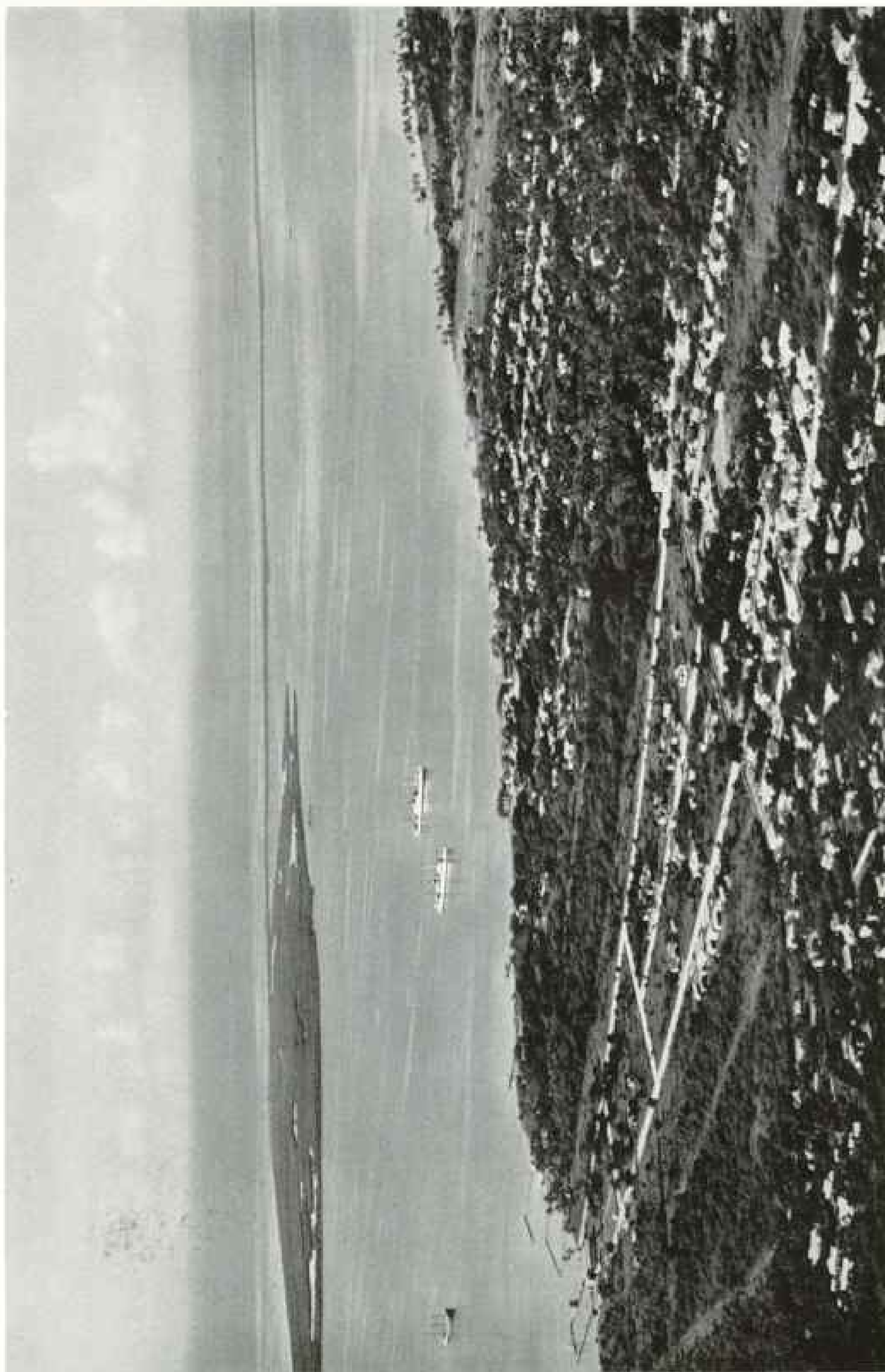
The progressive modern town, facing Venezuela only a few miles away across the Gulf of Paria, is the business heart of the southernmost British West Indian island. From its new deep-water harbor vessels carry away Trinidad's rich output of petroleum, asphalt (from famous Pitch Lake), sugar, molasses, rum, cacao, coconuts, and tropical fruits. Columbus discovered Trinidad in 1498. Sir Walter Raleigh destroyed the first Spanish settlement when he raided the island in 1595. It is expected that the new United States military base will be established on the shores of the Gulf of Paria.



Photograph by Richard H. Holt

**The Bahamas, Long a Strategically Located Playground, Soon Will Fill a Vital Role in the Defense of the Americas**

From an airplane, the view over New Providence Island takes in Nassau, the capital, and its harbor, with Hog Island in the right foreground. The Duke of Windsor is now Governor of the Bahamas. The United States' base probably will be situated on the eastern fringe of the numerous coral group.



Photograph courtesy United Fruit Company

**Kingston's Reef-sheltered Harbor Could Berth a Mighty Armada of Warships**

Port Royal, at the western tip of the narrow, eight-mile-long peninsula of the Palisades (background), was the headquarters of Caribbean buccanera, and the port from which Henry Morgan sailed to sack Panama. Fruit-shipping Kingston, largest city in the British West Indies, is capital of Jamaica, the biggest British West Indian island.



**Georgetown, at the Mouth of the Demerara River, Is Capital of the Only British Possession on Mainland South America**

British Guiana, on the north coast of South America, is the westernmost of the three European-owned Guianas (others: French Guiana and Surinam, formerly Dutch Guiana). Sugar, bauxite (ore of aluminum), gold, rice, diamonds, and timber are shipped from Georgetown's water front. United States planes and ships based in British Guiana will be able to patrol the whole north coast of South America, and will be within range of the ship routes linking Europe and Africa with South America.





Fields of Sugar Cane Reach Almost to the Doorsteps of St. Johns, Island of Antigua



Small but Snug Is the Harbor of Castries on Mountainous St. Lucia

# Burma Road, Back Door to China

Like the Great Wall of Ancient Times, This Mighty Mountain Highway Has Been Built by Myriad Chinese to Help Defend Their Homeland

BY FRANK OUTRAM AND G. E. FANE

*With Illustrations from Photographs by Mr. Outram*

WE HAD heard so many superlatives showered upon China for her construction of the new motor road from Burma that we were determined to go and see it as soon as the highway was open to traffic.

Our main object was to verify from personal experience the Chinese claim that they were building an "all-weather" road. To do this it would be necessary to see how the road would stand up to the deluge of a monsoon, the torrential series of storms which sweeps across southwestern Asia every year from May to October or from June to nearly November.\*

The map shows the extent of the highway—and highway is the right word, for it crests a dozen mountain ranges (map, page 631). It follows in many places the old Tribute Road, once trod by the adventurous feet of Marco Polo and still used by mule caravans with bales of silk.

Though the entire 2,100-mile motor route from Chungking to Rangoon is sometimes referred to as the Burma Road, the term is usually reserved for the spectacular stretch from Kunming (Yunnanfu) to the railhead at Lashio across the Burmese border.

The older parts are not comparable in grandeur to the new road over the Mekong and Salween watersheds. The section from Kunming to Siakwan was built in 1934-35, but the last link in the chain—from Siakwan to the Burma frontier—was forged less than two years ago.

This link, though only 307 miles long, is the culminating achievement which has given China a front-rank place among road builders. It passes through country as difficult as any in the world for a motor road, cutting across lines of mountain ranges and great rivers, through soil varying from rock and limestone to laterite and loose shale.

Between January and September, 1938, nearly 200,000 Chinese engineers and coolies were engaged on this 307-mile section, an average of more than 650 men per mile of road—or less than three yards per man.

It might seem leisurely work for one man to build about eight feet of road in nine months, but such figures are purely academic. The road required the cutting of mountains and the building of innumerable bridges and culverts. Methods have been extremely primitive—earth removed in small baskets, rock cut without machinery, and stone rollers drawn by hand or by water buffalo.

To us, the experience gained from a rapid reconnaissance earlier in the season was helpful in forming plans for the more serious onslaught later on. This first trip was made early in December, 1938, soon after the road was opened for traffic.

In the same month a convoy of thirty lorries containing fifty tons of arms and munitions went through to Kunming for a test; nothing passed up or down the road again until the middle of February, 1939, when a regular traffic of war stores commenced.

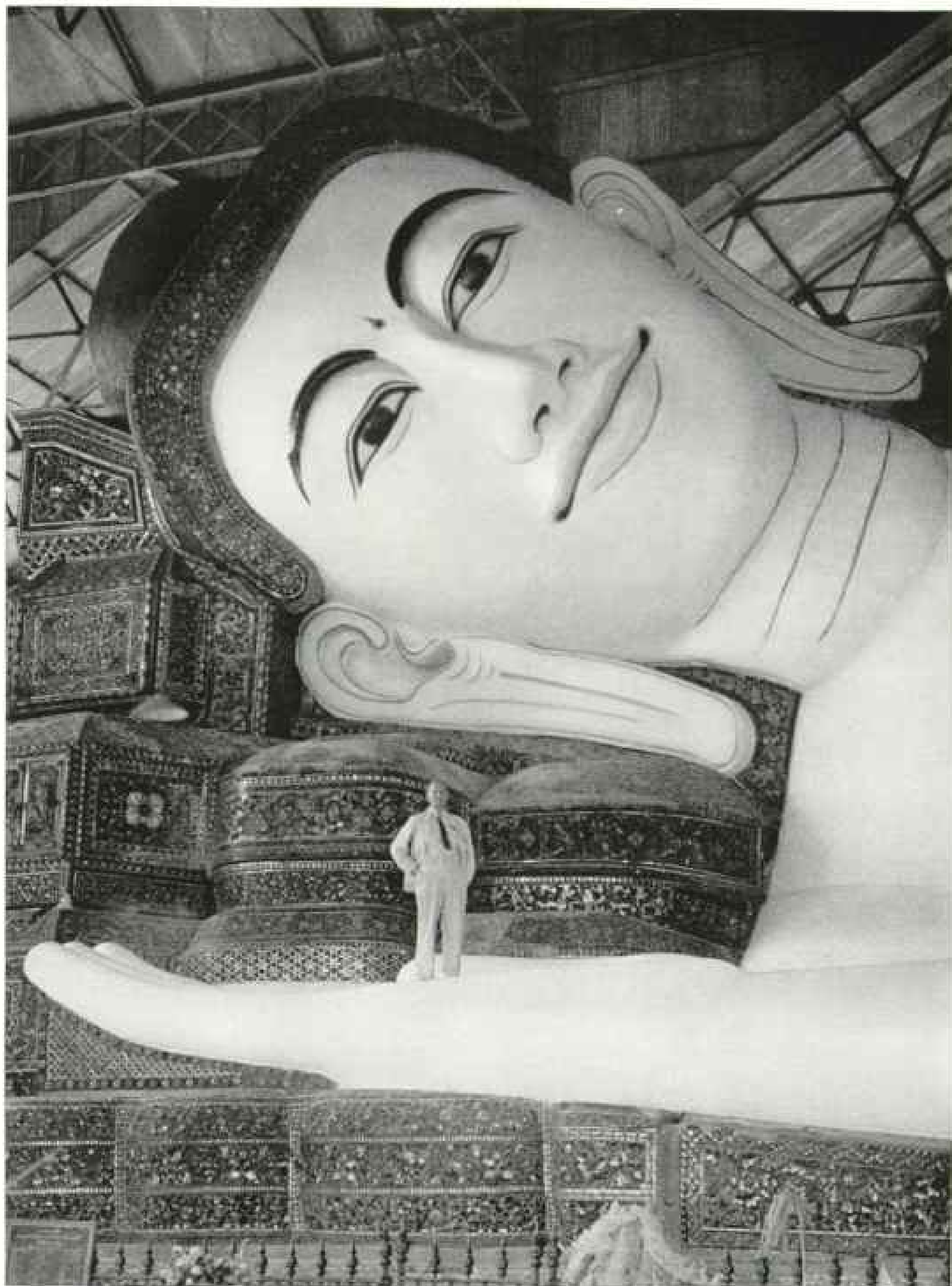
## Braving Mountain and Monsoon

At the time of our first journey the road was three-quarters finished. In the higher sections it was extremely cold—we even saw rice fields under ice—but otherwise we met with no bad weather.

For the monsoon journey we decided to cut down our personnel. That first trip had necessitated hiring a motorbus and lorry. The second was accomplished in an ordinary car.

The Chinese interpreter and the cook were scrapped. At all the recognized halting places English was understood. The interpreter was not really necessary unless we fell by the wayside, and in such a calamity vernacular ver-

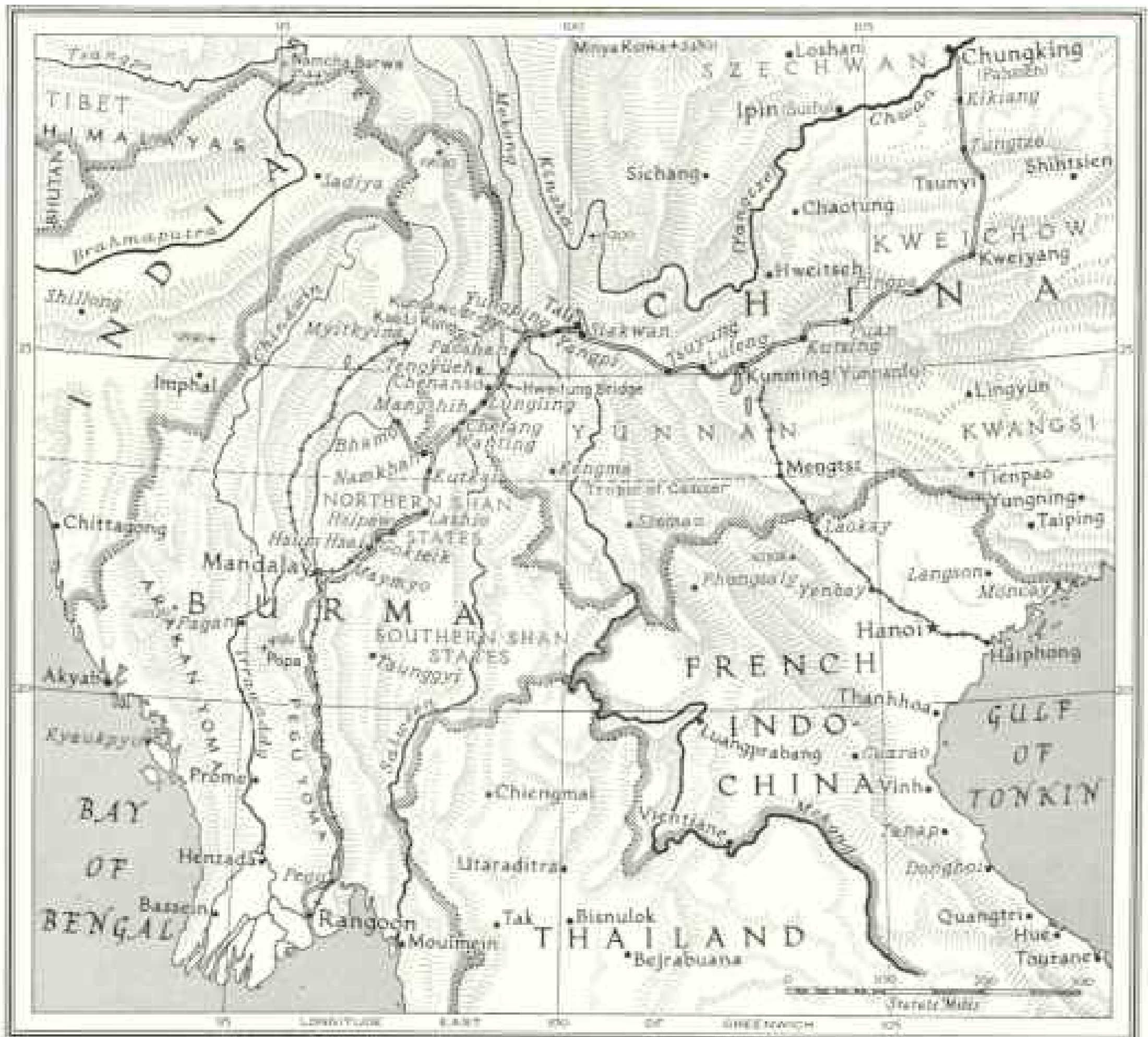
\* On July 18, 1940, the Burma Road was closed to military supplies for three months by Great Britain on condition that Japan consider a settlement of all differences in Asia, including the Sino-Japanese War. This period coincides with the rainy season, during which traffic over the raw new road is sharply curtailed by the weather. November ushers in the season when the highway is at its best for the motor-truck fleets of the beleaguered Chinese Government, cut off from its other chief sources of supply by Japan's control of the coast and the closing of the route through Indo-China. The only remaining route is from Russia.



Photograph by Randolph A. Christie

#### On the Road to Mandalay—the Reclining Buddha of Pegu

The giant figure represents the great Buddha in that blissful state in which his followers believe the soul has ceased its transmigrations. Nirvana, or absorption into the divine, has been attained. The colossal size is not uncommon; sometimes statues of reclining Buddhas are more than 150 feet long.



Drawn by Ralph E. McNeer

### War Necessity Built the Burma Road, Beleaguered China's Lifeline

For 688 breath-taking miles the new highway climbs above the clouds, then plunges deep into vast gorges, to join Kunming (Yunnanfu), capital of Yunnan Province, with Lashio, railhead in Burma. The all-important last link, from Suakwan to Lashio, was built at war speed in 1938 by some 200,000 workmen. It completed a direct route for military supplies from Rangoon, Burmese seaport, to Pehsien (Chungking), provisional capital of China, a distance of nearly 2,100 miles. On July 18, 1940, the British closed the road to war materials for three months upon the insistence of Japan.

bosity would help us no more than manual effort. The cook was not necessary if we ate Chinese food, or food prepared by ourselves.

Actually we found our dwindled retinue and staff—one excellent boy—shouldering the duties of domestic servant, controller of accounts, motor and photographic assistant, and emergency cook. He qualified as a cook by his ability to produce an edible dawn breakfast, that most difficult of all meals.

#### Kipling Never Saw Road to Mandalay

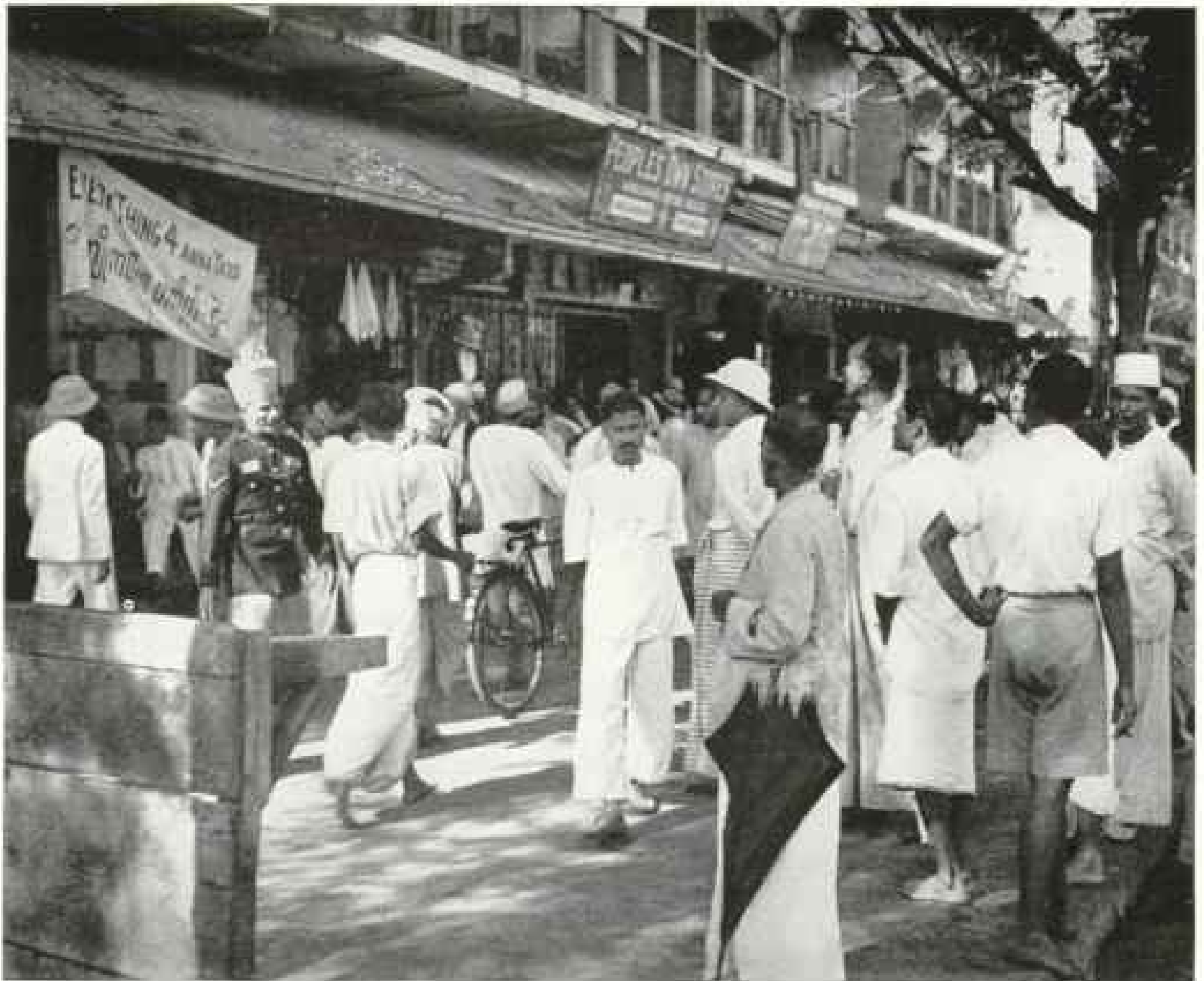
From Rangoon we took "the road to Mandalay." Kipling, who gave the world the phrase, never journeyed on that road; he went by water, in a comfortable—even in

those days—steamship of the Irrawaddy Flotilla Company. The road was not even seriously projected when Kipling visited Burma.

Weird and fascinating peoples and places lay a few miles off our road—the long-necked women who visited America; mysterious Popa, home of king cobras; and women whose legs are so heavy they cannot walk.

Resisting the attraction of these "side shows," we ate up the miles of dull flat road, over four hundred of them, and in the evening mists saw Mandalay Hill.

From about April until June the gold mohur tree flowers. Mandalay Palace, one-time home of the kings of Upper Burma and now a museum piece, is surrounded by these



### Burmese Bargain with Indian Merchants in Rangoon's Market Place

"Everything 4 anna yard," reads the sign over the "People's Own Stores." (An anna is two cents.) When the Burma Road is open, ships put into Rangoon with cargoes of military stores from the United States and Great Britain. The supplies are transferred to railroad cars and shipped by fast freight to Lashio, where they are transferred to trucks for their journey over the Burma Road (map, page 631). Some munitions go all the way from Rangoon to Pohnsien by truck.

golden trees which give the building a fitting frame. In the Queen's Garden we picnicked with royalty (page 637).

#### Maymyo, Cool Hill Station

On the 42-mile drive up to Maymyo, hill station for Burma's civil and military officials, we paused at View Point and looked back, down onto the hot plains and rice fields of Mandalay. Storm clouds were low and great belts of rain were sweeping the countryside.

The rice fields of Mandalay provide, between October and February, one of the finest snipe-shooting grounds in the world. Bags of over a hundred couple are frequent.

Maymyo, pronounced "May-me-oh," is not a Burmese town. Thick jungle before the British came to Upper Burma, it takes its name from Colonel May of the Bengal Army, first commandant of the post, and from the

word *myo*, Burmese for "place" or "town."

From Maymyo the road drops gently toward the Gokteik Gorge, where a series of hairpin bends carried us down to a small river. Three miles downstream this gorge is crossed by one of the famed railway bridges of the world, a steel viaduct erected on a natural bridge by an American firm forty years ago. The trestle is 2,260 feet long and 320 feet high, and the limestone arch on which it is built stands more than 500 feet above the base of the gorge (page 639).

We were now well into the Northern Shan States and heading for Hsipaw, center of the richest of these medieval principedoms. It was dusk when we drove through the town and sped on our way to Lashio. Signposts flashed past us; we did not need to read them—the main road was clear and metaled all the way; side roads were gravel tracks.

When we saw a small van stranded by the roadside with an Englishman standing beside it, an old instinct of road courtesy pulled me up and I [Outram] stopped to ask if he wanted any help.

"No, thanks," he smiled. "I work here."

I laughed and let in the clutch. "Oh, I didn't know. Cheero!"

"Cheero," he replied. "Where are you going?"

"Lashio—and China!"

"No, you're not!" he cried.

"What?"

"You're on the wrong road. You're heading for Taunggyi, and it's a devil of a long way, too!"

Driving gaily out of Hsipaw, we had branched right along the metaled road instead of going left on the gravel road.

Our courtesy stood us in good stead, for Mr. Forbes insisted on our staying to dinner and spending the night at his tung oil estate.

#### Boom Hits Lashio, Frontier Town

At five the next morning we were off again and in Lashio for breakfast. Lashio, 120 miles from the border by road, is a small frontier town, headquarters of a civil division and a battalion of the Burma Frontier Force. It was a place of no pretensions until the beginning of last year. Now mushroom buildings, trucking concerns, and business agencies have sprung up at this goal of a great highway.

A special railway extension line served the heavily guarded munitions and stores dump a few miles out of town, and an airport was nearing completion.

With all this rich legacy has come the inevitable sprinkling of adventurers and beach-combers of all nationalities. Some remain in Lashio, pestering everyone; others manage to get up the road and do things; a few go up the road—and disappear.

In Lashio my companion fell sick of an obscure depressing fever and nearly had to be left behind. While he was recovering, I made friends with many interesting and helpful persons.

Chinese officials, young and old, were all eager and willing to talk. I noticed particularly the interest the younger Chinese take in modern politics, and their shrewdness and judgment surprised me.

Responsible for transport of stores along the highway is a big Chinese Government organization, the Southwest Transportation Company. A head office in Rangoon handles the arrival of shipments; there are offices and agencies at Lashio and several towns on the road, with another headquarters in Kunming.

The company owned a few trucks but relied mostly on contracts given to private firms. One firm owned 180 Chevrolet 1½-ton trucks, out of the 300 trucks and buses then running on the Burma section of the road.

I was shown 50 of these trucks out of commission, mostly through accidents on the road. One had left the highway on a curve and fallen nearly 100 feet. A tree stump crashed through the gasoline tank, under the driver's feet, and came up between his legs, tearing his pants but not injuring him. The driver returned to tell his story, but was so scared he ran away immediately afterward.

With members of the company staff I went bathing at the junction of two streams, one cold and the other extremely hot. There are many such streams in the Shan States, rising from hot springs.

Men, women, and children came to this bathing place to swim, to wash themselves or their clothes, and even to shave. The water is supposed to cure rheumatism, and afflicted persons lie in it for hours daily.

At last we were well and ready. We carried two light bivouac tents, camp furniture, stores enough to feed us independently for ten days, spares for the car, including a spring, and a set of chains.

#### 688 Miles without a Gas Station

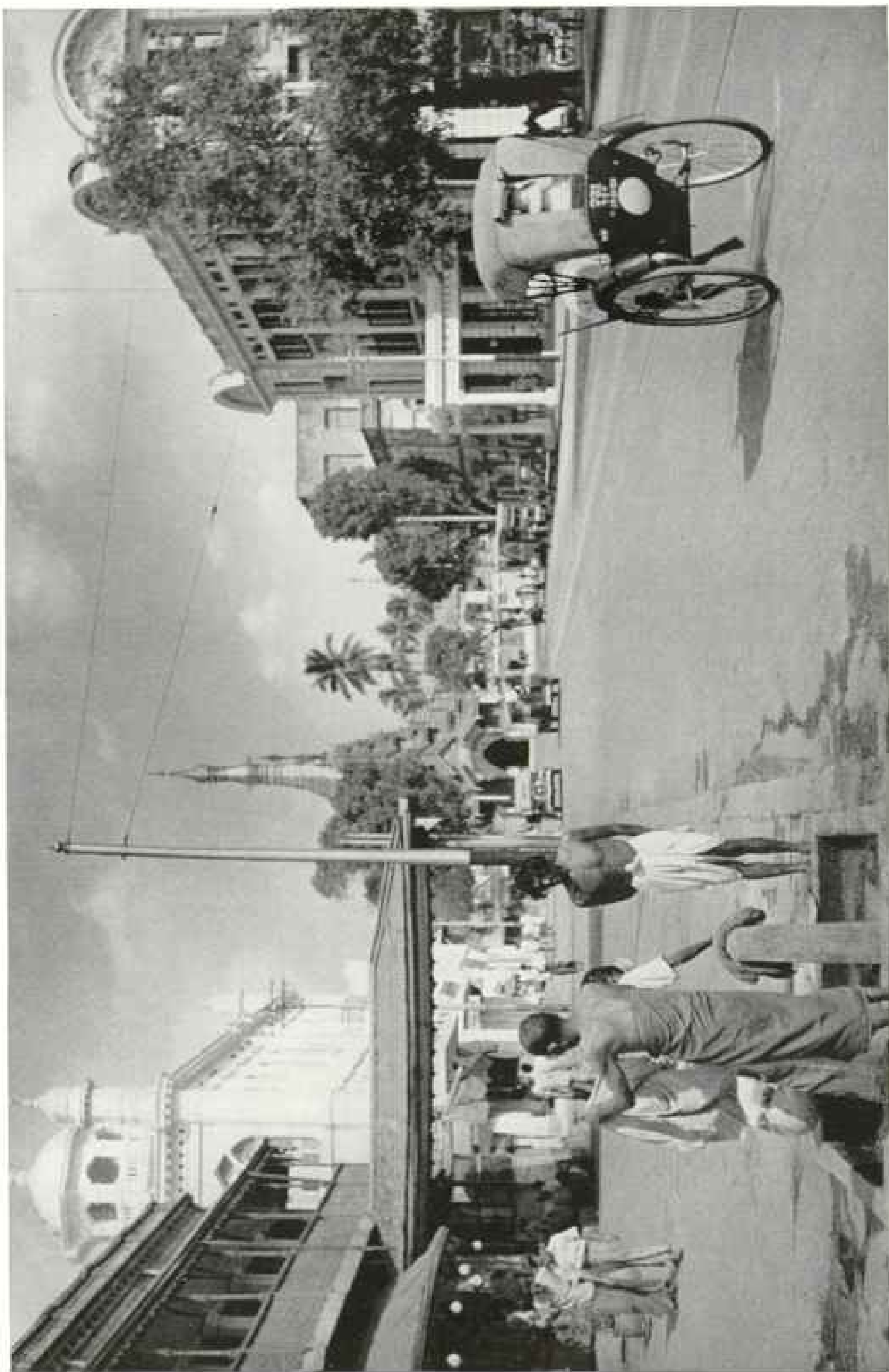
Facilities for casual touring on the highway were nil. Gasoline could not be obtained between Lashio and Kunming, 688 miles; and there were no resthouses beyond the Burma border, though some were under construction. We carried enough gasoline for 800 miles of mountain roads.

Less than a dozen miles out of Lashio the road became atrocious, with sharp rocks, loose stones, and huge ruts. We climbed a hill section steeply to nearly 5,000 feet and dropped over a saddle into the undulating valley at Kutkai. I remember a governor of Burma once saying to me, "What a pity Colonel May stopped at Maymyo. He might have found Kutkai."

We were due at Hosi that night and it was dark already. Our head lamps jogged up and down, stabbing the uneven road with their light. We passed a long column of brand-new Dodge two-ton trucks, on their way to some destination unknown. Kunming? Chungking? The Front Line?

Just before midnight we turned up a narrow lane to Hosi resthouse. Long after we were asleep the Dodge trucks must have rumbled past. If they had removed their mufflers I believe we would still have slept.

Next morning we reached the China border



**Every Day Is Washday at the Public Hydrants in Rangoon**

Poor folk go to the nearest street tap to do the family washing. They pay little heed to rickshaws, buses, taxis, pony carts, or even trucks laden with munitions for China. In the background gleams the spire of Sule Pagoda. Here, legend tells, a Taling prince was buried alive, so his disgruntled spirit might guard the pagoda.



**When the Monsoon Strikes, Hsum Hsai's Pleasant Waterfalls Become Raging Torrents**

Bathing place for near-by Maymyo's British and Burmese residents, the resort was a haven for the authors. They turned off the dusty road from Rangoon to Lashio for a brief holiday here. Officials in Rangoon come to this cool spot in Upper Burma for their vacations in April and October, the hot months.





#### Miss Ruby, Miss Beauty, and Miss Friday Come into the Sawbwa's Garden

The girls are Shan nurses from the American Baptist Mission Hospital at Namkham, who have come to Mangshih to help Dr. Yao (right) in his antimalarial campaign (page 638). G. E. Fane, co-author of this article, is seated at left. The building is the Sawbwa of Mangshih's guesthouse, where all were stopping. The Nepalese gardener stands in left background.

and, a few hundred yards beyond, the Chinese frontier and customs post, Wanting. When the Chinese first opened this post two years before, the local Kachin tribes descended upon it, destroying buildings and killing officials.

#### Into China at Last

A Chinese customs officer came out and we showed him our passports. "Ah, you are British! I am British also. Yes, born in Bombay."

From Wanting to Kunming is 568 miles. At noon we reached Chefang, farthest point served by the Burma-owned trucks.

Tertian malaria, commonest form of this disease, was taking a heavy toll here. The local agent was in bed and 80 of the 200 Southwest Company coolies were laid low too.

From Chefang the road climbed and ran along the crest of a wooded ridge for a dozen miles, to descend into the plain of Mangshih.

In the late afternoon we ran into a collection of empty bazaar stalls, mud houses, and a few stone buildings. With much gesticulation we gave the impression that we wished to be led to the Sawbwa of Mangshih, ruler of one of the largest of the Chinese Shan districts.

Mr. Y. Fang, the hereditary Sawbwa of Mangshih, was at his guesthouse, enjoying a quiet game of badminton in the garden with—could it be true?—three Burmese girls. He welcomed us as best he could, for we knew not a word of Chinese and his English was yes, no, and a few grunts.

A friend, however, introduced himself in



**Work Crews from Far-off Villages Dwell in Rude Huts Along the Burma Road**

The Chinese Government conscripted labor to build the highway, calling on communities many miles distant to furnish their quotas of men. So remote were some of these mountain towns that the inhabitants did not know a war was going on. Thousands never had seen an automobile.



**Smiling June Rose Wears Headdress Befitting a Princess of Mandalay**

Her mother, Princess Ma Lat, descendant of the last reigning monarch of Mandalay, entertained the authors in the palace grounds. They enjoyed a picnic lunch with June Rose in the Queen's Garden.

English as Dr. Yao, operating in connection with malarial research work in Yunnan.

The three girls proved to be Shan nurses from the American Baptist Mission Hospital in Namkham, within the Burma border. Their names, translated, were Ruby, Beauty, and Friday (page 636).

The Sawbwa called for beer, and we sat on the veranda of the guesthouse while the girls continued their badminton. A fountain was playing in the garden and fish swam in the pool below it.

A Nepalese (Gurkha) gardener saluted us and answered my questions. "I came from India, but the Sawbwa Sahib brought me from Lashio. Do I like it here? Oh, yes. My pay? Eight rupees a month. It is not much, but then food is cheap here." Eight rupees is about \$2.40, U. S.

The arrival of a very austere Chinese in a long, somber mandarin coat increased Dr. Yao's duties, because this gentleman, like our host, spoke only his native tongue. He was the Sawbwa's secretary, a mandarin scholar, and, by the look of him, not a man to be trifled with.

On Mr. Fang's departure we were taken upstairs to our room in the guesthouse, built to accommodate friends and travelers visiting Mangshih as guests of the ruler. It is separated by some distance from the Sawbwa's "Haw," the Shan name for a palace.

#### Prince in Shorts

Though the Sawbwa has not troubled to learn English, he dresses in modern clothes, usually white shirt and shorts, and owns an American motorcar. He likes his "beer and baccy" and stocks a good brand of whiskey.

When we were changed for dinner, the Sawbwa came over to the guesthouse and we all dined together. We were disappointed in our hope of a Chinese meal, for it was a Western dinner, perhaps arranged out of politeness.

Dr. Yao said that in his malarial work he was having language difficulties. At first he could not even talk to the local people. They are Chinese Shans, speaking a hybrid tongue, mostly Shan but with Chinese and Yunnanese words and construction muddled into it.

He called for help from the American Baptist Hospital in Namkham and three nurses were sent to him temporarily. Even they have difficulty in understanding the local Shan-Tyoks.

There is no hospital in Mangshih. Dr. Yao has a clinic, but it can deal with only a percentage of his cases. Local ignorance and superstition are other factors he has to contend with.

Mangshih and Kengma are among the largest of the Chinese Shan principalities, which have much the same status under the Chinese Government as the Burma Shan States have under the Government of Burma. They are self-governing but answerable to the higher authority.

For instance, Mr. Fang has been made responsible for that section of the highway which runs through his district. It is probably the most vital task he has ever had. Upon it depends most certainly his future progress and probably his existence. He takes the task seriously, paying frequent visits to the road and making every endeavor to stir up the lethargic Shan-Tyoks to greater efforts.

There must have been many anxious months last year, when the road was being constructed, and now the Sawbwa's face was reflecting the approach of another anxious period—the annual monsoon.

#### Road Needs Constant Repair

The Mangshih section of road is not a good one. The soil is laterite, gravel, and shale. The country is hilly and many of the hills stand already at their natural angle. This means that any cutting on this natural angle upsets the whole slope, which will slide completely at the slightest provocation; and provocation, on hills, means rain.

Because labor is scarce in the Mangshih sector, the road was not made wide enough to allow for any falling away of the outer edge.

Repairs present a problem. The men argue that the road has been built, so what's all the fuss about? They cannot be made to realize that a mountain road needs constant repair, especially during its first four or five years of existence.

Workmen are reluctant to leave their crops and villages. They do not see why they should live in unsociable grass huts beside a finished road when they can live comfortably in their own mud houses.

"And who will look after our paddy fields?" they ask, refusing to budge, even though offered the munificent wage of 28 Chinese dollars a month (about \$1.45, U. S.).

Mr. W. Tamm, Director of the Yunnan-Burma Highway Administration, from the Ministry of Communications in China, is most concerned over this labor problem. Conscription would demand the presence of Central Government troops to enforce orders, and these cannot easily be spared.

Therefore Central Government officials are encouraging local rulers to bring out their subjects by persuasion. But the Yunnanese are apathetic; they cannot believe that the



Photograph by G. L. G. Simons from PHE

### American Engineers Spanned Gokteik Gorge with Steel 40 Years Ago

The trestle, 2,260 feet long and 320 feet tall, stands on a natural bridge more than 500 feet high. The spectacular structure is about 65 miles southwest of Lashio in Upper Burma (page 632). Over this railroad military supplies for China traveled by fast freight, from the seaport of Rangoon to the Lashio terminus.

Japanese will come into Yunnan, even if the rest of China collapses.

We were shortly to arrive in Paoshan, on the wall of which is a large painting depicting the aerial bombing of a big town.

The drawing is crude but the facts are there—jagged flames rising up above the houses, with pieces of masonry and men perched on the tips of the flames. Airplanes of such shape and design that they could never leave the ground soar above the city, and Nipponese faces, goggled and giggling, enjoy the fun.

I stopped beside this gigantic *alfresco* fresco and watched. Little boys sometimes came and looked at it, and one added a touch to the masterpiece with a piece of damp buffalo dung; but the children mostly paused to gaze at me. As propaganda it had ceased to exist.

We left Mangshih after breakfast and soon arrived at a detour about two miles long. The main road, awaiting the long-delayed construction of a masonry bridge, was to follow a gentle alignment on the left bank of a river. The detour skirted a shale hillside on the right bank, rising halfway up it.

### Munitions Truck Stalled

On this detour only twenty-four hours of rain would bring the hillside tumbling down. (Since this was written the rain has arrived.) In one part the loose shale road was less than eight feet wide.

Joining the main road, we found a truck with the outer wheels deep in the soft side dressing. Piles of munitions were lying in the road, guarded by a soldier and the driver.



#### Hand Labor Builds a Masonry Arch Over a Stream Once Forded by Caravans

Today imported steam rollers and shovels help keep the highway in repair, but when the roadbed was built in 1938 no modern equipment was available. Hundreds of small bridges and concrete culverts spanning creeks and gullies were erected with primitive tools.

They were presumably awaiting the arrival of another truck.

We felt sorry for the mule caravans we met. The mules, still unaccustomed to motors, always took fright and rushed off in all directions, with muleteers running frantically after them, waving and shouting.

Sometimes the mules were being ridden. One time an old, old Chinese lady with bound feet was carried down the steep side of the road by her timid mount. She stuck on.

Often the mules threw their loads onto the road, and once there was a crash which sounded like breaking china, and was.

#### Children Storm the Car at Lungling

Up and down, around curves, passing trucks and mule caravans, we drove to Lungling, another customs post, where duty has to be paid on all motorcars. This duty is refunded on the return journey.

The highway ran through the main street

of Lungling and we had our first glimpse of really old China, little changed through thousands of years.

The car bumped slowly over a cobbled street, and children scrambled aboard. We paused occasionally to push them off. Some cling like limpets.

During one pause a man in half-uniform came and jabbered Chinese. I hurriedly showed him the first two letters of introduction which came to my hand. He stared hard at them, without apparent comprehension, then departed up a side street while we settled down to removing children.

One youngster pressed the horn button by accident; this nearly cost us our lives, not because there were strict anti-noise regulations in Lungling, but because it was a ready signal for all children in town to come and have some fun.

Half an hour later the Chinese official brought back our letters. We took them, raced



### Get Out and Get Under! No Service Stations on This Highway

A Burmese military truck sinks gently into a temporary culvert. Driver and helper must extricate it unaided. When the Burma Road was first opened to traffic, trucks frequently were mired. Once the highway was blocked for three days with a mass tie-up. By spring of 1940, the journey from Lashio to Kunming was still an adventure, but road improvements had reduced mishaps.

the engine to blow off half a dozen moppets from the rear bumper, shouted and pushed away nearly a dozen more, and moved on with an adhesive pair who dropped off at the exit gate.

#### Salween Valley, Majestic and Dangerous

By midday we had climbed to nearly 10,000 feet. The air was cool and clear and the sun shone. We were on rolling hills, grass-covered, with pine trees. There was a fair amount of cultivation.

Gradually the road fell, and kept on falling for 26 miles. This descent to the river Salween, and equal ascent on the opposite bank, affords the grandest scenery of the whole road. It is terrible and majestic. The photographs give some idea of the country, but they lack the stereoscopic effect, the atmosphere, and the feeling of great distances (pages 644-5).

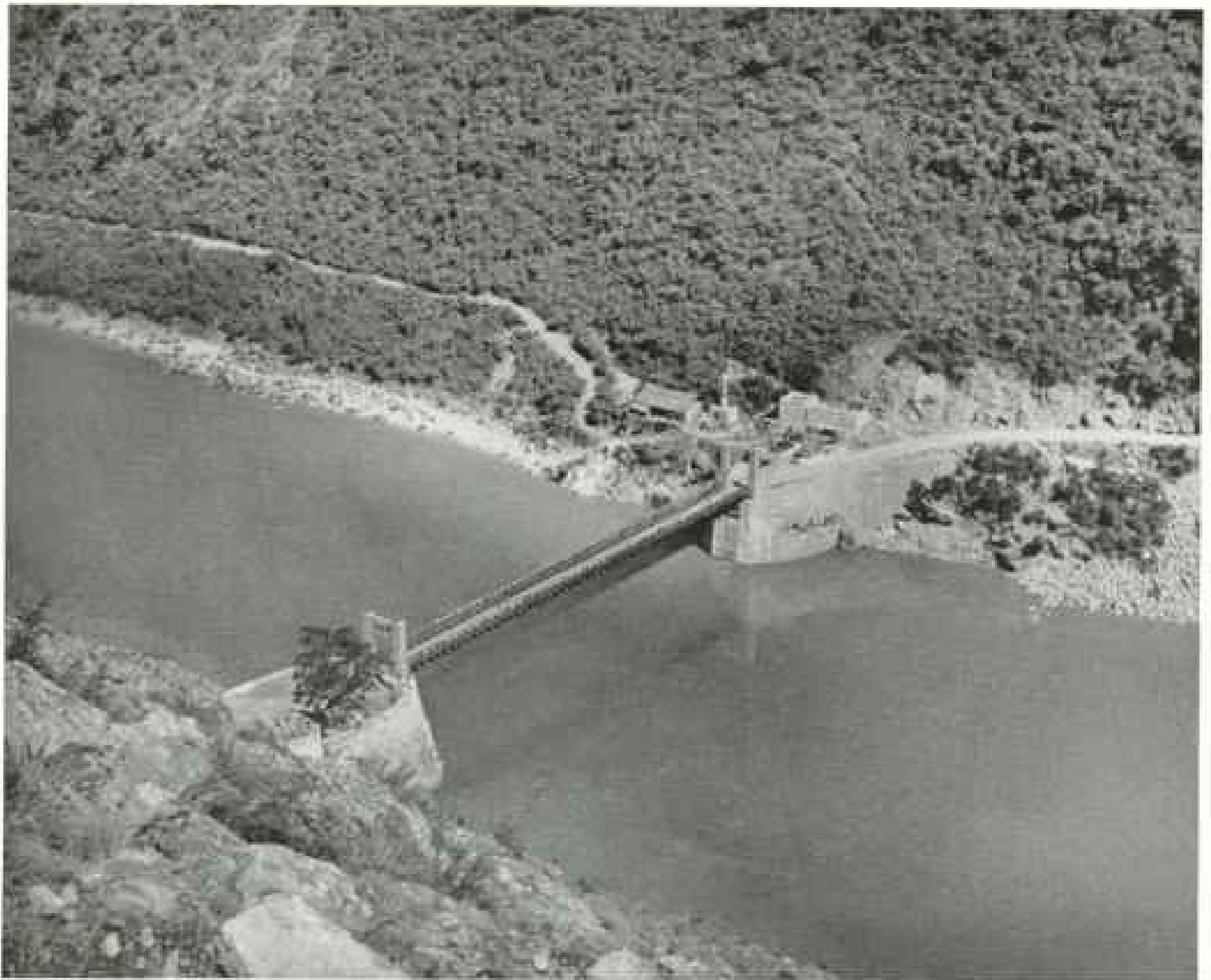
In one picture the car can be seen on the

road in the foreground and a section of the highway is visible across the valley. To reach that section took us more than four hours along 50 miles of road.

The Salween, 2,500 feet above sea level, is crossed by the Hweitung Suspension Bridge, 250 feet long (page 642). The bridge is heavily guarded by Chinese troops housed in two blockhouses. We were not subjected to any inspection, nor even stopped; it is the person who does stop that they dislike.

A few months ago a Chinese was caught loitering near the bridge and asking questions. Finally, we were told, he confessed that he had been offered three hundred Chinese dollars for any serious damage he could do to the bridge.

Dangerous curves and precipices near the bridge have been the cause of more than one accident this year. A new driver, a Singapore Chinese, was put on this section. He drove his truck too fast at a curve and left the road.



### Canyon Walls Rise 6,000 Feet Above the Salween River

The suspension bridge, similar to the one crossing the Mekong (page 658), was not the most serious problem for engineers at this point. Nearly the entire roadway, on both sides of the canyon, was blasted out of the faces of the towering cliffs. The Kao Li Kung range, on the far side of the river, is the Salween-Irrawaddy divide. The old caravan trail crossed it by a long stone staircase winding up a narrow cleft—an impossible route for a motor road.

The truck rolled and jumped down to the river and into it. It has not been seen since the accident, but the driver is still alive, with most of his bones broken.

Another truck fell over a precipice and all three occupants were killed outright.

#### Storm Clouds Foreshadow the Monsoon

This day ominous black storm clouds gathered overhead. We thought of the detours and the unfinished bridges behind us and we wondered if we ought to have come so far. If a serious break in the road should occur, we might be held up for weeks, or even months.

Halfway up the 25-mile climb along the left bank of the Salween the car coughed and stopped. Nothing would make it go.

No truck had passed us in hours. The sun had disappeared behind the high hills. There were bandits on this stretch of road—and we

had been cautioned that they worked by night.

We tinkered on the car for half an hour, and it grew cooler. Then for a third time I pressed my mouth to the filler hole and nearly burst my lungs blowing into the gasoline tank to force air out of the supply pipe. We tried again, and it started like a bird. Oh, blessed relief! The imaginary bandits, scowling at us over the barren rocks around, scuttled away disappointed and we drove on.

Half an hour later the car coughed and stopped again; but we knew the remedy and had tea while waiting for the engine to cool.

At half past six in the evening, with our lights picking out the road, we descended into the Paoshan plain and drove across flat country to the walled city of Paoshan (page 656). We entered through the West Gate and asked for Dr. Ling, local manager of the Southwest Transportation Company.



© R. M. Woods from Helen Black

Coolies from a Far-distant Tribe Help Build the Burma Road

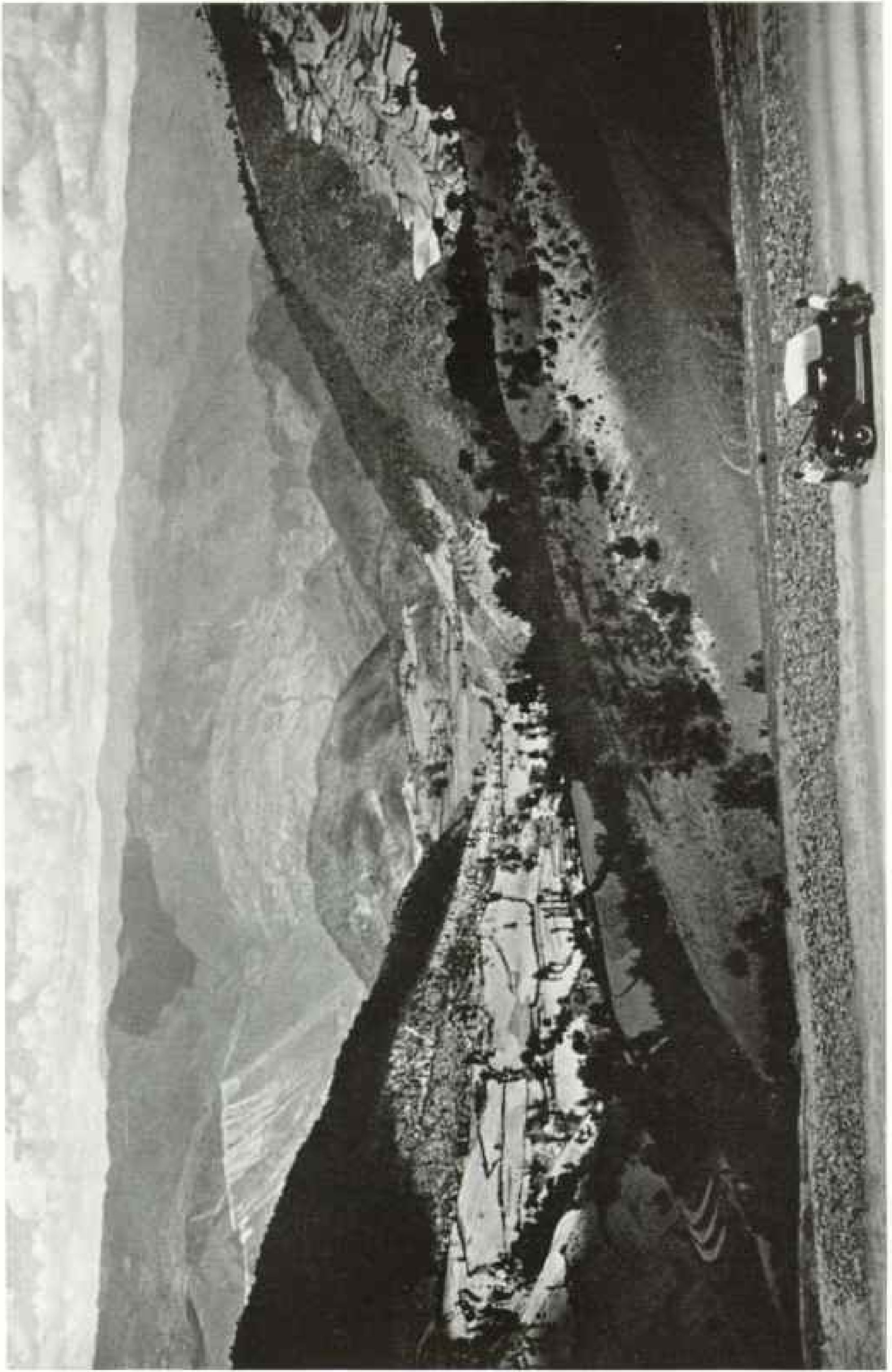


Photograph by G. L. G. Sisson from Pitt

Armed with Poles, Workmen Combat a Landslide

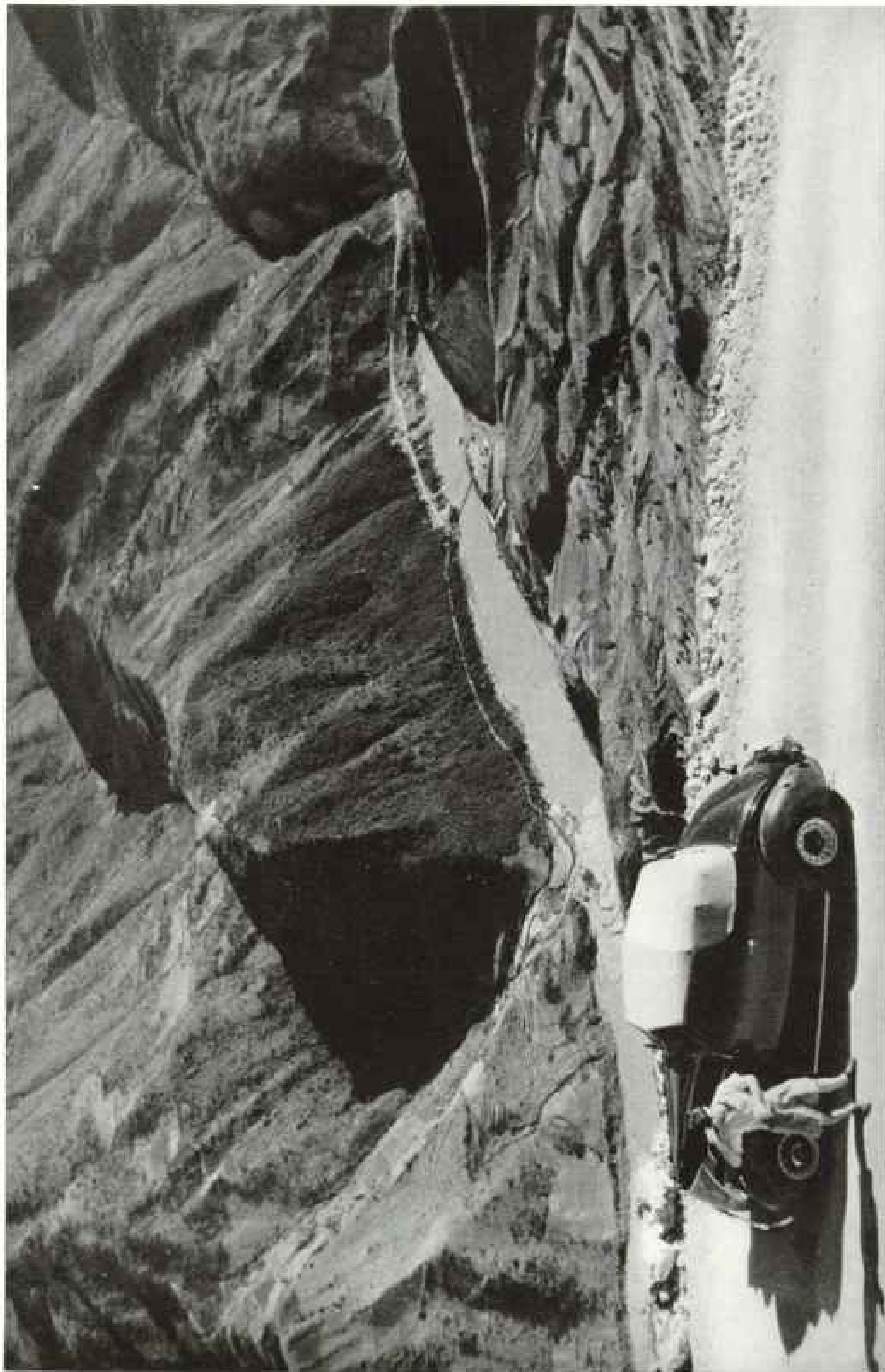
Down onto the highway, carved out of the cliff, a volley of rocks has thundered, barring the Burma Road. It took sixty workmen—and dynamite—to clear this slide above the deep-cut Salween Valley.





From the Crest of a Lofty Range, the Burma Road Plunges Down 4,000 Feet into the Salween Valley

"Fever Valley," the Chinese call these hot, steamy lowlands, shunned even in Marco Polo's day as gloomy and unwholesome. Only a few Shan tribespeople, apparently less susceptible to malaria and miasma than the Chinese, dwell on the lower slopes. Villagers believe malevolent spirits haunt the valley.



**Like a Silver Eel, the Salween River Twists Down the Hill-locked Valley**

Far below, the new suspension bridge (page 642) is barely discernible. Legend tells that a Salween demon wraps itself about luckless swimmers. In old caravan days, men and mules descending from the cold heights to the hot valley plunged into the icy waters. Often they were seized with cramps and drowned.



### Automobiles Are a Novelty in Ancient Paoshan

Trucks have become a common sight, but passenger cars still are few on the Burma Road. Almost as unusual is one of the onlookers, the matron at left with bound feet. Except in remote districts, China has discarded the old practice of the upper classes, who wrapped infant girls' feet to keep them small by preventing normal growth of the foot bones.

We were taken through another gateway guarded by an armed policeman, and the car was halted before a walled courtyard. Outside, mechanics were working on 30 or 40 Dodge and White two-ton trucks, changing broken springs and replacing worn-out parts.

A slim man in rimmed spectacles opened a small door and came forward smiling.

"I am Doctor Ling. How do you do?"

He led us past offices where clerks were still working, through courtyards where drivers were asleep, and brought us to a canteen, graced by a portrait of Sun Yat-sen framed between the two flags of national China.

A door from the canteen led into the guest room. Hot wet towels were handed to us. Knowing this Chinese custom, I bade my friend wipe his face politely and hand back the towel. It is most refreshing, this hot wet towel habit, but just then washing only our faces seemed superficial.

I forestalled my companion's request for a real bath. "It must wait," I cautioned. "Don't hurry. This is China, real China."

### China Tea and Tub

Tea was brought and we sat and sipped it. I was so thirsty I wanted to gulp it down and ask for more. However, we sipped quickly and steadily instead, while Dr. Ling asked solicitously after our health and about our journey. We discussed the road, the war, and world politics; and during this time we consumed, so my companion assured me, about ten cups of tea each.

Presently Dr. Ling excused himself and we asked if a bath could be arranged. Another room, also white-papered, was allotted to us as a bathroom and my canvas bath was filled with steaming water.

The windows of this room were covered with paper, like the shutters of a Japanese house,

and prying fingers poked holes in it to watch our antics with silent awe.

Our kindly host returned later and sat with us while we ate a Chinese meal in the canteen. Over chopsticks we discussed the prospects of our journey next day to Tali.

I was not looking forward to the road beyond the Mekong River. It had sounded very glib and easy in Burma—to go and see the monsoon breaking over the China road—but then what would happen to us if the rains came when we were out here?

Avalanches would fall, not necessarily upon us but before and behind us, and we should be stuck indefinitely. If a serious break in a mountain road occurs during the active months of the monsoon, the breach is likely to remain until the monsoon is over.

However, the weather had been fine all along; we could not with decency counsel any policy but going forward, and Dr. Ling agreed. In two days we should reach Kunming.

#### Downpour in Paoshan

That night the heavens opened and showed us what was in store. Thunder, lightning, and a wind-driven deluge swept across the plain.

The sun broke fitfully through a heavy dawn and I gazed out upon a damp courtyard, where yawning truck drivers were winding on ragged puttees and getting ready for the road.

Dr. Ling advised us to wait a day, until weather reports were received. Last night might be the beginning of the monsoon. We were disappointed, but the advice was sound.

Paoshan, like hundreds of other towns in China, lies within a protecting wall, with four gates. This city wall, twenty feet high and almost as thick, encloses half of a small hill at the northern end of the city, and toward this hill we set out after breakfast.

Shopping on the way, we bought green tea. This tea must be made from fresh water brought just to the boiling point before it is poured on the leaves. It should be drunk from Chinese cups with their lids kept on except when actually drinking, and it is correct to "smell" the tea as one drinks. Sugar and milk, of course, are not added.

The tea we bought was cheap, but the best that Paoshan sold openly. The finest blends cost many dollars a pound, which these simple country folk could not afford.

Besides local produce the shops displayed American and European goods, such as cigarettes, mirrors, scissors, clocks, beads, and canned milk.

We passed a military barracks, where blue-uniformed soldiers were doing physical training on a graveled square. The drill was com-

plicated and comprised a set of quaint antics. We were told it was Chinese boxing, which was all done in fixed poses.

The exercise seemed more mental than physical. It must have demanded great concentration to carry out the long succession of those quaint figures. I wanted to photograph them but refrained. Troops were one of the forbidden subjects.

Near the top of the hill stood an old Taoist temple dedicated to Yü Wang, the Jade Emperor. Over the entrance to the central building were large gold characters, "God's Face Is Very Near."

Our attention was attracted to another sign. When we looked at this from the front, four Chinese characters were seen. Our companion translated them to mean "Uttermost Sincerity Never Rests." He took us toward the right and we looked at the sign again. The characters had changed completely! He translated them for us—"The Dragon Is Flying and the Phoenix Is Dancing." He took us to the left and the writing changed again—"All Gods Are Hovering in the Sky."

In the smaller houses beside the main temple are huge colored figures of the gods of the constellations, and I photographed one group of them. In the center sat Wuff, senior stellar deity, very fierce and with a spare eye in his forehead (page 651).

#### Marco Polo's "Plain of Vochan"

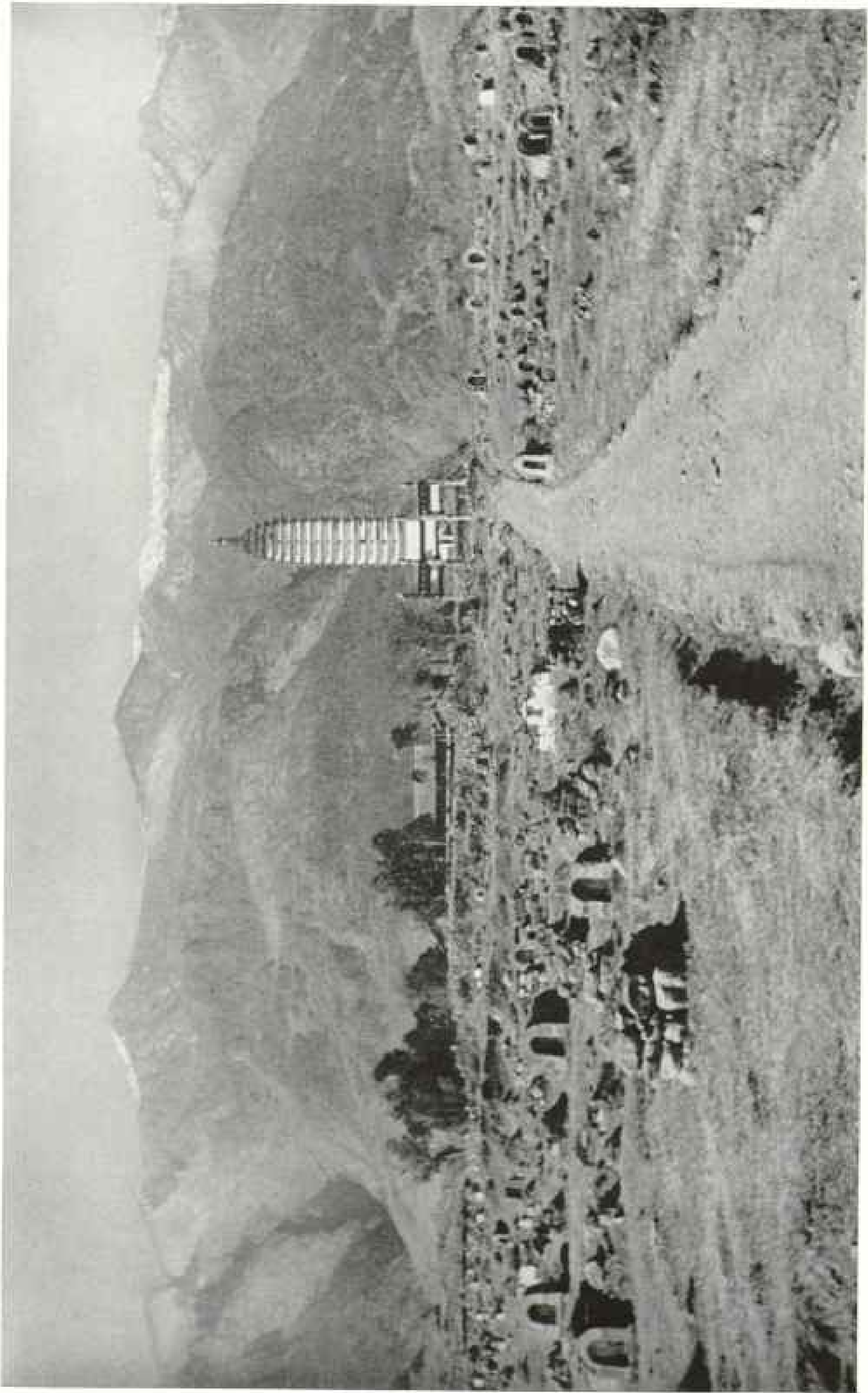
From the temple we saw a magnificent panorama of the city and plain of Paoshan. We realized then that the walls enclose a vast area, of which much is parkland and rice fields. There also are many houses outside the walls. Evidently Paoshan has been free of banditry for some years.

The plain is mostly under paddy cultivation. It contains over forty villages of mud-brick houses with thatched roofs, better made than the mud villages of Burma and India. The graceful curved roof of Chinese choice tops the meanest house, and most villages boast a mud-brick temple, drab but dignified.

Marco Polo recounts how in the plain of Vochan, or Yungchang (alternative name of Paoshan), the Chinese army of 12,000 mounted Tatars defeated a Burmese army of 60,000 which had marched north to meet their attack on Burma. This battle took place A. D. 1277.

The Tatar horses were terrified at the 2,000 Burmese war elephants and began to stampede. The captain of the Tatar host turned a rout into victory by ordering his troops to tie their horses to trees in a near-by wood and take to their bows.

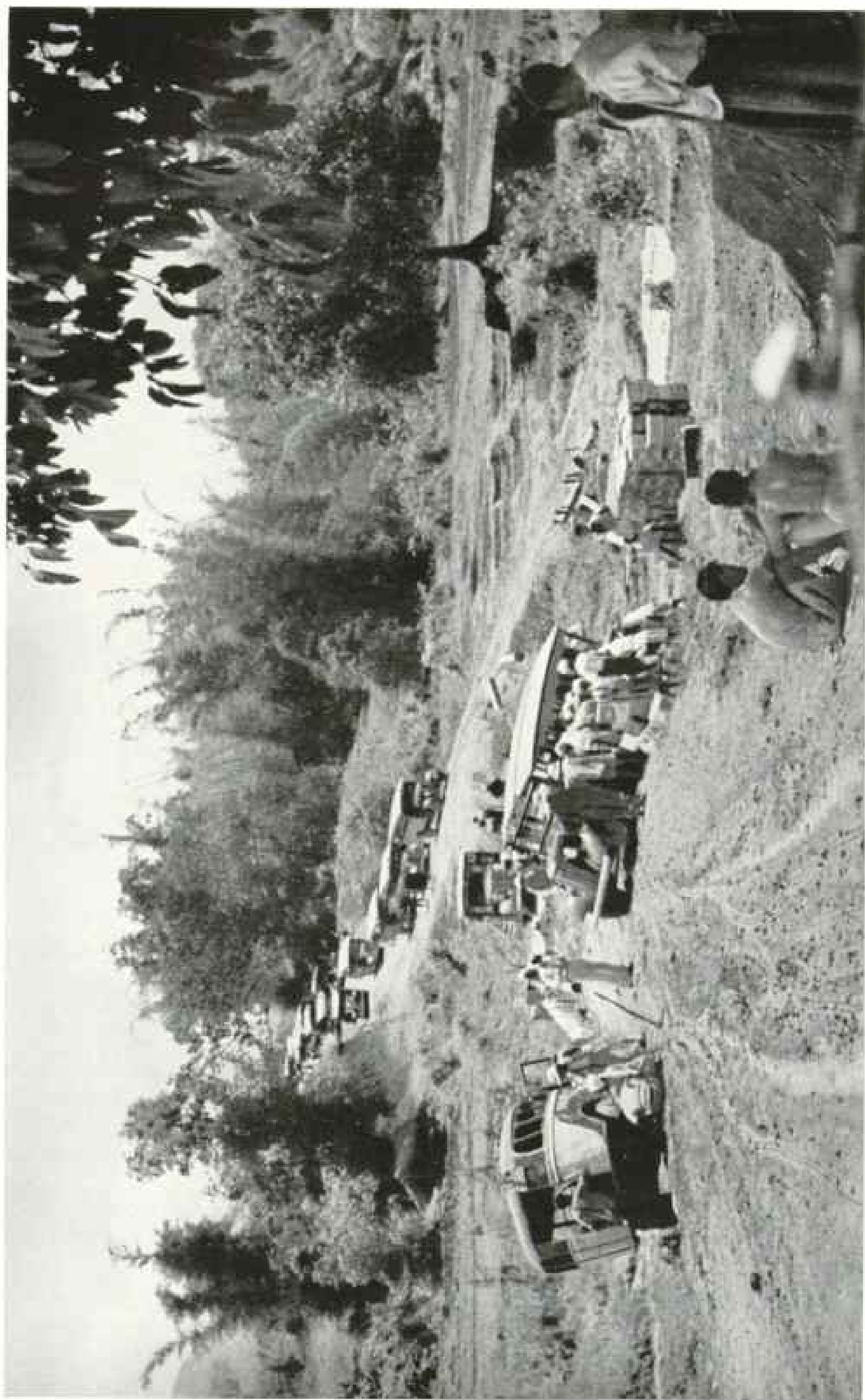
The elephants refused to advance before the



Photograph by G. L. G. taken from P'ia

**At the Foot of the Tali Mountains Lies a City of the Dead**

For nearly two miles the burial ground stretches along the Burma Road. Overlooking the mounds rises a 16-story pagoda. The Tali range was hard for the road builders. Two steep passes, fancifully named Dragon's Head and Dragon's Tail, guard the entrances to the high Tali plateau.



### Buses Trying to Pass Each Other Slip Off the Monsoon-softened Road

A pile of munitions boxes has been taken from one bus and piled along the road (right) to lessen the weight. In the background is a convoy of trucks waiting for the road to be cleared. The tie-up lasted two hours. Sometimes five or six trucks in a convoy will bog down at one time, requiring the combined efforts of all the drivers to extricate them from the muck.

rain of arrows, sped by the finest bowmen in the East; they turned and fled, crashing through the troops behind and back into a forest, which tore off riders and trappings.

Immediately the Tatars mounted their horses and attacked fiercely. The dismayed Burmese were no match for them and defeat soon turned to rout. Narathihapade, king of Burma, was defeated, and eventually the Tatars sacked his capital, Pagan.

#### Monsoon on the Mekong

After our walk my companion lay down with a mild recurrence of his Lashio fever. I went out with our Chinese friend to see something of the villages and the Mekong watershed.

Storm clouds were gathering and great belts of rain were lashing the hills, but where we stood the sun was shining and a double rainbow touched the rice fields.

A pretty woman sat on her doorstep, feeding her child. She gazed at us quite unabashed until I opened my camera, when she hurried indoors.

The rain came sweeping up the flat valley and drops fell on us. We drove on. There was a duck boy tending his charges and a man plowing; both wore raincoats made of plaited rushes. Men in the paddy fields went on hoeing in the wet mud, though a few ran for shelter under the eaves of a house.

After leaving the plain the road climbed. We were in the rain now; it beat and tore at us as if trying to sweep us off the road. We skidded and the wheels raced. We put chains on the back wheels.

The drop to the Mekong gorge is gradual, but needs care when rain is falling and water is pouring over the road surface.

For twelve miles the road meandered up and down alongside the river to Kungkwo Suspension Bridge, which resembles that over the Salween but carries a maximum load of only  $7\frac{1}{2}$  tons. This bridge also had a military guard. A new alignment and bridge were under construction, to shorten the road by several miles.

A steep ascent and a sharp right turn, followed by sharp-angled hairpin curves—most unpleasant under heavy rain—carried the road over the watershed. On the other side was more rain—rain, rain, everywhere. There was a very bad section, surfaced only, from the top to Yungping valley.

I looked at the clock; it was early afternoon. A chunk of loose earth fell away from the cutting above, rolled down and broke across the road, spattering gravel and mud against the fenders.

I turned back. A piece of slushy road and a curtain of rain were all we saw that afternoon, and they look just the same all over the world.

Two soldiers stopped us ten miles outside Paoshan and demanded a hitch back to the city. Soldiers, at one time looked down upon in China, are now highly esteemed.

We drove along and I asked if they had any pretty girl friends, as I wanted to photograph them. They replied guardedly that they knew a few but that they did not know me. When I dropped them, they stood to attention and bowed politely from the waist.

My companion was better, but the recurrence of his sickness and this heavy rain demanded a fresh appreciation of our position.

At dinner Dr. Ling gave us his opinion that the monsoon would break in full force in two days at the latest and that some sections would most certainly slide away, one between the Mekong and Yangpi, ahead of us, and one or two between the Salween and Mangshih. We admitted that in our opinion the detour near Mangshih would not stand up to even one day's continuous rain.

We decided to turn back. We had accomplished our intention—to see the monsoon breaking and judge its effect. It was a disappointment not to reach Kunming, but it had been visited during the winter reconnaissance, and the road, comparatively uninteresting, would not merit the hazards involved.

Eastward from the crossing of the Mekong the ranges grow less steep and the valleys less deeply cut, yet many of the obstacles encountered here, too, were tremendous. One of the worst of these was at Siakwan where the face of a cliff nearly a quarter of a mile long had to be blasted away.

Wild country lies eastward from Siakwan to Tsuyung, and the road winds over four high passes. But beyond Lufeng the terrain becomes less rugged, and as the Chinese supply trucks approach Kunming, they roll through flat and fertile rice land to this metropolis of Yünnan, their goal through many a dangerous mile (page 654).

#### Back to Burma, a Race with the Rain

The return to Burma was a race with the rain. It gave us excellent opportunities for photographs, which unfortunately cannot show the exhilaration of great heights and distance, the cold wind that blows before rain, the rumble of thunder down deep valleys, and the first big cold drops which made us cover the cameras as we ran back to the car.

Often the road would curl back to take us straight into advancing storms. We prayed



#### Gods of the Stars Keep Vigil Outside Paoshan's Main Temple

Well, black-bearded figure at right, is the principal stellar deity. His fierce features are embellished with an extra eye, which appears here as a narrow slit in his forehead (page 647). Kneeling mat and incense bowl lie on the pavement. A second bowl stands on the table.

that the sudden gusts would not cause the car to skid or swerve over the edge.

We halted while coolies worked nobly in sun or rain to clear earth that had fallen onto the road. The big avalanches kindly waited until we had passed. They slid down behind us, as we found out on our return to Burma. Mountainsides slipped and carried the road with them, forming an impenetrable barrier.

Shortly after we reached Burma, I received a letter from one of the many Chinese friends we made on our journey:

"The rainy season has set in with the month of June, and it will not be over until late October. Now we have wet weather nearly nine days out of every ten.

"Blockades and incidents due to muddy roads and falling of mountain soil are often reported along the whole highway between Kunming and Wanting. The worst place is the section between Chefang and Lungling. . . .

"In the middle of last month, one of our

trucks fell into a ravine on account of loosened soil due to rain, and the chauffeur's life was sacrificed.

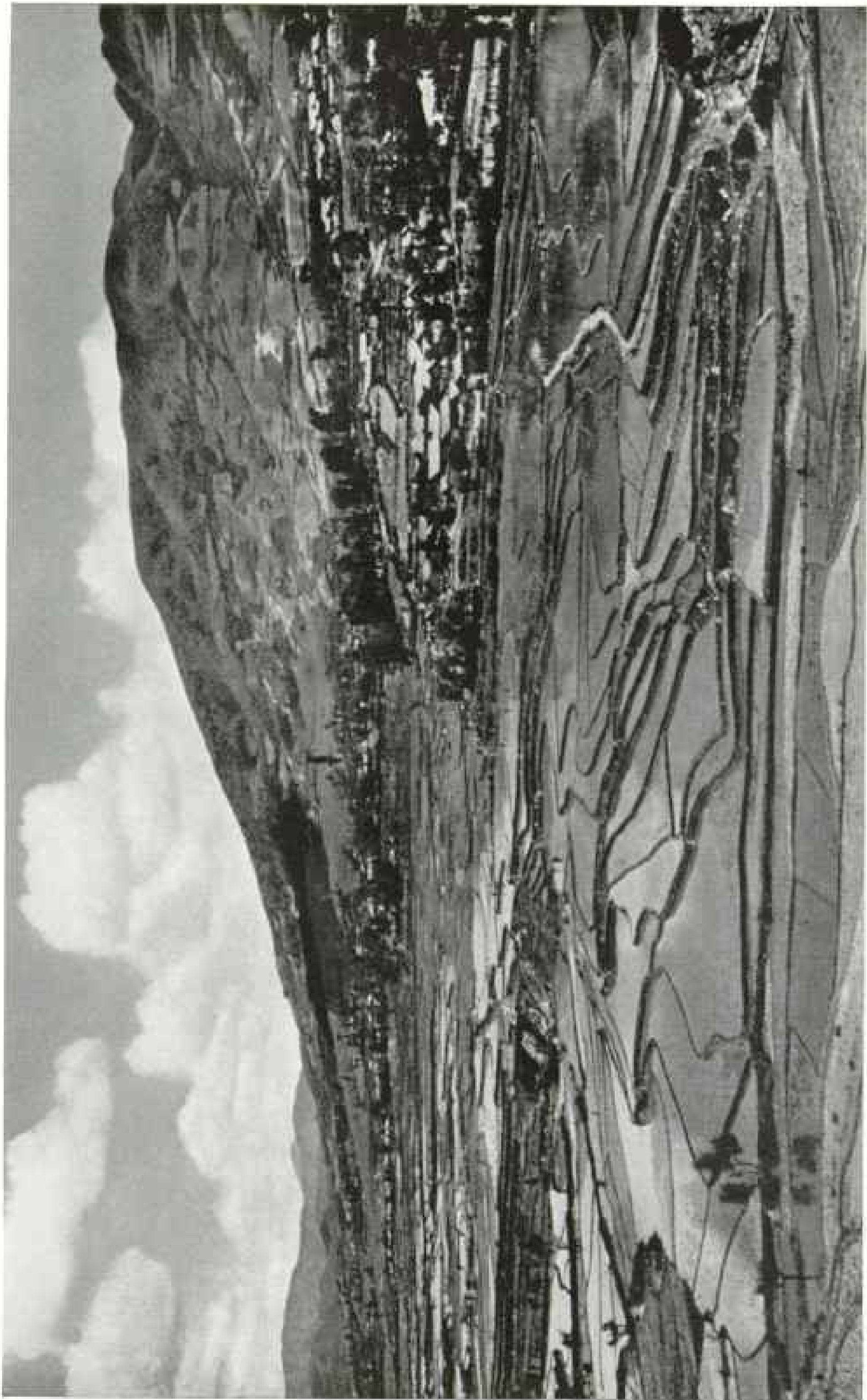
"Although the damaged places are to be repaired as soon as we find out, we are warned that the Nature's mischief may happen at any unlucky moment, and we can never tell how long it may take to clear up a blockade, etc.—often several days.

"Moreover, countless places along the whole way to Kunming are deeply rutted. The big trucks may follow the ruts, but small cars cannot, as the body of a small car is too low compared with the high trucks."

With the temporary closing of the road, stores and munitions were piling high in Lashio and Rangoon. This was serious to China, and it has become increasingly so since the supply route through French Indo-China has been closed under Japanese pressure.

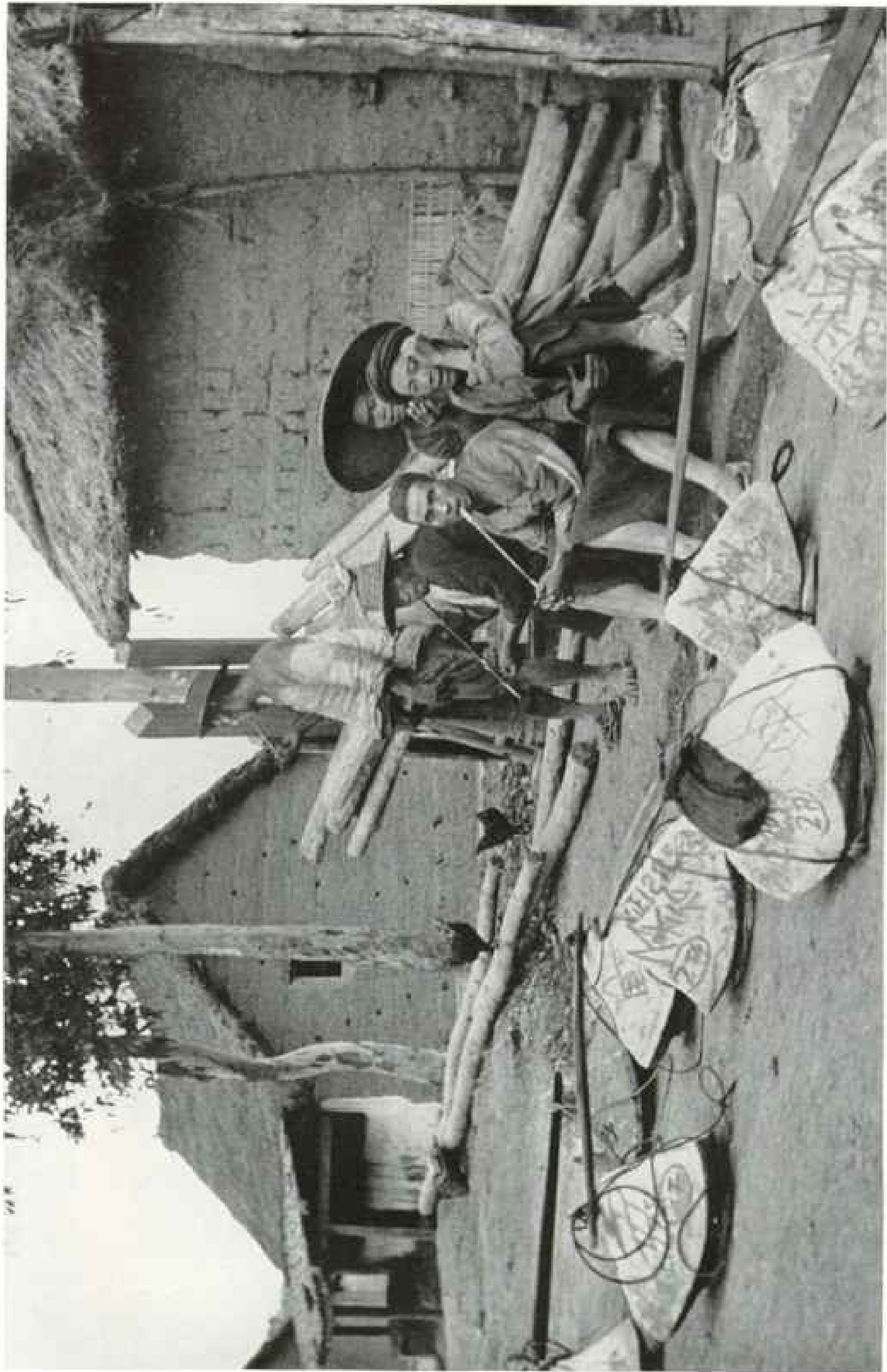
Before Japan arrived, a vast seaboard gave China's trade unlimited contact with the world.





**In Broad Chennanso Valley Terraced Rice Fields Completely Surround the Small Towns**

Barrellegged workers dot the flooded tlets in the fertile stretch between Lungling and the Salween River. Content with their comfortable mud houses and agreeable surroundings, they were loath to leave their villages to work on the Burma Road (pages 637 and 643). Sometimes it was necessary to employ troops to persuade villages to supply their quota of road labor.



Photograph by G. L. G. Schmitt from the

**Salt Carriers Pause for a Smoke at a Wayside Rest in Lufeng**

On each chunk of the mineral is stamped the seal of the Yunnan tax bureau. Motor transport has failed to halt human carriers or mule caravans on the Burma Road. Most of this traffic is in Szechwan silk, on its way to India. When a truck convoy approaches a mule or horse pack train, many of the animals bolt (page 640).



Photograph by Pierre Yveret from G. Aulic and Company

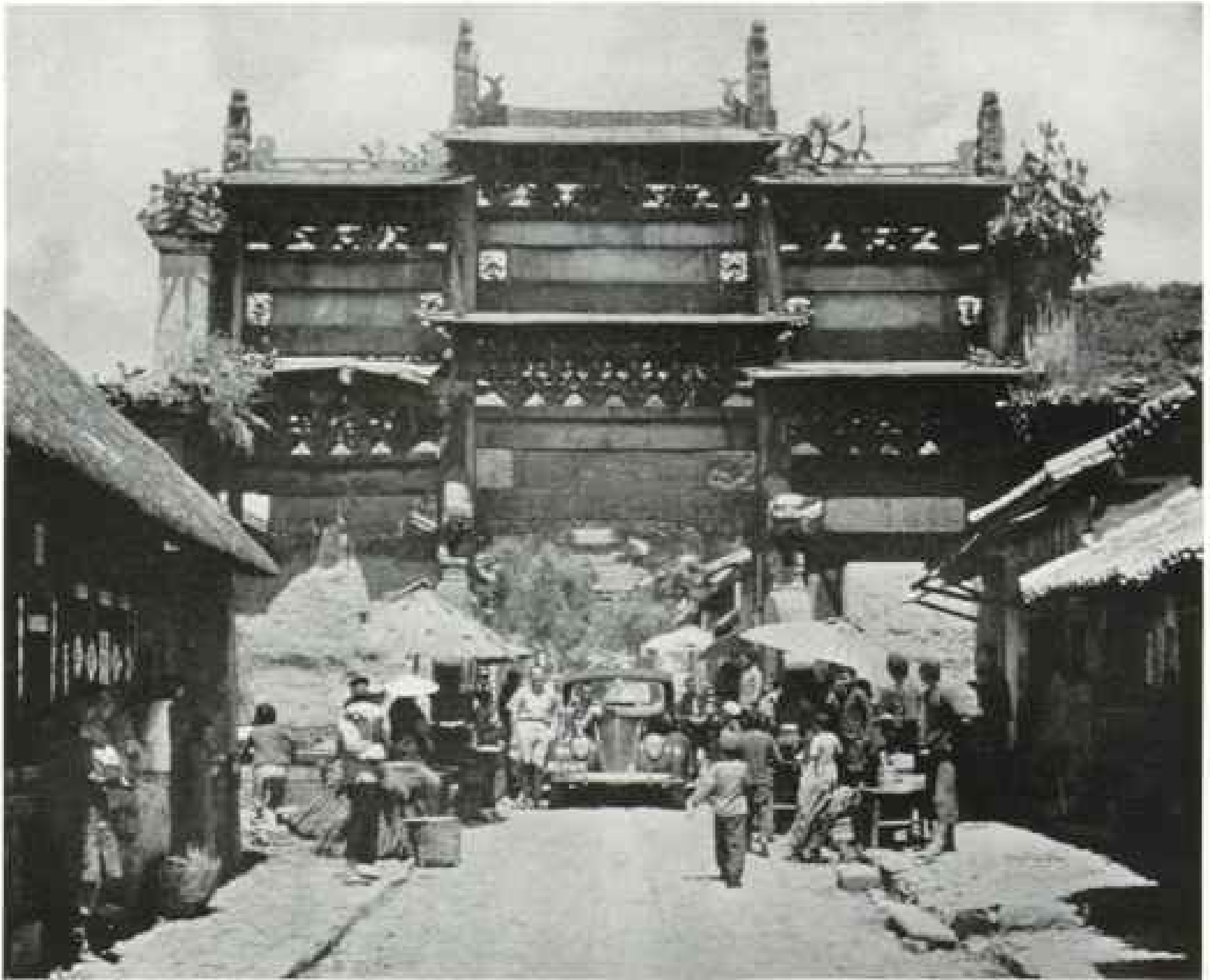
### Opening of the Burma Road Turned Sleepy Kunming into a Bustling Metropolis

Capital and largest city of Yunnan Province, the ancient community slumbered half-forgotten until 1939. Even the opening of the narrow-gauge railway from Haiphong, French Indo-China seaport, nearly thirty years before, failed to rouse it from lethargy. Suddenly trucks by the hundred poured into the city, which became a distributing center for the Chinese armies. On this busy shopping street almost every house and gateway is made of wood. No European signs are visible, for few foreigners have business in remote Kunming.



**Racing Against the Dread Monsoon—the Authors, Hurrying Back to Burma, Hurtle Over a Sunken Culvert**

During July, August, September, and occasionally October and June; heavy rains fall over the Burma Road. Always dangerous, the highway at times becomes impassable. Landslides block it with tons of rock, and maintenance crews must be on the job day and night (page 643). This stretch is near Kutkal, Burma.



Small Boys Swarm Over the Authors' Car as They Drive Through Paoshan

Marco Polo visited this walled city of 30,000 when he traveled to the Middle Kingdom more than six centuries ago and recorded strange customs. The elaborate portal is in the heart of the town.

The land routes were neglected or nonexistent. Toward Russia there were deserts and mountains; farther south lay a network of lofty ranges and uncharted rivers. "Excellent frontiers," thought the Chinese. "Let them remain so."

When Japan began to roll up that great seaboard, China looked around feverishly. In French Indo-China the Haiphong-Kunming railroad, now thirty years old, was the obvious answer. But, as events were to prove, an alternative route was needed.

In their distress Chinese engineers remembered a long-forgotten scheme to build both a road and a railway from China to Burma. The road was to follow approximately the thousands-of-years-old Tribute Route. The railway was to take an alignment planned by Major H. R. Davies, of the British Army, who had journeyed into Yunnan 45 years before and produced a map which still stood as the most accurate topography of this unsurveyed province.

The railroad is now under construction, and it follows almost exactly the alignment suggested by Major Davies. It will continue beyond Kunming to Suifu, linking up with the Province of Szechwan and the Yangtze River (page 657 and map, page 631).

The Chinese, optimistic, expect to have these lines completed within three years. Burma's railway representative estimates a more conservative five to seven years.

"The object of building this railway is mainly strategic," he states. "It will not be completed in time to carry munitions for the present war; but the Chinese are building it as a safeguard for the future. They do not intend to be hemmed in again."

An air service has been proposed between Kunming and Rangoon. Three airports have already been built, but their location may not yet be divulged.

Road, rail, and air service, in addition to forming a vital line of communication for China in her present predicament, are going



Photograph by G. L. G. Samsen from P12

### China Points Railway Tracks Westward toward Burma

Kunming is to be the eastern terminus of the new 500-mile Yunnan-Burma railroad, now under construction by Chinese engineers and workmen. Roughly, the route runs south of, and parallels, the Burma motor road. When the railroad will be finished is a matter of conjecture (page 656).

to open up a province which, although potentially rich in mineral wealth, is actually extremely poor because of its inaccessibility. Before the road was built, travelers from Burma had to journey to Kunming on the trail followed by Marco Polo, the old Tribute Route, and by the same method—foot, mule, and pony.

#### Men and Machines vs. Mud and Monsoon

The natural enemies of an advancing army, rain and flood, harass Japan in the east, but are proving an ally in the west. Rain pours steadily upon that highway, wonderful work of vast numbers of men, destroying their puny efforts to fight mountains and storms.

But the fight goes on. For one small section, where malaria has taken heavy toll, a thousand coolies have been transported from Kwangsi Province, with 500 more from Kengma. The battle against Nature continues.

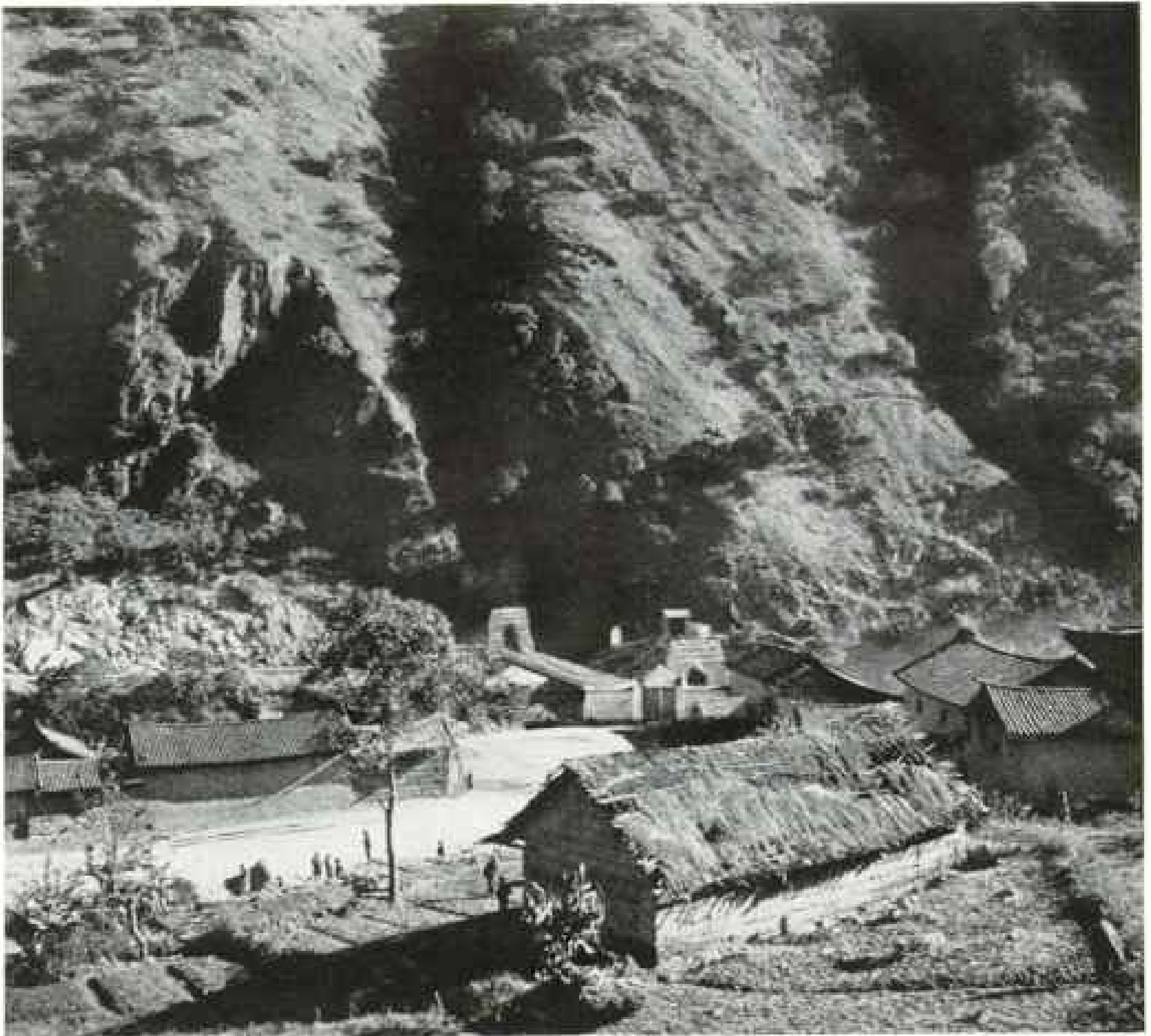
Six weeks after my return to Burma I had

the pleasure of entertaining the Denis-Roosevelt Asiatic Expedition for half a day. Mr. and Mrs. Denis stated that the road was in an appalling condition. Setting out for Kunming and Chungking, they had taken their specially fitted cars with difficulty as far as Mangshih, and a few miles beyond to the first detour.

Here they were confronted with an unsurfaced quagmire, along which ran two ruts, each almost as deep as an auto wheel; they must have been formed by Chinese trucks traveling along at a 45-degree angle. Alongside the road and in the valley lay derelict trucks. There were reports of an even worse section at a detour a few miles ahead.

After repeated attempts, with chains, stones, and planks, to fit the road to his cars, Mr. Denis was reluctantly compelled to turn back.

When a carefully planned, well-organized expedition has to turn around, defeated, some idea of the difficulties with which the Chinese



#### Engineers Veered from Marco Polo's Route to Build the Mekong Bridge

The ancient caravan trail descended an almost sheer face for more than 2,000 feet to reach the rushing river between Sinkwan and Paoshan. The new approach, on an angle which trucks can travel, winds down from a height of 7,300 feet to 4,500 in about an hour's drive. The 300-foot span, held by heavy cables embedded in concrete buttresses, is wide enough only for one-way traffic. Construction and maintenance crews have built their houses at the bridge level, on a bluff a hundred feet above the river.

are successfully battling may be gauged.

This winter, if the road is reopened to war supplies, two thousand trained Chinese drivers will be rushing two thousand great trucks at "war speed" up and down those mountains—up to nearly 10,000 feet, down to almost sea level, then up again, then down, around hair-pin curves, under overhanging rocks, past a sheer precipice of a thousand feet, steering out from a passing truck to within a foot of the road edge—and, below, a 3,000-foot roll straight to the deep river Salween.

#### An All-weather Road?

My original object rises up rather like an ogre, to be quelled or pacified.

I set out to verify from personal experience

the Chinese claim that they were building an all-weather road. Are they doing so and have they done it? The answer is yes and no. Yes, they are doing it. No, they have not done it.

To build an all-weather road in such country within one year was never possible; an ordinary mountain road needs four or five years to settle down—and this is no ordinary mountain road.

In a few years it should be fairly settled, and through traffic should be possible all the year round, provided repair gangs will be available near all the bad sections throughout the monsoon months. Then the road will fairly be classed as all-weather.

But it is anyhow a magnificent achievement, and the Chinese are justly proud of it.

# Tin, the Cinderella Metal

BY ALICIA O'REARDON OVERBECK

ALL THE gold and silver mines in the world could stop producing with less disturbance of our personal comfort than a cessation of tin mining would cause! Nevertheless, tin in the popular estimation is a synonym for something cheap and shoddy.

Some of our earliest records make tin appear as the Cinderella, the Ugly Duckling, of the metal family. Both Isaiah (1: 25) and Ezekiel (22: 18, 20) list it along with dross; and the ancient metallurgists call it *Diabolus metallorum*, devil among metals.

Tin looks somewhat like silver, but as it is far more abundant, and consequently cheaper, it receives a low rating in the popular mind. For example, a bell with a thin, jangling tone is described as "tinny" and one with a delicate, musical peal is described as "silvery." How unfair to tin! Bells, good and bad, are made of copper and tin, and nowadays, at least, contain no silver at all.

The word "tin" in its true sense seldom appears alone, except in connection with cans and pans; and the *metal* tin seldom appears in nature except in the company of other metals. For this reason few laymen pause to think that bronze, bell metal, gun metal, Babbitt metal, type metal, pewter, and a host of others have tin to thank for their existence.

## U. S. Dependence Upon Tin

"The present intense interest in national defense," says the Minerals Yearbook, 1939, of the U. S. Bureau of Mines, "has focused attention on strategic materials in which the United States is deficient. Tin ranks high among such materials. . . ."

"Under normal conditions the United States consumes more than 75,000 tons of tin annually, or approximately 45 per cent of the total world output. Domestic production never has exceeded 170 tons per annum; thus requirements have been met by imported metal.

"During the last five years 81 per cent of the foreign purchases was obtained from Asia (69 per cent from British Malaya), 18 per cent from Europe, and 1 per cent elsewhere. In the event of war this dependence on foreign sources constitutes a serious threat to national security. . . . Deprived of tin, the industrial power and hence the military effectiveness of the United States would be impaired seriously."

Surprisingly, there are no large tin smelters in the Americas, and the only one of commercial size in South America is in Argentina. We

import refined metal mostly from smelters in the British Empire.

Even now our Government officials are proposing to purchase, under contract with the Bolivian Government, tin ore mined in Bolivia and to build smelters to refine it in this country. Such a contract would bring us only half the amount needed. The remainder must be imported as metal from the Far East.

## Mining High Up in Bolivia

The romance of tin mining in Bolivia, part of the old Inca Empire, has touched my own life most closely.

If some of the mines of Cornwall lie under the sea (pages 678-9), the mines of Bolivia lie along the roof of the world. They are, in fact, the highest mines in existence, many of them being at an elevation well above 15,000 feet, where only the barrel-chested Bolivian Indian can work with any degree of comfort (page 662).

For generations the tin which was mined along with the silver in Bolivia was thrown aside as worthless; and it was not until the last century that its value was recognized. This is understandable when it is considered that the King of Spain was interested only in filling his coffers with precious metals.

Soon after Peru was conquered by Pizarro, Potosí Hill, or the Cerro Rico de Potosí, became the treasure chest of the world. In the early part of the 17th century Potosí was probably the largest city of either North or South America, with a population, including slaves, reputed to vary between a quarter and a half million, according to the fancy of the particular chronicler.

The Spaniards usually mined by shafts, and every ounce of ore was packed to the surface on the backs of sweating Indian captives, who passed in endless procession up and down flimsy, insecure ladders made of notched logs. If a slave dropped dead from overexertion, or slipped from the wet notches of the ladder, another was pushed into his place.

What mattered human lives when every day strings of llamas loaded down with bars of silver pushed off for the coast to feed the hungry maws of the galleons that lay waiting in the roadway of Arica?

What did it matter that pirates—although they called themselves privateers—were often lurking outside the harbor for a chance to pounce on the fat prize? Potosí Hill was making history those days.





Photograph from Adria O'Beard's Overland

#### Injured Miners Ride the "Roof of the World" in an Aerial Ambulance

High in the Andes, a remote Bolivian tin mine uses this special car for its cable tramway. Patients are transported from the mine entrances to the mill, five miles away, for first-aid treatment. Then relays of Indians carry the men on open wire stretchers for two additional miles, down to the modern hospital in the base camp. In colonial days sweating Indian captives were left to die from exhaustion (page 659).

Not until long after the Liberation (1824) did tin become the important mineral of the "Hill." Then the old dumps which contained the leavings of the Conquistadores, the dumps which had cost such human misery and so many human lives, were, and still are being, worked over for tin.

#### Wild Tales of Mine Wars

In the heyday of mining at Potosí Hill a peculiar code of mining laws developed. The principal feature of this code was known as the "tunnel right." This right allowed a man to drive anywhere in the Hill, either vertically or horizontally, so long as he did not encounter other workings. As simple as this ruling seems, it was the cause of bloodshed through the ages, and at times turned the twisted, ink-black bowels of the Hill into a seething, subterranean battlefield.

Each miner naturally wanted to block out as much ore as he could. As a result, there was a continuous race in the dark for a favorable position, and in this race every means was used to thwart the rival.

Outposts were kept in all workings to listen for near-by drilling or shooting. Sappers were

sent out to get under the other fellows' drifts and blow them, together with the miners employed in them, to kingdom come. If an opening could be made into an enemy drift, fumes of burning pepper or straw were shot into it to drive out the men and hold up the advance.

For 400 years mining has been going on within the Hill, and it is honeycombed with tortuous passages, of which no one has now any clear understanding. There are no precise mine maps in existence. Mine owners hesitated to indicate their workings on a map for fear enemies would get hold of the precious document and so be enabled to carry on a campaign of intervention.

Because of this lack of maps, spies have always been employed to creep through rival workings to try to get some idea of what was going on. If these spies were caught, they were killed without benefit either of law or of clergy.

Although this code originally applied only to Potosí Hill, attempts were made to extend it to other mines, and a few years ago, when my husband and I lived in Bolivia, it was not uncommon to find machine guns and



Photograph by Vish Belin

#### Tinsmiths Flourish in La Paz, Bolivia, Close to the Source of Supply

A few small smelters meet their demand, but nearly all Bolivian tin is shipped abroad to be refined. Behind the vender rises a stack of gasoline containers which have been turned into water cans. Decorative crosses of tin are much in demand among Bolivian Indians, who place them on the roofs of their homes.



Photograph by E. K. Hether

### Bolivian Tin Miners Drill by the Light of an Oil Lamp

Only deep-breathing, barrel-chested Indians can work with comfort in these mountain mines, some 15,000 feet or more above sea level (page 659). During Spanish rule the metal, which was mined along with silver, was thrown aside as worthless. Bolivia today ranks third as a world producer of tin, but has developed the industry only in the last half century.

armor-plate doors in workings far from the Cerro Rico de Potosí.

Aside from these stirring feuds, a queer Old World flavor lingers around Bolivian tin mining. At Potosí Hill I saw miners still carrying medieval oil lamps, each one topped by a cross, and the ordinary mine greeting remains the centuries-old "Ave María Purísima!" To which the conventional reply is, "Sin pecado concebido!"

Every mine has its little chapel at the portal, in which stands the patron saint, and in the mornings, as the men advance on their always dangerous, sometimes murderous, work, they drop to their knees and pray for a min-

ute, just as the knights of old prayed to Our Lady before swooping down on an enemy.

Some of the most interesting Indian fiestas take place underground and around the portals of the mines.\*

Just as gold and silver have built up amazing fortunes, so has tin. I shall always remember a ride I took down a wild, wind-torn river bed of southern Bolivia, near the Argentine frontier, and a house where I rested at the end of the ride. All day I had been following my husband from one tin prospect to another in the hills that overhung the river, and only as evening came on did we realize that we still had a good 12 miles to go before we made the pueblo in which we planned to spend the night.

As the quick tropical darkness fell, the wind rose, black clouds flattened off the mountain tops, and rain fell in sharp, volleying gusts. We dropped down the winding trail to the river bed—actual roads don't exist in this particular part of Bolivia—and with no better guide than

the shining white rump of our muleteer's animal, we ground off the endless miles, our weary mules sliding, stumbling, sinking deep into the treacherous sands.

### A Palace in the Wilderness

Just as I had decided that the last tooth in my head was definitely loosed from its moorings and the last bone in my body split in twain, our leader turned suddenly up a side stream, and then willow trees were dripping on us, the earth was solid beneath us, and there were houses with lighted windows. Domi-

\* See "Bolivia, Land of Fiestas," by Mrs. Overbeck, in NATIONAL GEOGRAPHIC MAGAZINE, November, 1934.

nating the tiny pueblo was a great mansion with balconies across its dark face and a giant pepper tree rearing high above its uppermost chimney.

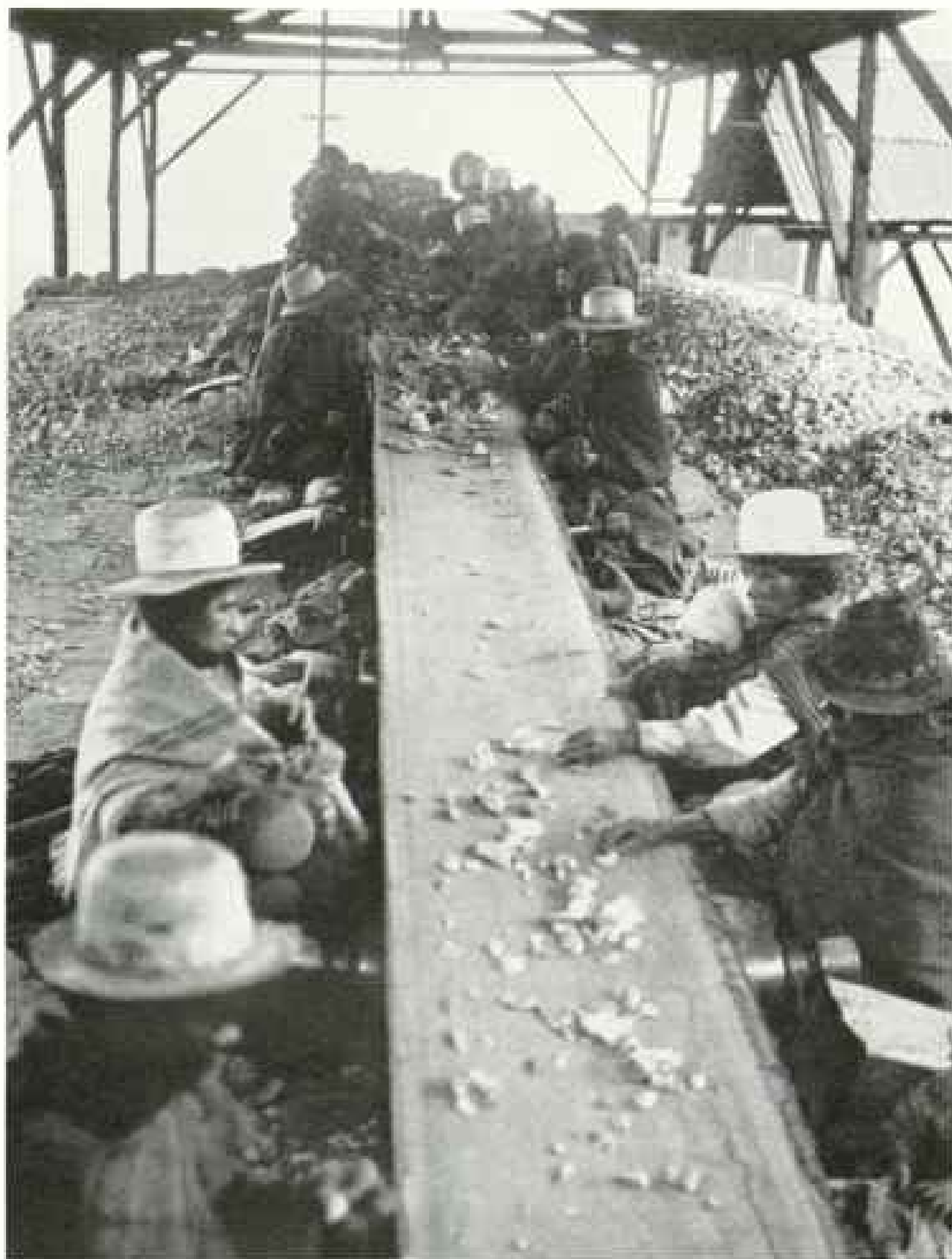
Even at the moment, with my boots full of water, my face smeared with river mud, and my wet hat brim dangling in my eyes, I was thrilled by the romance of this house, miles from a railroad, surrounded by Indian mud huts, and cut off from anything approaching its kind by the watchtowers of the Andes. For this was the stronghold of one of Bolivia's great tin fortunes.

Most of the year it was closed and empty, save for a little dried-up *cholo* (half-breed) retainer; but every once in a while, for a week or so, came the third generation of a family raised to almost unheard-of wealth by tin—the Cambridge-bred young man, his lovely wife, and a retinue of French and English servants—and to this obscure and far-flung corner of the earth they had brought a curious and unexpected patina of European culture.

For nearly a month I lived in that empty house, feeling all the time like Aladdin in the genie's cave.

#### Art Among the Mines

Books were everywhere—exquisite first editions in hand-tooled bindings, French novels in yellow paper covers, the latest murder story, and the most popular biography. A recent number of *La Vie Parisienne* lay on the table of the stately library. A 16th-century Italian painting of the child St. John hung over the mantelpiece of the great dim dining room. Modern French dry points and some Zorn etchings adorned the walls of the drawing room.



Photograph by E. E. Dooler

#### Bolivian Indian Women Sort Tin Ore from Waste Rock

They pick rich fragments of cassiterite (tinstone, or native oxide of tin), sometimes only a quarter of an inch thick, from the conveyor belt. The ore later is crushed, and then concentrated by a screening process. Once most tin in Bolivia was recovered by long lines of keen-eyed feminine sorters. Today modern milling equipment does 85 per cent of this work.

The bedrooms were shrines for beds with actual box springs, linen sheets, and fleecy blankets. And the bathroom—the blessed bathroom, probably the only one in a radius of several hundred miles—was a gleaming temple of marble and nickel plate.

Bolivia's greatest tin fortune, however, is but one generation old. The impressive blue palace and the immense stock farms of its founder are in Cochabamba, but the founder and his family have lived in Europe for years. One son was married to a Bourbon princess, one daughter to a French count, and another to a Spanish grandee who rated the delirious prerogative of appearing before his monarch



Photograph by Almet from the Urtiologuilla Expedition

### From 100 Miles of Tunnels, Tin Ore Comes Into Bolivia's Vast Llallagua Mills

The shafts are sunk into the mountains almost 15,000 feet above sea level. Mining costs are higher than in other tin-producing countries because the ore is mostly from narrow vein deposits and often of lower grade. Llallagua mine, at Catavi, is the principal holding of the Patiño Mines and Enterprises Consolidated, Inc. At the head of this group is "Tin King" Simón Patiño, builder of one of the most spectacular mining fortunes of this century (page 663). Patiño started his business career as a store clerk in Cochabamba, Bolivia.



Photograph from Alicia O'Roarke O'Connell

#### Bolivian Prospectors Drill for Tin with Burro Power

The metal occurs chiefly in veins, but sometimes in placers, deposits where the tin may be washed out with hydraulic equipment (page 670). The burro turns a drill, weighted down by the men. The drill brings up samples to determine whether the percentage of tin is high enough to make placer operations profitable.



Photograph by James C. Swales

#### Down Comes the Empty Ore Car, Ready for Another Burden of Tin

Some of the shafts here in the Llallagua mine at Catavi, Bolivia, are 1,000 feet deep (page 664).

hatted, which is only a proper ending for a story that reads like a fairy tale.

This is one of the versions of the story which I heard:

Not long after the beginning of the century a young clerk was selling calicoes and chola skirts and hats and gaudy wool cloth for a German who owned a general store in the mountain town of Cochabamba. The store had a heavy debtor, a Portuguese, and the proprietor ordered his clerk to run down the delinquent and collect the money.

Since the town had no railroad in those days, and only a rattly-bang stagecoach drawn by four mules connected it with the outside world, the task of running down a debtor was no easy matter; and the clerk rode many a mile before he finally treed his man.

Followed discussions and an offer. The Portuguese owned a tin claim. How would the clerk's boss like to take this claim and call sundry shirts and trousers and boots a day?

The offer was accepted. When the clerk got back, however, the storekeeper viewed with aversion the tin claim, and in a fine white rage threw his assistant out, advising him as he went that he might keep the indescribable claim in lieu of certain back wages due him.

Out of a job and broke, the clerk decided that all that was left for him to do was to work the despised claim himself. A friend staked him to some canned goods and a few tools, and he set out to look over the property that had been wished on him.

For months on end, with only a few Indians to help him, he toiled on that bitter, desolate mountainside. He lived in a hut made of rough stones piled one on the other, its floor of mud, its roof of thatch held fast by rocks against the omnipresent wind.

He ate canned beans and *picante*, a highly seasoned stew, made of *charqui* (sun-dried meat) and *chuño* (frozen potatoes). He concentrated ore in the icy water of the high-altitude streams, and carried sacks of *barrilla* on his back.\*

In the course of time he hit some stuff which when assayed proved to be almost pure tin oxide, worth more than \$500 a ton.

#### Millions from a "Worthless" Claim

The news spread, and in a short time drew an offer of a million dollars for the property. After discussing the matter with his wife—the average Bolivian woman is a monument of hard common sense—he decided to refuse the offer, a lucky break for him, because before long he was able to buy in the surrounding properties, which also proved to be rich in tin.

Today the mines of Señor Simón I. Patiño supply about half of Bolivia's tin output, and the Patiño fortune stands out as one of the most spectacular mining fortunes of the century (pages 664 and 665).

From the romance of mining it is but a step to the romance of the mighty tin can—romantic because its advent marked another metamorphosis in the history of civilization; mighty because it controls the fate of millions of people and every year keeps hundreds of millions of dollars in circulation.

#### Tin Can a Napoleonic Victory

The necessities of war started the canning industry, and its patron saint is Napoleon.

Until comparatively recent times, when an army took the field it could not carry with it the huge stores of provisions that would enable it to subsist. It had to live on the country, and to do so meant uncertain fare for the conquerors and untold horrors for the conquered.

Napoleon, then, his covetous eye cast on the broad face of Europe as his prospective battlefield, determined to solve the problem of portable food; and he offered a reward of 12,000 francs to any one who could devise a method of preserving vegetables and meat and fish.

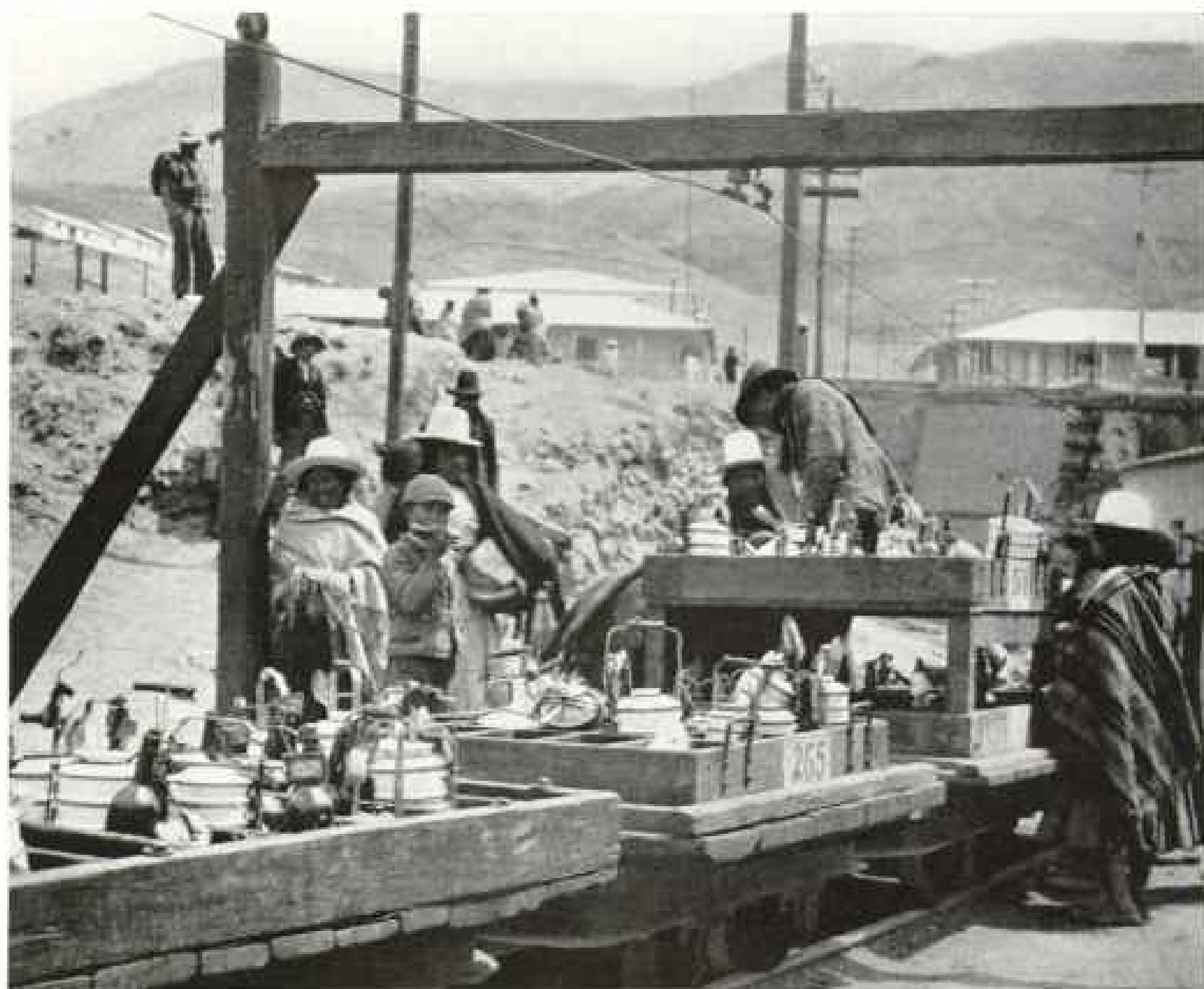
Nicolas Appert accepted the challenge, and after much experimenting hit on a rough approximate of our present method of canning by heating and sealing. But he could think of no better way of packing his products than in glass jars, which were hardly practicable for an army about to sally forth to distant parts.

It was not until 1825 that one Thomas Kensett, an Englishman living in New York City, secured an American patent on tin cans to be used as containers. An English patent had been taken out in 1810.

The use of tin as a protective covering for metal seems to have been known to the ancients. Much later, between 1240 and the early 1600's, tin plates were manufactured in Bohemia, and after that in Saxony, whence, about 1670, the secret was brought to England. Work was started in 1673, but the business languished. In 1720 Wales established the industry, and by 1776 it was the world's leading dispenser of tin plate, a position which it held until the McKinley Bill of 1890 started our own industry.

Tin plating is simple. It consists merely in dipping thin sheets of steel into a bath of molten tin. The expressions "tin pan" and "tin can," therefore, are really misnomers, since both the pans and the cans are actually

\* *Barrilla* is ore mechanically concentrated to yield from 55 to 70 per cent tin.



Photograph by James C. Bamberg

### When Empty Pails Glide from the Tin Mine, Lunch Hour Is Over

Indian miners at this Llallagua shaft in Bolivia eat the midday meal underground. Wives and children, who brought the containers well filled, retrieve them from the special flatcars on their return from the mine and take them home. Bolivia's economic life is almost wholly dependent upon tin, which accounts for 80 per cent of her exports.

steel with an exceedingly thin skin of tin. Despite the thinness of this skin, about 40 per cent of the tin used at the present time goes into the making of tin plate—say, roughly, around 50,000 tons of tin each year.

#### The Tin Can a Miracle Worker

And it takes very little more imagination to sense the changes the tin can has wrought in our modern civilization. It has made the movement of large armies an almost easy task. Picture the trenches of Flanders without bully beef! It has made exploration a positively jolly occupation. Imagine Roy Chapman Andrews and his men living off the country in the Gobi! It has helped to make scurvy a rare disease and has also fought other nutritional deficiency diseases.

If the tin can had been known earlier, the British seaman might never have earned the title he carries to this day—"limey." It has

absolved many peoples of the earth from the necessity of eating up at once and on the spot all the fish and vegetables and fruit they produce, or preserving such products in dried, smoked, salted, and other forms.

And it has made existence bearable for us who must live in the distant and obscure corners of the earth.

My personal debt of gratitude to the tin can is enormous. Over the years I lived in Bolivia, home of tin, where cows have apparently not been told that milk is their métier, where butter is sheer luxury, where potatoes range in color from pink to royal purple and in size from a marble to a modest plum, where the impresario of a single hen will hoard her output until it runs into the hundreds before contemplating a market, cans were a godsend.

They brought us the barest necessities of life as well as the luxuries—butter, milk, fruit, vegetables, fish, meat, even gasoline. To this

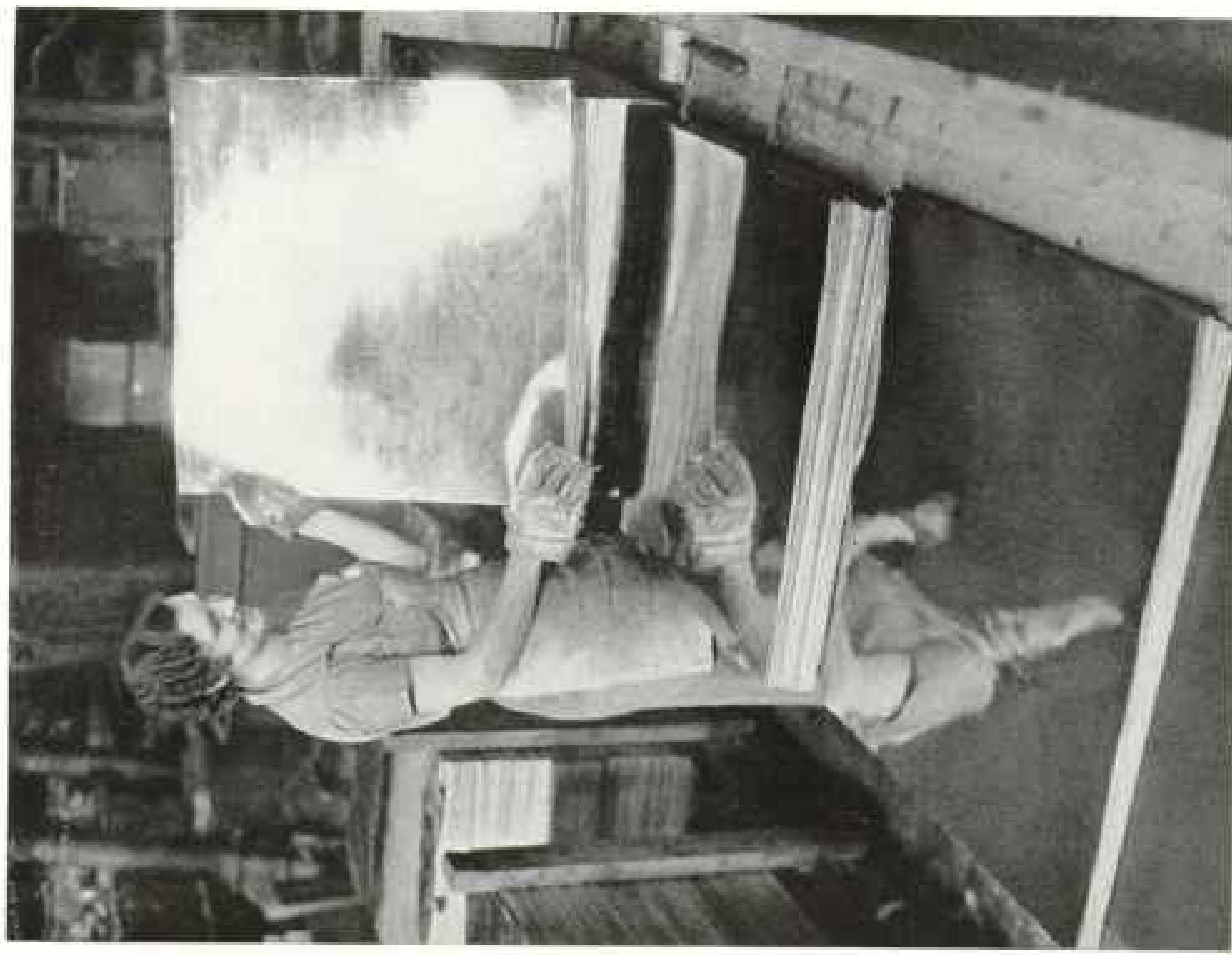




Photograph by William H. Hoelzel.

### Ore Cars Glide Overhead as a Catavi Housewife Shops

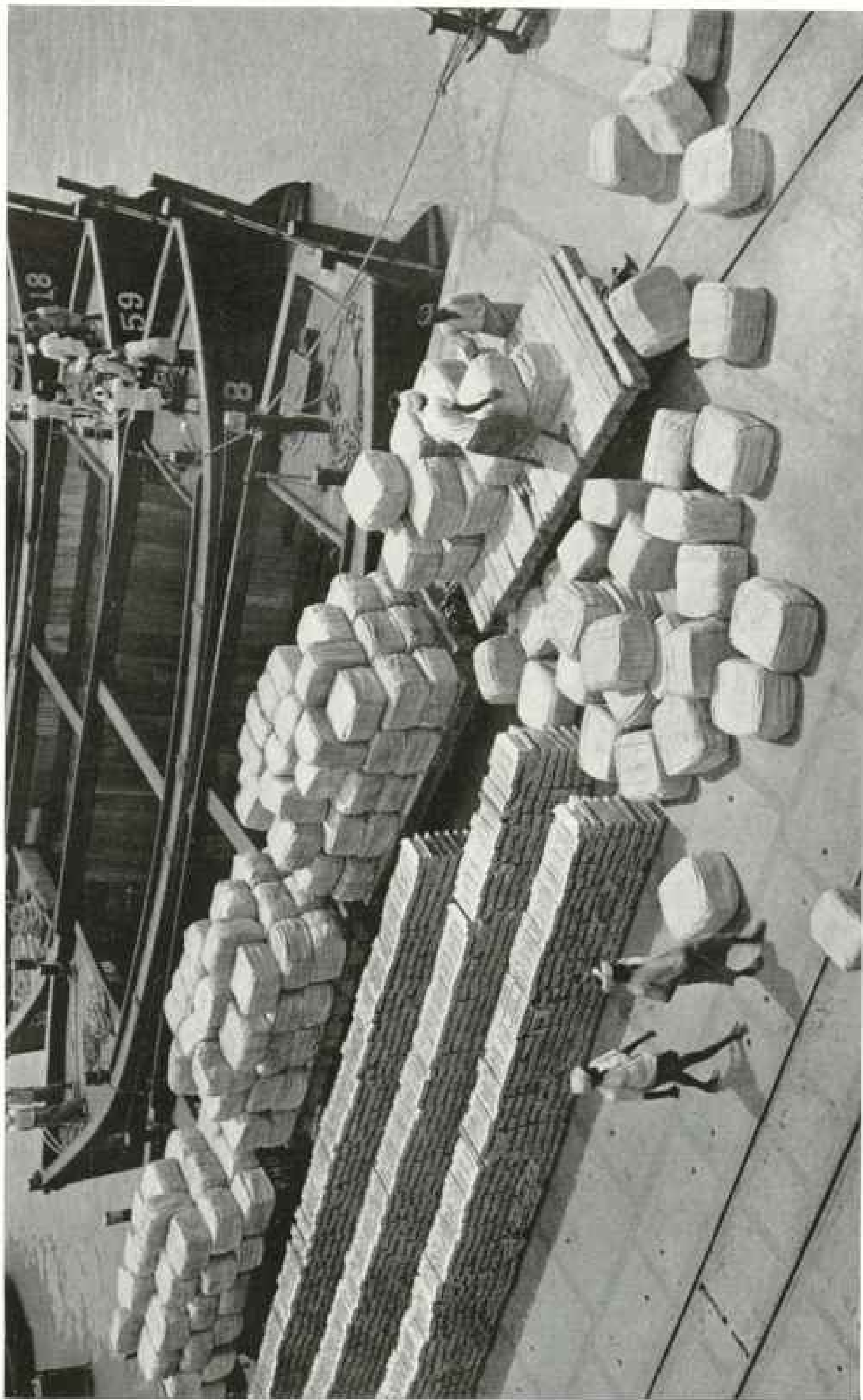
Tin controls the destinies of the town, high in the Andes, where the huge Lalaguin mine is located (pages 664-5). Nearly all inhabitants are Bolivian Indians, inured to the cold in the high altitude.



Photograph by Edeeta L. Whelan

### Shiny Plates for Tin Cans Must Be Perfect

An inspector looks for flaws in tin plate at a McKeesport, Pennsylvania, mill. So-called "tin" cans are 98½ percent steel, covered with a 1½ percent protective coating of tin (pages 666, 680, 682, 683).



Photograph by Alfred T. Palmer

### American Canneries and Tire Factories Await the Tin and Rubber Stacked on Penang's Docks

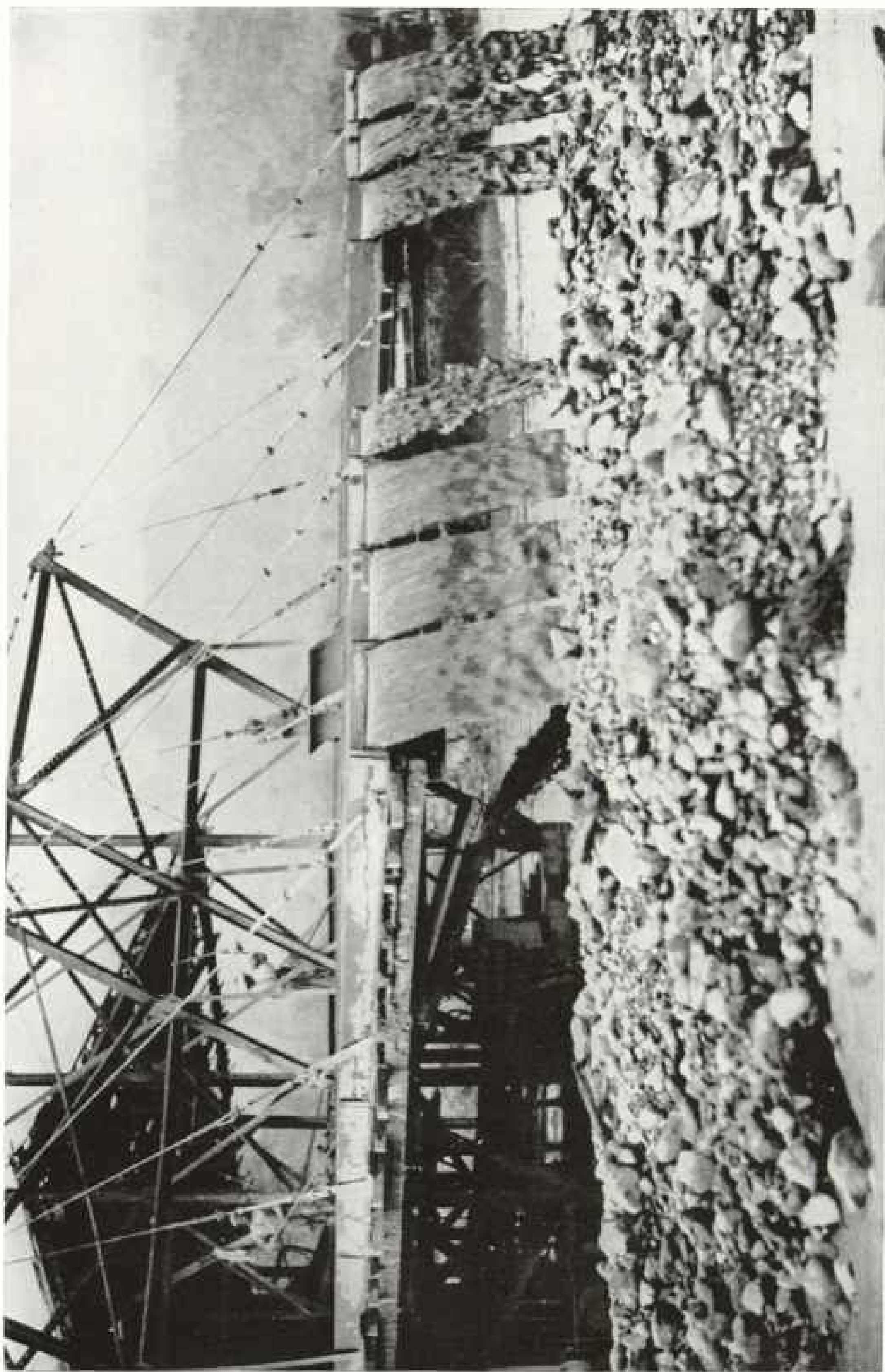
Pigs of tin in neat, silvery stacks will be placed in the lighters as soon as the bales of rubber have been loaded. Every time you buy a can of tomatoes, the odds are two to one that the tin came from British Malaya (page 681). Disturbed world conditions may soon change this ratio, for the United States now is negotiating with Bolivia for the purchase of ore mined there (page 659).



Photograph by J. Taylor Roberts

**Toughest Deposits of Tin Ore Break Down Quickly Under the Pounding of a "Water Cannon"**

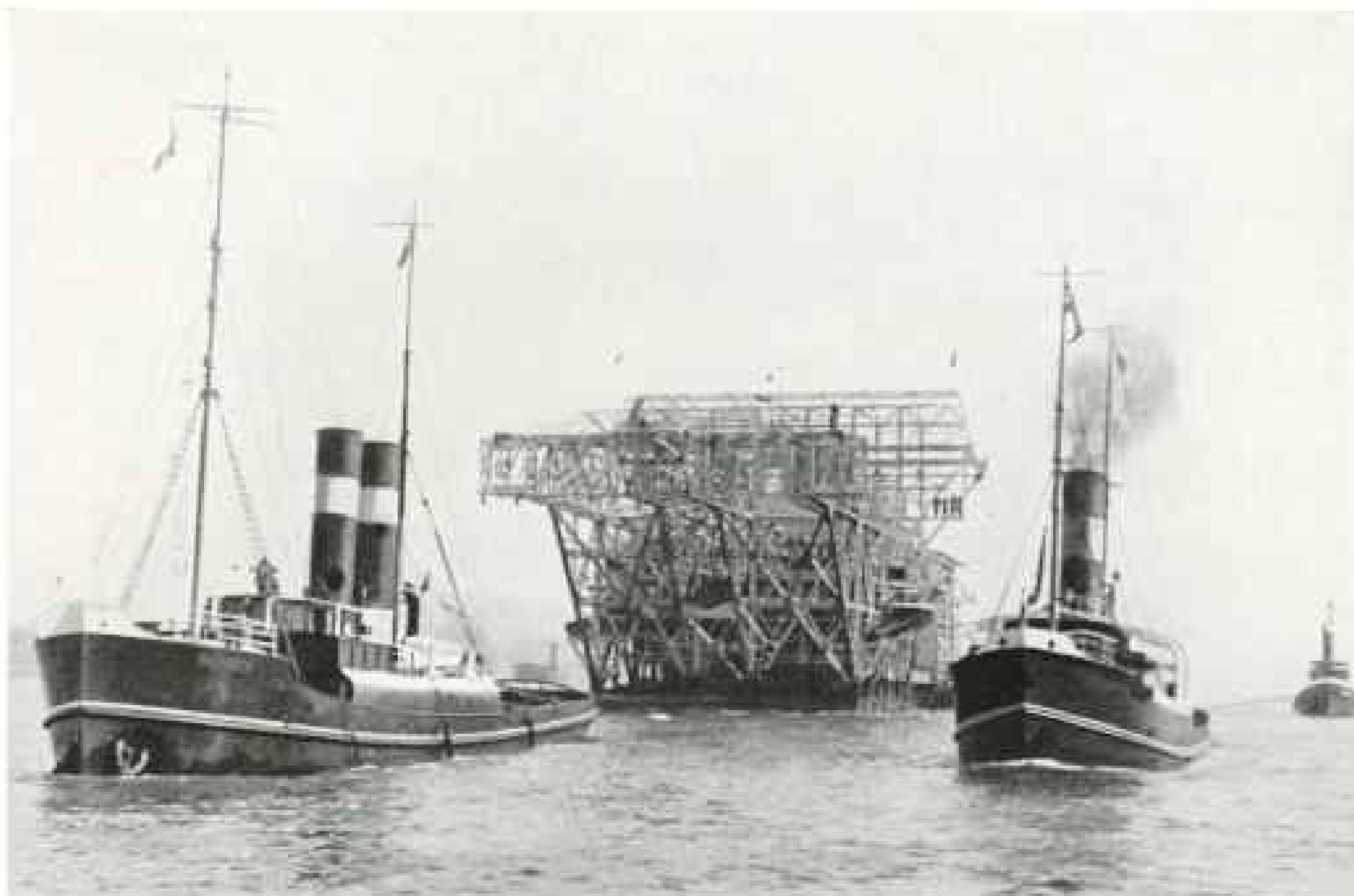
Methods used in this mine at Johore Bahru, Malay Peninsula, are similar to the working of gold placer mines. By ditches, flumes, and pipes, the water is brought to a point higher than the working face of the deposit. A monitor nozzle is fitted to the pipe and the stream is pumped through with terrific force.



Photograph by H. C. Moody

### Sucked from a River in Burma by Bucket Dredges, Tin-bearing Earth Pours Across Shutes

Workmen armed with long rakes stand in the torrent and help recover the ore. Below them, waste rock plunges back into the river through a chute. In his quest for tin, man has searched the river beds of Burma, the high peaks of the Andes, the hillsides of Malaya, the ocean floor off Britain's Cornish coast, and elsewhere (pp. 678-9).



© Wide World

### *Kantoeng*, Ill-fated Monster Tin Dredge, Puts Out to Sea from Rotterdam

Ocean-going tugs tow the heavy craft, on its way to the tin deposits of the Netherlands Indies. The photograph was made on May 3, 1937. A few days later the expensive dredge foundered in a North Sea gale. The Netherlands Government immediately began construction of an even larger unit, and finally had it escorted successfully to the island of Bangka.

day I never see an opulent display of canned goods without a warm feeling of comfort and well-being.

Has it ever struck you how many other roles tin plays in our everyday life?

#### Life in the "Tin Age"

All means of transportation we may use—automobiles, streetcars, railroad trains, airplanes, ocean liners—are dependent on tin. Every automotive vehicle takes from seven to nine pounds of tin, and the variations in tin deliveries are a fair test of the pulse of the industry. Into a modern ocean liner go about 17 tons of tin.

Our newspapers, magazines, and books are printed from type metal—an alloy of tin. Our radios, refrigerators, plumbing, and fire-protection systems employ tin in their make-up. Our tubes of cold cream or shaving soap, our best silk blouses, and even the fillings in our teeth more than likely contain tin.

Many of our foodstuffs have been wrapped in tinfoil. Solder, which consumes around 20 per cent of the world's tin production, is the tie that binds. Thus our Cinderella metal serves modern culture.

The complete story of the service of tin to mankind carries us back through the centuries to the time when our ancestors began to muss about with copper. This malleable yellow metal was an improvement over stone, but it was too soft to be satisfactory either for tilling the soil or for carving game and enemies.

For almost a thousand years, however, our forebears had to put up with it, until one day primitive man discovered that, by mixing molten copper with another metal which a geologically minded person had lately unearthed, he could produce an alloy sufficiently hard and brittle to hold an edge. This new alloy was bronze, and the metal added to copper to make it was tin.

The period which followed the discovery was called the Bronze Age. Man had become metal-conscious, and the tempo of the march toward our present-day civilization had been quickened by tin.

It is curious that tin should have been one of the earliest metals discovered. In nature it is generally found in complex ores associated with other metallic elements, and important tin deposits of the world are confined to a few localities—the Federated Malay States,

the Netherlands Indies, Bolivia, Siam (Thailand), Burma, China, Nigeria, Cornwall.

Indeed, tin ore itself is scarcely arresting. To the uninitiated it looks like nothing more than a chunk of ordinary rock, and even the initiated can only guess at its metal content by its extremely high specific gravity. But it is still more curious that, in spite of the limited means of communication of the period, many of the peoples of the ancient world—the Chinese, the Egyptians, the Europeans—made bronze.

#### Iron Replaced Bronze But Not Tin

The Bronze Age ended when another early metallurgist discovered the properties of iron. Iron then gradually replaced bronze to a large extent. Tin, however, never lost step in the march of time.

The Phoenicians are remembered chiefly not because of their alphabet, which is now ours, nor because of their famous Tyrian dyes, but because of their tin trade.

The Phoenicians sent their ships into all parts of the known world and into the fringes of the unknown; and it has long been held that they carried on important trade in tin with Britain. Well do I remember as a child standing in the Royal Exchange in London and gazing reverently at Lord Leighton's mural showing the uncouth Cornishmen, chastely draped in furs, bartering on the seashore with swarthy, beady-eyed, hawk-nosed Orientals.

Certain scholars have argued that the islands mentioned by the historian Herodotus as "Cassiterides," or Tin Islands, were the Scilly Isles and not England at all. But the fact remains that wherever they got the metal—whether in Cornwall or the Scilly Isles or in Spain—the Phoenicians distributed tin to every part of their little world.

Ancient literature is full of tin talk. The Bible (Numbers 31: 22) tells of tin found among the spoils of the Midianites in the days of Moses. In Ezekiel (27: 12) tin is spoken of as a current commodity at Tyre, and also as being a product of Tarshish (probably Tartessos, now identifiable with Cádiz) in what is now Spain.

Homer knew tin and mentioned it in his *Iliad* (xviii):

In hissing flames huge silver bars are roll'd,  
And stubborn brass and tin and solid gold.

Pliny speaks of tin found on the island of Mictis, six days' sail from Britannia.

The ancient Chinese list tin among their five metals.

It is a moot question, however, whether the translated word "tin" means pure tin.



Photograph by The American Numismatic Society

#### Good as Gold!—An Old Malay Tin Coin

Jean Tavernier, French traveler and merchant, found tin coins used as a medium of exchange in Tavoy, Perak, and other districts of the Malay Peninsula in the 17th century. The Chinese suppressed tin coinage in 221 B.C. (page 684).

More probably it stands for a mixture of tin with some other metal. The Hebrew word *bedhil*, used in the Bible and translated "tin," meant in reality a copper alloy known in Egypt as early as 1600 B.C. Not until the beginning of our era did the Greek word *kassiteros* come to mean our modern tin; and not until several hundred years later did the Latin word *stannum*—derived perhaps from a Celtic word—have the same connotation.

#### Tin Had a Part in Martial History

With the 14th and 15th centuries came another quickening in the march of civilization, and as usual tin was in the vanguard. Firearms were invented, and feudalism was smashed. Old, gray-roated castles, brave walled towns, gallant knights in armor, sturdy yeoman archers were gradually blasted out of being by the new bronze cannon; and the whole scheme of human existence was changed.

Until less than a hundred years ago virtually all guns were made of bronze; those of cast iron were not in great favor. Engineering developments, however, finally enabled iron to steal tin's thunder, and today our heavy armament is made of steel.

Bells, another and kinder contribution of tin to the life of the world, have heralded about every event of historic importance, touched almost every human emotion. The blending of molten copper and tin (approximately 4 parts copper to 1 of tin) into what is known as "bell metal" was one of the chief



Photograph by Hans Hjaltra.

### Hat Trimmings Are for Shade, Not Style

Fringe and broad brim protect her from the hot sun of the Federated Malay States. The Chinese woman is a worker in a placer tin mine (opposite page and 676). With her sister laborers, she helped produce 30 per cent of the world's output of tin in 1939.

secrets of the old metalworkers' art, and the casting of the metal into bells amounted to a religious rite.

The Liberty Bell was the first of large size to be cast in America. This bell had been ordered from England for the State House in Philadelphia, but at its testing it cracked, and it had, therefore, to be recast.

The original bell (1752) was inscribed with the line from Leviticus: "Proclaim Liberty throughout all the Land unto all the Inhabitants thereof."

On the eighth of July—not the fourth—1776, the sturdy bell obeyed the admonition and announced to its little world that a new republic had been born.

Bells figure in very early history. In Exodus (39: 25-26) the high priest wore tinkling golden bells on his robe. A.D. 400 at Campania, Italy, Paulinus, Bishop of Nola, is reputed to have used for the first time a single bell in the top of a meeting house.

In 680, records indicate, church bells were introduced into England from Italy. They are mentioned by the Venerable Bede with much the same awe with which we spoke of our first airplanes.

In the early centuries, when clocks were not common possessions, bells regulated the everyday life of the everyday people; and even now in many small Continental towns and villages the bells—each one known by voice and by name—tell off the day's routine.

Pliny says that in Athens fish sales were announced by the ringing of small bells. In pagan Rome bathing hour was indicated by bells, and later, when Rome went Christian, her inhabitants were called to worship by the same bells.

Bells were fastened to the necks of criminals on their way to execution; and bells were often placed under the coronation throne of kings to remind the new monarch of the fragility of royal prestige.

### Bells Rung Backward for Woe

A series of bells was rung backward (i. e., from the lowest to the highest notes) to announce revolts, massacres, or national defeats. Witness Scott's ballad *The Bonnets o' Bonnie Dundee*:

"Dundee lie is mounted, he rides up the street,  
The bells are rung backward, the drums they are beat."

History reports that the bells of St. Germain l'Auxerrois rang thus when the gaunt



Photograph by Hans Hoffmeyer

### Chinese Women Workers Push Ore-bearing Earth into a Rushing Stream

Water, forced into this hillside mine in the Federated Malay States, carries the load to a pumping station (page 670). Unlike ore in Bolivian tin mines, which is buried deep in the mountains, the metal on the Malay Peninsula lies close to the surface. The deposits are known as "contact" or placer mines.





Photograph from Wide World

### Like a Colony of Ants, Chinese Coolies Swarm Over a Hillside Tin Mine

Most easily and cheaply worked are these open-cut mines in Malaya. With a plentiful supply of water, a worker will shift several cubic yards a day, removing the tin ore from the waste matter. Each coolie is armed with a primitive cutting tool and a washing box.

horror of St. Bartholomew's Eve was loosed on Paris.

Today the radio often brings to lonely wanderers the voice of their beloved home bells. Many a son of Sweden has found comfort in listening in to the familiar sound of Stockholm's City Hall bells tinkling out at six o'clock in the evening their sweet old Swedish melody.

#### Bells Cheer Homesick Exiles

I have picked up the friendly, throaty clang of London's Big Ben in almost every corner of the world—in a forsaken, sun-baked town in Chile, in a bleak and frozen camp in Lapland, in a wind-swept office on the Bolivian pampa, in a little village on the Spanish frontier.

My tenderest memory of bells is associated with New Year's Eve—New Year's Eve in a dingy tent clamped to the giddy sides of the high Andes, when homesickness overwhelmed

me and only a desperate courage kept me from breaking into actual howls of anguish.

One of the mine boys had brought a short-wave radio outfit into camp, but reception was very poor, and all evening our efforts at tuning in had brought only sputterings and slithering shrieks and groans. Suddenly, just before midnight, above the hammer of rain on the roof and the tearing cries of the wind as it hurtled through the cuts of the mountains, the words "New York" came in clear and sharp.

We clasped hands, we lonely exiles, and waited breathless. And then the bells rang out their heavenly message of home and love and good cheer.

"It's Trinity Church bells," gulped the youngest of our young engineers.

And being loyal tin miners, we thanked our Maker for the tin that made bells possible and prayed Him for more tin to speed the world on its way.

Tin lent a hand with the birth of the pipe organ. A record of 1481 states that 14,500 pounds of metal—a blend of six parts tin and four parts lead—were sold during that year for organ pipes. In modern organs some of the pipes are of wood and some of an alloy of tin and lead. Occasionally a few are of pure tin, to give the string quality. Tin gives a harder, more keen and cutting quality of tone, as a rule.

#### Handmaiden of Art

Music is not the only form of art that is indebted to tin. The introduction of bronze in sculpture caused an actual revolution. Previous to this the sculptor had worked in stone, a medium that naturally restricted his form of expression; or in clay, which, though plastic enough, lacked tensile strength; or in wood and ivory.

About the middle of the 6th century B.C., however, hollow casting was discovered, and bronze, because of its lightness and strength, made possible attitudes that were out of the question in anything so unwieldy as stone or so fragile as clay.

How, for example, could the Flying Mercury of Giovanni da Bologna poise himself on one foot and toss back his other classic leg with such airy abandon if he had been cut in marble? How could the wild beasts of Antoine Louis Barye have attained such absolute realism in a less tractable medium than bronze?

During the classical and medieval periods a tremendous amount of bronze statuary must have been cast, of which only a remnant is left. Bronze was a valuable metal.

When the barbarians came thundering down from the north, their ice-blue eyes doubtless gleamed with appreciation of Rome's brazen treasure. A colossal Nero, a sad-eyed faun, a pensive Venus held the makings of stout shields, of good armor, of pots and pans, and even of farm implements.

At later times, when the value of bronze as cannon material rose by leaps and bounds, immense quantities of statuary and architectural bronze were recast as armaments.

#### Bronze Known in Antiquity

When bronze became fashionable in the classical world, various combinations of tin and copper were tried out by the metalworkers, and many of these products were given special names—Corinthian bronze, Delian bronze, Syracusan bronze. Different proportions of tin and copper give alloys of distinctly different colors.

For example, copper, which is red, when

mixed in a certain ratio with tin, which is gray, produces a white metal much lighter than pure tin alone. Some of these bronze color schemes are said to have been discovered by sheer accident. During the burning of Corinth by the Romans in 145 B.C., streams of white-hot metal mingled and formed the splendid Corinthian bronze.

Greece and Rome, however, were not peculiar among the ancients in their use of tin and copper alloys for artistic purposes. Early Egypt has given us bronze statues, and in China bronze was held in especially high esteem. In India, too, bronze is of great antiquity; and in Peru some bronzes, made up of 94 per cent copper and 6 per cent tin, believed to precede the Incaic civilization, have been unearthed.

From the time Christianity dominated Europe until the Renaissance, bronze was in eclipse. With the dawning of the new culture the leaders of the Italian school revived the art, and bronze again became a favorite medium for sculptors. The first notable nude statue of this era, Donatello's David, was executed in bronze.

#### Tin Saved Cellini's Perseus

The great Florentine artist, Benvenuto Cellini, gives a lively and highly personal account of the casting of his famous statue of Perseus. Benvenuto, as usual, had been trying out a new method of casting, a method designed to mantle its author with glory and to mantle with shame lesser craftsmen; and in his enthusiasm he had spared neither himself nor his apprentices.

In the midst of the excitement of melting down the metal, the master was seized with one of his "fevers" (probably an attack of malarial shakes) and was forced to retire to his bed. Thereupon the workmen who had been left in charge of the furnace allowed the heating metal to curdle—or, to use the technical word, to cake.

When news of the disaster was brought to Cellini, he leaped from his bed with a roar which he modestly describes as being loud enough to pierce the realms of flame, and, merely taking a second off to kick his maids and knock down his house boy, galloped into the workshop and at once ordered half a pig of pewter weighing 60 pounds to be thrown into the middle of the cake.

Observing that even then the metal did not run so rapidly as usual, he sent for all his pewter plates, porringers, and dishes, and one by one he hurled them into the molten mass.

Thus the day was saved by tin, for pewter is an alloy that in composition closely ap-



© Planet News Ltd. from Agence

### Miners Tunnel Under the Sea Floor to Find Tin in Cornwall

Along Britain's Cornish coast lie the oldest worked tin mines and mills in the world. In ancient and medieval times they were one of Europe's greatest sources for the malleable metal. Today they furnish less than two per cent of the world supply (pages 673 and 684).

proaches pure tin (from 80 to 90 per cent), and the lovely Perseus was preserved to grace the Loggia dei Lanzi in Florence.

A few classic examples of modern American bronze casting are St. Gaudens' beautiful Adams Memorial in Washington's Rock Creek Cemetery, and MacMonnies' Bacchante in New York's Metropolitan Museum of Art.

In the early 15th century, tin, added to elements previously used for making enameled terra cotta, provided the long-sought white, opaque enamel which resulted in the brilliant development of Italian majolica.

Although today pewter is valued chiefly by collectors of antiques, it held so definite a place in the life of the people of long ago that it rates a chapter in any history of tin. The ancient Chinese, the Chaldeans, the Egyptians, and Greeks were supposed to have made it; and there is no question at all that the Romans did.

Plautus describes in detail a great Roman banquet which was served on pewter dishes. The historian Suetonius tells of silver vessels being removed from the temple and being replaced by pewter. And, more convincing than mere literary proof, large numbers of pewter household utensils and ornaments have been

unearthed, not only in and about Rome, but in Britain, where the Roman conquerors evidently made use of the abundant Cornish tin.

All through the Middle Ages pewter was much in vogue in Europe. It was used for church vessels, when, as in Rome, the precious metals were required for other purposes. When in 1194 England had to pay a huge ransom for the release of her gadabout Richard Coeur de Lion, all the gold and silver service of the realm was tossed into the pot, and pewter took its place on the high altar.

Pewter was also used for domestic purposes. A record states that the meat for the coronation banquet of King Edward I of England was boiled in pewter caldrons, and that more than 300 pewter dishes, platters, and saltcellars formed part of the pewter collection owned by the same king in 1290.

#### A Legacy of "Peautre"

The will of a certain Lady Elizabeth Uvedale in 1487 bequeaths "A boole garnish of peautre vessel, and two round basin of peautre."

As the years went by, pewter lost its hold on the public fancy, and although sporadic attempts have been made to revive its popu-



Photograph from Keystone

### Cornwall Miners Burn Off Deadly Arsenic from Tin Ore

The men must protect their mouths and noses from the dangerous fumes. When the ore is ground and heated, the arsenic rises in the form of vapor, settling on the walls of the ovens. Later it is collected and much of it is sold to the cotton planters of the United States, to be used in sprays for crops.

larity, it has at present a comparatively small body of admirers. Pewter beer mugs, however, have persisted, and connoisseurs will tell you that nothing gives beer the same cool, sharp flavor as does pewter.

These mugs have apparently always been appreciated and have not infrequently made handy weapons in barroom brawls. As far back as 1396, a certain Frenchman was accused of striking a fellow toper with his pewter wine measure. Possibly the predilection for these pewter vessels runs back to an early law which ordered that "all retailers of ale must sell the same in their houses in pots of pewter, sealed and open."

### Powerful Guilds Controlled Pewter

As with all important trades of the Middle Ages, the manufacture and sale of pewter was controlled by guilds scattered all over the Continent.

The pewterers of Bruges were famous; the pewterers of the Netherlands were so highly respected during some periods that they were given the honor of leading all civic processions; and the women pewterers of London, York, and of France were spoken of with high respect.

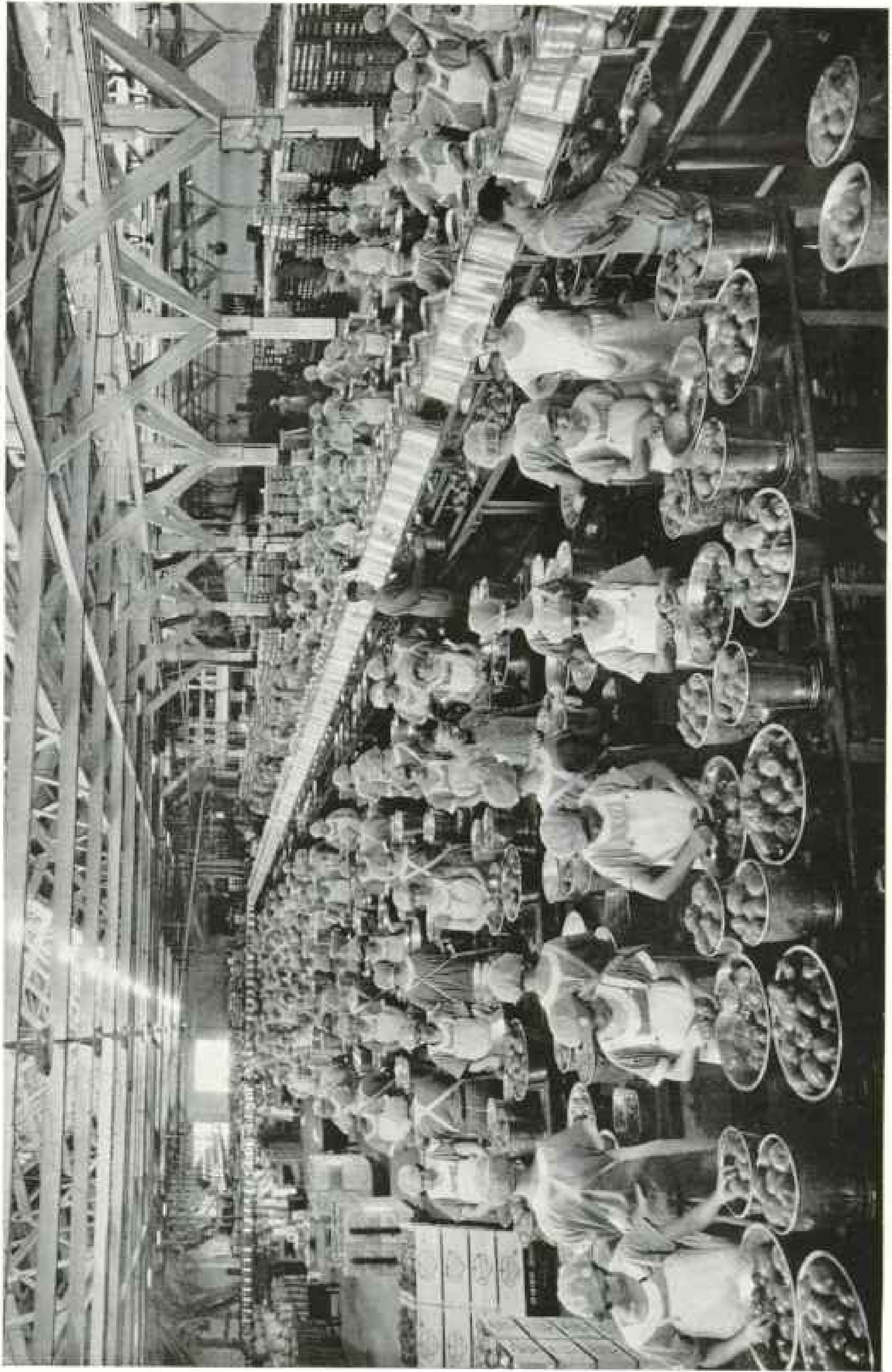
The London guild is the one about which we have most detailed information. This honorable order of craftsmen set for its members a lofty standard of commercial virtue.

Authorized searchers had the right at any time to assay pewter ware to see that the material was up to the requirements set by the guild, and each worker was obliged to put his mark—his "touch" it was called—on every finished piece. The touch showed who had done the work.

To become a certified member of the London guild of pewterers was a difficult business. An applicant had to be native born. He had to serve at least six years of apprenticeship, and at the end of this time he had to work for one year free of charge to repay his master for the expense of his novitiate.

These seven years put behind him, he was free to open "shopp" (not "shoppe" you will note) in London; but even then his guild exercised over him an authority that would surprise the most advanced labor leader of modern times.

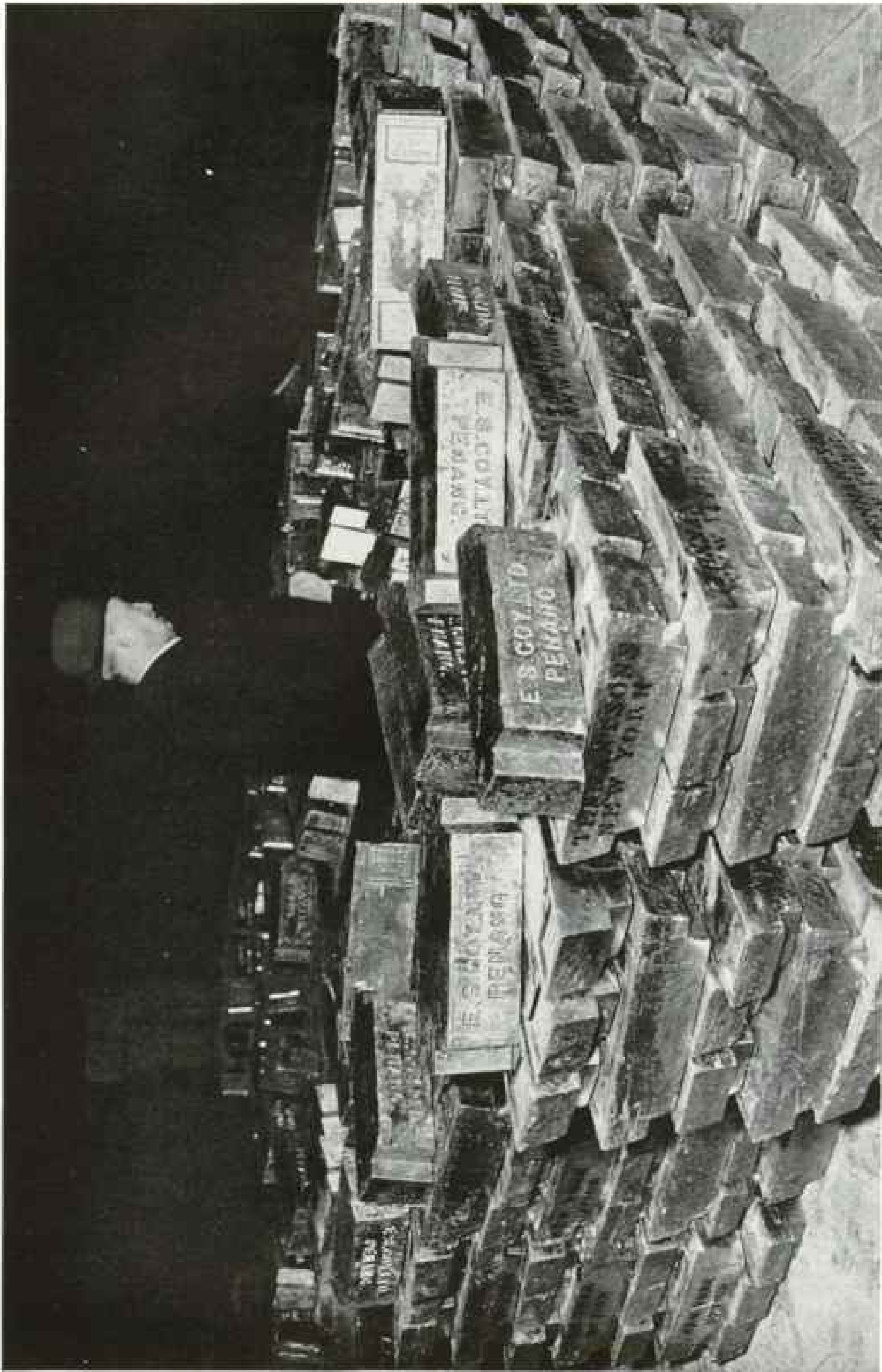
A pewterer was considered an outcast if he carried the secrets of his guild even into the provinces of his own country. If he had the audacity to venture on the Continent, he was



Photograph by Frances Weston

**Peel, Peel, Peel! Ripe Tomatoes Wait for No Man, So Canneries Bustle During the Short Season**

The tomatoes have been washed, scalded to loosen the skins, and then sprayed with cold water to make peeling even easier. Skins and cores are removed with specially designed knives. In this Del Monte plant, the cans are filled solidly, no juice being added. Liquid found on opening drained from the tomatoes when they were cooked.



Photograph by Underwood and Underwood

**Machinists, Printers, Bellmakers, Sculptors, Canners—All Need the Tin Piled High on New York Docks**

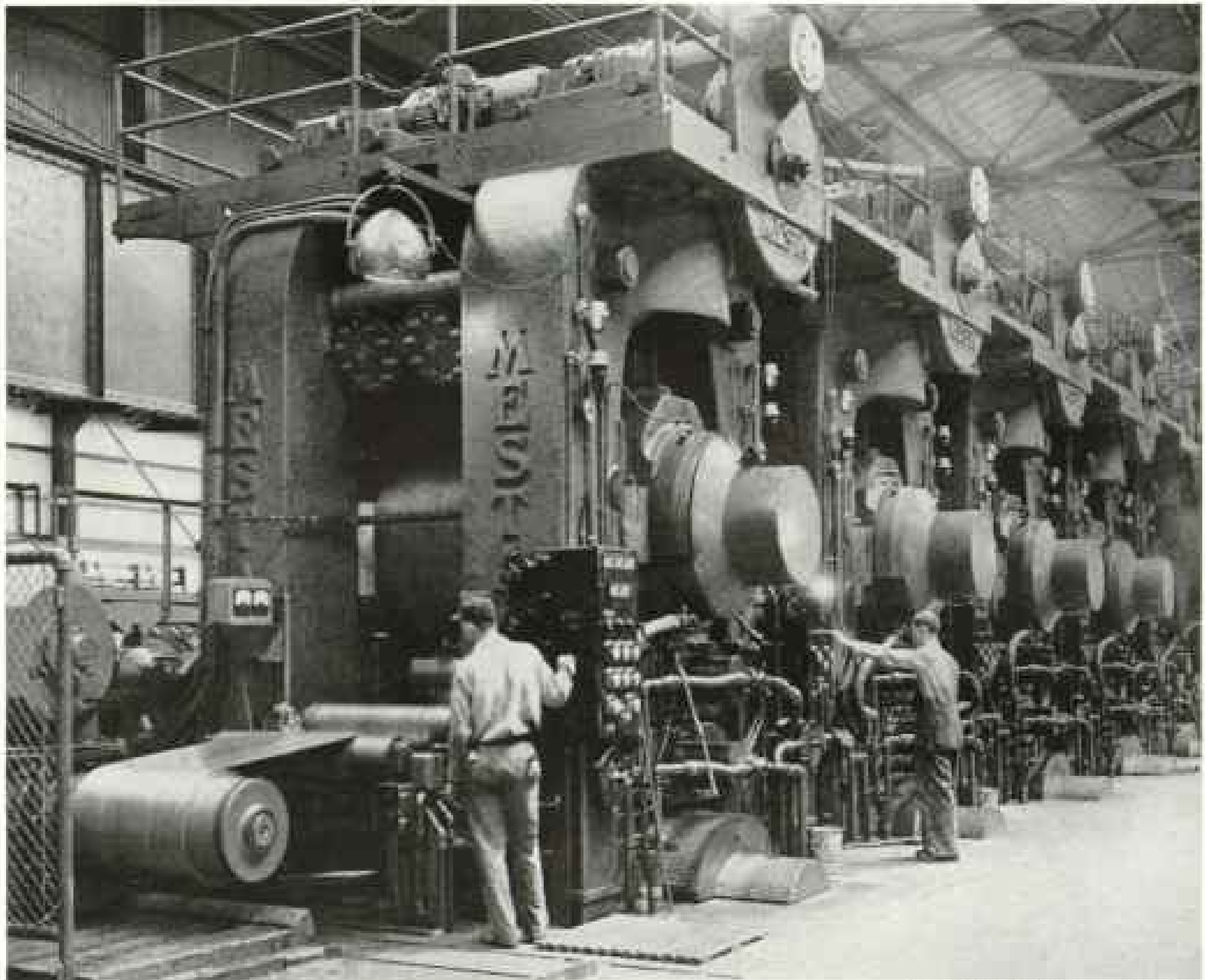
A freighter in from Penang (page 669), has unloaded a shipment at the Bush Terminal, Brooklyn. The pigs will be sent to factories, later to appear in parts of train and automobile bearings, tin cans, tin plate, type metal, bells, bronze statues, or solder. Chemists list hundreds of alloys containing tin.



Photograph from American Can Co.

### Miles of Tin Plate—Fodder for Machines Which Grind Out 12 Billion Cans a Year

Girls inspect the sheets in the assorting room of a Gary, Indiana, mill (page 668). Then the plates go to manufacturers, who produce enough cans annually to supply every man, woman, and child in the United States with about 100 apiece. Of this number, about 60 are for food and the remainder for paint, varnish, oil, and other products.



Photograph from American Can Co.

### Giant "Reducing" Machines Roll Out Thin Steel Sheets for Tin Cans

When the required thickness is reached, the sheets are "pickled" in acid to remove scale rust and other impurities. Then, passing through a bath of molten tin, they become tin plate. Cans made from tin alone are not suitable for commercial use, being too heavy and expensive.

subject to call from London, and if he did not return at once, he was forthwith expelled from his guild.

His "shopp" could not open on the street, where any foreign or country pewterer might in passing spy on him and profit by the secrets of his trade. He might not work at night, because the delicacy of his task required the brighter light of day; he might not work on holy days because of the religious affiliations of the guild.

Long after the last master pewterer and his youngest apprentice were dead and gone, the metal on which they had lavished such loving care performed another signal service to mankind. Joseph Nicéphore Niepce, an inventor of photography and later a partner of Daguerre, used plates of pewter in his earliest experiments in photography, and even in our own day tin has played its part in this art.

From tintypes to a royal tinner seems a far cry, but the full story of tin knows no social

bounds. England holds her tin industry so dear that since the days of the Black Prince the heir to the throne has been traditional head of the Stannaries (i.e., tin mines), a noble of the realm has been their warden, and the "tinnery" themselves have been a privileged class.

As far back as the Roman Conquest these tinnery were free men, and later they were given all sorts of special concessions, even to their own parliament and their own courts. The last stannary parliament sat in 1752, but the Stannary Courts continued until 1896.

#### Privileges and Penalties for Tinnery

Under this self-government the miners enjoyed a certain amount of freedom that their contemporaries did not, but they were held accountable to a rigid standard of honesty. Tinnery could be forced to serve in the army when their warden decided their own industry no longer required them.



A tinner could avail himself of the "right of tin bounding," whereby he could start mining for tin wherever he saw fit, under certain conditions, with no other formality than the promise to pay the owner of the land the traditional tin toll—one fifteenth of any ore he might produce.

But if this tinner, when smelting the ore, was caught adulterating the metal, he was forced to swallow as many spoonfuls of molten tin as he could manage.

A man who sold below specified prices had his hand pinioned to a tree or a board by a knife, and it stayed there until he got up nerve to jerk it loose. Not much fun being a tin "chiseler"!

#### Ancient Tin Money

The history of coinage is splashed now and then with tin, although this metal has never been largely favored for money, and it is possible that most tin coins were of an alloy and never exclusively of tin.\* At any rate, ancient historians state that token coins of tin, or of copper plated with tin, were struck by Dionysius of Syracuse, and in Gaul during the reigns of Septimius Severus and Caracalla; those of Severus, however, may have been counterfeit.

Coins of tin were in use among the early Britons. During the Middle Ages in England tin coins were widely circulated in Devon and Cornwall.

In 1684 farthings of tin were struck, with a square peg of lead in the center to hinder counterfeiting.

The slang term "tin" for money dates from an English silver coinage of the 18th century that wore so thin and smooth before its recall that it was said to resemble tin.

At present tin in coinage is restricted to its use with copper to form bronze. Bronze was the early currency of Rome and northern Italy, and for 2,000 years bronze cash constituted the chief coinage of China.

Bronze coins first appeared in Greece near the end of the 5th century B.C., but then, as now, they were used merely for small change.

#### Bronze Helped Roman Inflation

When wars or other strains on the treasuries of our forebears made inflation desirable, bronze was used to replace precious metals. In the years of her decline Rome often resorted to this bronze inflation.

The curious tin "hat coins" of Pahang, in the Malay Peninsula, struck from 1845 to 1878, were shaped like a truncated obelisk;

hence their name. Another Malay tin coin is shown on page 673.

In medal making, as in coinage, bronze has always been an important medium. Until the time of the Great War the Victoria Cross was struck from bronze cannon taken from Russian and possibly French enemies.

When in the political reshuffle of 1914 old enemies became new allies, it seemed discourteous so to use the armaments of friends; and England now employs some captured Chinese bronze guns to make this most prized British reward for heroism.

Possibly because tin is not a home product, the saga of tin mining is to many of us an untold tale.

Yet for the most part tin mines are found in places sufficiently romantic to form a suitable background for any saga: Cornwall, home of Jack the Giant Killer; the distant East—the Malay Peninsula with its pirates and their wicked crises; China, the Far Cathay of Marco Polo; Burma, with its tinkling pagoda bells; Siam (Thailand), with its white elephants; Nigeria, whose natives brought ornaments of tin to the coast as far back as the beginning of the 18th century.

#### Legend of Cornwall Mines

Although the time element is rather confusing to a hard and fast historian, legend has it that a certain Christian saint, obviously a geologist, discovered Cornish tin. St. Piran, or Perran, for some unexplained reason, had been chained to a rock and set adrift by his Irish colleagues; but by good luck he had floated up on the coast of Cornwall.

After he had made his notable find, the inhabitants of the district celebrated with such fervor that to this day "drunk as a Perraner" is a common expression in Cornwall. The saint lived, so it is said, to be 206 years old, and his feast is celebrated on the fifth of March.

Another legend, which has many supporters, states that St. Paul came to Cornwall to preach to the tanners.

The Cornish mines—some of them tunneled under the floor of the sea—were in historical times one of the greatest sources of tin in the Western World; today they furnish less than two per cent of the world's tin (pages 678-9).

But Cornish miners—Cousin Jacks—with their single-minded devotion to their job and their flair for metals, inherited from generations of mining ancestors, are known wherever there are mines.

\* See "Geography of Money," by William Atherton Du Puy, NATIONAL GEOGRAPHIC MAGAZINE, December, 1927.

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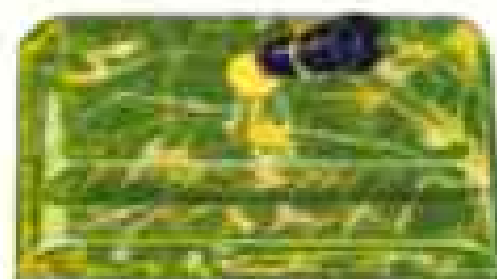
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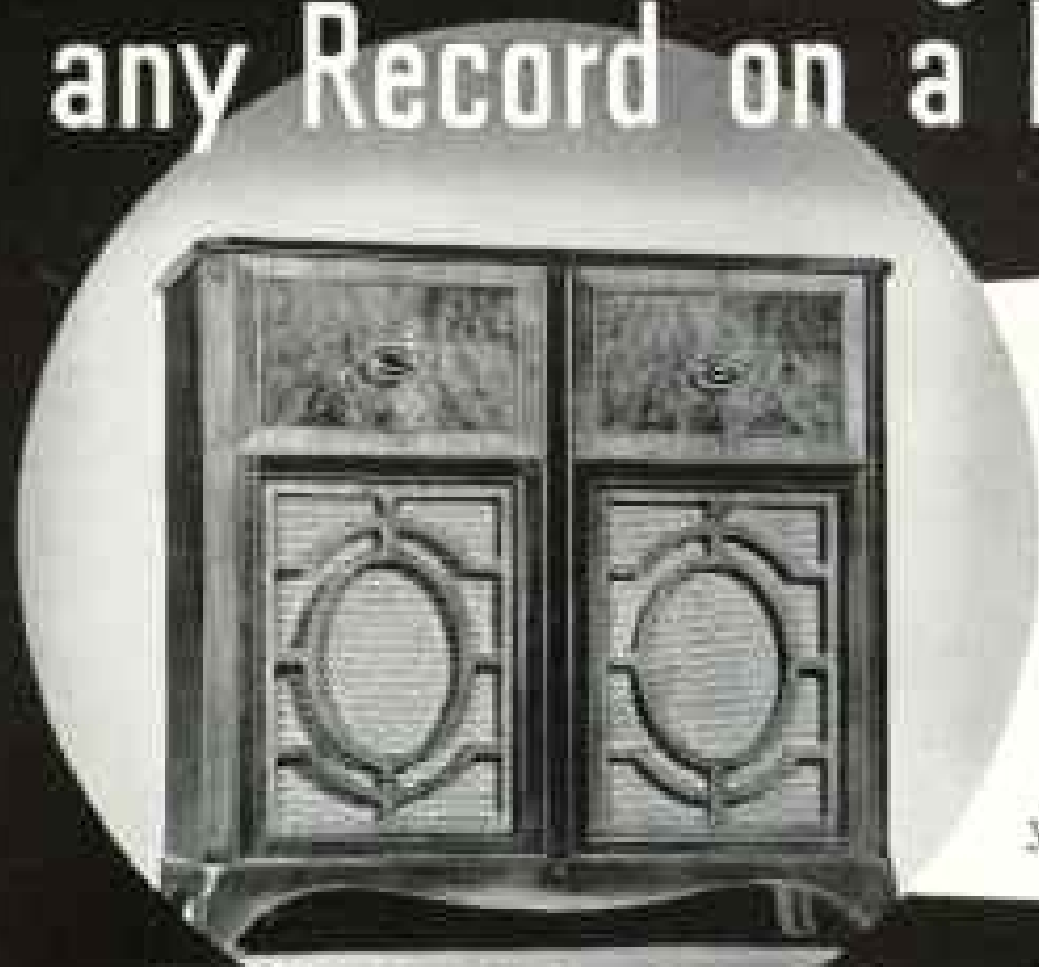
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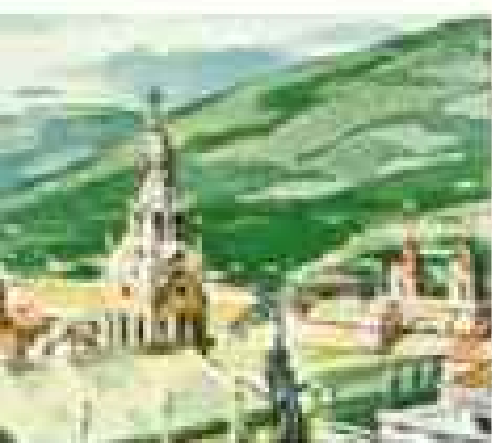
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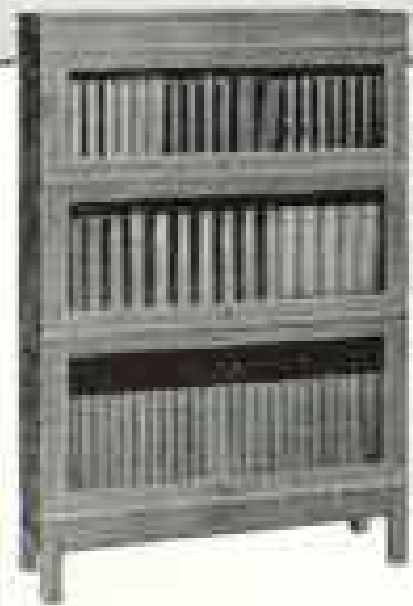
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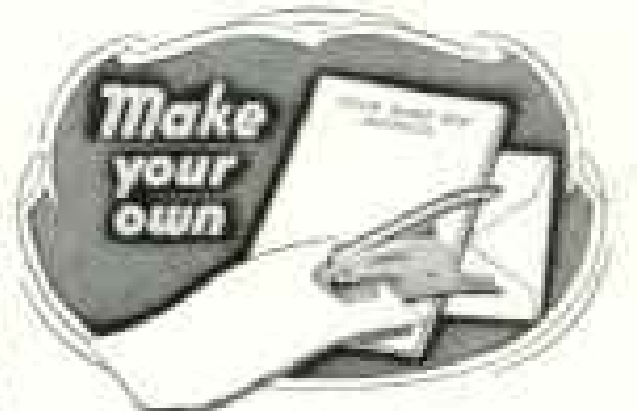
Left: Ardmore style... solid end bookcase... adjustable shelves.



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# DEATH SENTENCE *for Dirt*

*by Westinghouse*



• *Several years ago* one of the most interesting experimental devices in our research laboratory was one that acted like a magnet on smoke, dust and dirt in the air. Strange part about this electric device was that it worked just as quietly and free from moving parts as a storage battery. Yet in practically no time at all it would collect a jar full of dirt from air you'd declare was clean and pure.

• *Today*, that device is known as the Precipitron\* and we're having a busy time filling orders for it. That's easy to understand once you appreciate that the great American smoke problem alone costs business, home owners and taxpayers millions of dollars each year. But smoke is only one of innumerable air-borne impurities such as dust, dirt, pollen and other substances.

• *The way* the Precipitron rids the air of smoke is an interesting example of its practical efficiency and usefulness. Smoke is made up of particles so minute that a screen fine enough to catch them would not allow air to pass.

• *Yet the Precipitron* takes smoke out of the air as if by magic. The principle employed is simple. Every incoming particle of smoke, dust, dirt, and pollen receives a *positive* electrical charge. Then a *negatively* charged plate, acting like a magnet on steel filings, draws these particles out of the air stream.

• *We knew that* there was a need for the Precipitron, but we hardly expected it would find so many uses as to open up an entirely new industry for us.

• *For instance*, in textile mills the Precipitron is removing smoke and soot from the air for the dryer and spinning rooms. In telephone exchanges it is protecting the tiny, delicate relays that operate the dial telephone system. In steel mills it is cleaning the ventilating air for main-drive motors and motor generator sets. In hospitals it is safeguarding recovery wards and operating rooms.

• *In all buildings* where installed, it is reducing cleaning and painting costs. One store which used to repaint every year now finds it need do so only once in *three* years.

• *Right now* Westinghouse Research Engineers are working on many other difficult projects. We hope a lot of things like the Precipitron will result.

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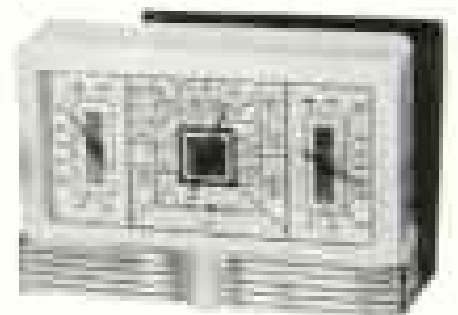
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**LISTEN WHILE YOU TRAVEL... PLAY... OR WORK**

Take this wonder portable where ordinary portables will not work efficiently; in a train, airplane, bus, ship, auto or any windowed building where metal construction *keeps out reception*. The secret of why it works while others fail is in the *Patented Movable Wavemagnet*, which is exclusive with Zenith.

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And that's not all! At home, in the office, in hotels, if you want to save your battery, plug

into any light socket... 110 volt AC or DC. That will automatically disconnect your battery and save it for outdoors or travel.

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This Zenith portable has storage space for earphones... (extra equipment) for use at ball games, fights, or while travelling; for privacy in reception without loudspeaker. At home—no annoyance to those in the next room or even in the next bed when you listen with Zenith earphones or Hushatone. A boon to the hard of hearing, too.

**UNDER NO OTHER NAME BUT ZENITH...**

... can you obtain this radio or a portable that *is, has, and does* so many things! *Patented Wavemagnet*—built-in yet movable—combination battery and lighting current operation—loudspeaker and ear-phone reproduction—adjustable to varying conditions—reception at home or travelling. Don't buy until you see and hear the Zenith Universal Portable at authorized Zenith Dealers everywhere.

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# FALSE TEETH SMILE



THANKS TO  
**POLIDENT Beauty Bath**  
Cleans plates like new—no brushing!

**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?

The thing to do is—get Polident—a powder that magically dissolves away all tarnish, stain and food-deposits from plates and removable bridges—*without brushing, acid or danger!*

What a difference in the way your plate

looks and feels! Polident actually *purifies* your plate—leaves it odorless, *clean*—attractive—as natural looking as the day you got it. Gums look more “alive” too!

*Grateful users praise it*

Leading dentists everywhere recommend Polident. Tens of thousands of grateful users call it a blessing. Long-lasting can only 30¢ at any drug store. And *your money back if you are not delighted.* Hudson Products, Inc., 220 West 19th St., New York, N. Y.

**False Teeth can't be cleaned with make-shift, inefficient methods!**

A tough, dingy, almost invisible film forms on plates and bridges. It absorbs impurities like a sponge! Mouth washes, ordinary pastes or powders are *not designed* to clean



false teeth! Household cleansers can ruin them. No brush can reach the danger-spots. Yet Polident *cleans and purifies* plates—like new—with safety!

**Cleans, Purifies WITHOUT BRUSHING!**

Do this daily: Add a little Polident powder to half a glass of water. Stir. Put in plate, bridge 10 to 15 minutes. Rinse—and it's ready to use.

# POLIDENT



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# Curbstone Medical Advice



*"That's the same kind of stomach trouble my husband had—why don't you do what his doctor advised?"*

*"Anne's headaches were just like that, too—I'll tell you what Grace should do for hers . . ."*

*"It cleared up Johnny's throat in no time—I'm sure it will help Jimmy . . ."*

How easy it is to get friendly, well-meant health advice! It is generously and sincerely offered over the luncheon table, the tea tray, the telephone, or on the street corner.

### *But how dangerous it can be!*

For one person's stomach upset may result from over-eating . . . but another's from gastric ulcer. A headache may be due to eyestrain . . . or to sinus infection . . . or even to brain tumor. And while one youngster's sore throat may be ordinary tonsillitis . . . the next can be a deep-seated abscess . . . or the start of diphtheria.

► And the danger of diagnosis by uninformed, unqualified advisors doesn't stop there. Frequently people *with the same complaint* should be treated differently. Literally, one man's medicine may be another man's poison. One of the world's leading medical authorities says that each case of sickness should be considered as unlike any other.

Then . . . what really is the right thing, the

safest thing for you to do when trouble comes?

### *Get your advice from a physician!*

His years of training and experience fit him better than anyone else to determine just what is wrong and what is the right treatment for you. It is unjust to put your druggist on the spot—don't ask him to act as your family physician. Get a doctor's advice early—for most of the common ailments known to man respond to treatment more promptly and more successfully when caught at the outset.

Remember—good intentions alone have caused too many tragedies. With good professional advice available, why take any chances with the kindest of amateur "medical" advice?

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**I**F YOU HAVE EVER WATCHED a nest of young yellow warblers carefully, you have observed that both parents co-operate in the job of feeding them.

Sometimes the mother sits on the nest while the father forages for worms, seeds, and other delicacies. Sometimes both the mother and father hunt for food.

But the mother is never left alone to shoulder the complete care of her young if there are more than two young birds in the nest; for the mother warbler, by herself, cannot take care of her children properly. The job is too much for her.

The task of a human mother is even more difficult. It is very hard for her to bring up even one child by her own efforts. For trying to be a real mother while providing food and clothes and a home for her child and herself is a desperate, even heart-breaking struggle for a woman.

No man, who loves his wife, ever consciously

exposes her to such a burden. But you probably have known too many cases where devoted husbands have left their wives with small children to bring up, and no money to bring them up with, simply through oversight or delay or too optimistic an attitude toward the future.

Unless you are certain that your loved ones are amply protected, no matter what should happen to you, why don't you call your local Travelers agent or insurance broker? He can give you sound, homely advice on what kinds of insurance are most necessary for you to have, and how much you should have.

Moral: Insure in The Travelers. All forms of life, casualty, and fire insurance; all forms of fidelity and surety bonds. The Travelers Insurance Company, The Travelers Indemnity Company, The Travelers Fire Insurance Company, Hartford, Connecticut.

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**SPAM**

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## *Life is a movie...* with a movie camera you keep it all...

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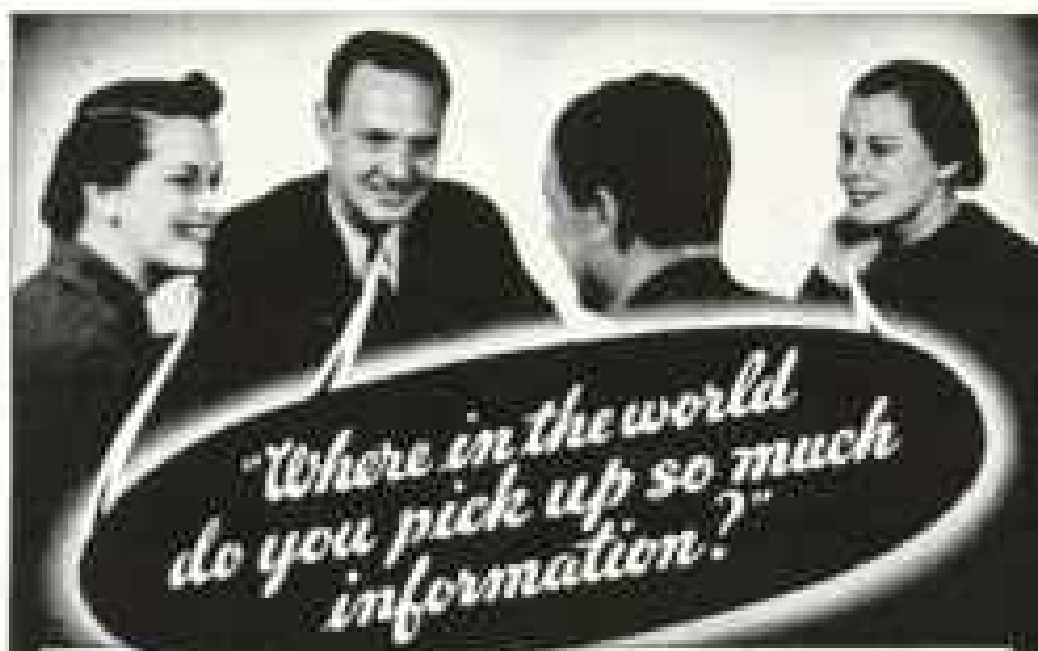
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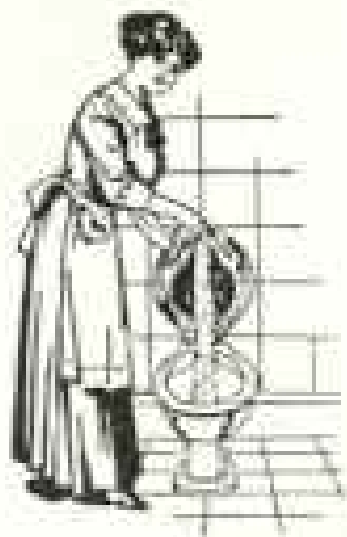
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