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THE NATIONAL GEOGRAPHIC MAGAZINE

Haunting Heart of the Everglades

By ANDREW H. BROWN

BIG BRAKES on four war-surplus bomber tires ground our 'Glades buggy to a sliding stop.

"There they go—into the high grass!"

I jumped down from my seat, climbed to the snake box in the back of George Espenlaub's swamp chariot, and stepped up to the cab roof. Two buck deer had sprung from the trackless Everglades ten yards ahead. They dropped out of sight in a swale.

"I'll beat the marsh and try to flush them," George proposed. "Maybe they'll run out past the buggy."

My companion pushed through head-high saw grass, flailing the thick growth with a stick. Suddenly the graceful animals bounced up almost from George's feet. They fled across the prairie, two tawny blurs with bobbing white "taillights."

The bounding deer gave the crowning touch of life to flat, rippling grasslands. Dips in the plain cupped mirrors of rain water floating white water lilies and edged with wild iris. Cloud castles billowed in a hot blue sky.

Wild Land of Swamp and Cypress

Our vantage point was deep in the wild heart of south Florida's Everglades, that alluring expanse of swamp and savanna, cypress head and hammock jungle, which Miamians jestingly style their city's 4½-million-acre backyard.

Technically, the Everglades are a broad sweep of saw-grass plains curving around the southeast side of vast Lake Okeechobee and extending south to Florida Bay and the Gulf of Mexico.

By freer interpretation the name "Everglades" takes in Big Cypress Swamp and Okaloacoochee Slough and hence most of Florida south of Lake Okeechobee.

During late winter and early spring of 1947 Willard Culver, National Geographic photographer, and I wandered foot-loose in this greater area.

Natural conditions long hampered development of the Everglades. Today, onetime "impediments" are being turned to man's benefit.

Water control has opened thousands of acres of black earth to truck crops. Sugar cane thrives on the peaty nitrogenous soil. Drier flatlands have been cleared for pasture. Remote sloughs are yielding hidden riches of pine and cypress timber.

Big stretches of the country devoid of economic value are being set aside for water and wildlife conservation—and for recreation.

The Nation has recently received a magnificent "gift," Everglades National Park, which President Truman dedicated on December 6, 1947. Twenty-eighth such public reserve, it is the only subtropical national park in the United States. A new three-cent stamp has been issued to celebrate the event.

Justified at last were the vision, faith, and unrelenting efforts of 81-year-old Ernest F. Coe, Director of the Everglades National Park Association. For 20 years Coe fought, often single-handed, for creation of a national park in south Florida's unique wilderness.

The Everglades National Park Commission also was instrumental in making the park a reality.

Limits of the park eventually are expected to embrace most of Florida Bay, including nesting keys of the striking, but scarce, roseate spoonbill (Plate IV). The park's preliminary 710-square-mile area takes in a broad patch of the tip of Florida south of the Tamiami Trail (map, page 149).

About half the protected region is marshy grasslands and the rest mangrove swamps

Ernest Bennett from Miami Daily News

To Picture an Air Plant, the National Geographic Photographer Shinnied up a Cypress

Willard Culver reaches for the camera passed up to him by the author, Andrew H. Brown. The bushy epiphyte, left, is one of thousands that bedeck trees in the western Everglades (Plate V).

veined by blue tracery of lakes, rivers, and tidal channels.

We struck out for the park area from Homestead, swaying down the narrow road towards Cape Sable, ultima Thule of mainland Florida.

Roads and Canals Are "Siamese Twins"

In the Everglades, road and parallel canal are inseparable. To build a highway in this soggy land you dig a ditch (which fills with water as fast as you shovel it out) and throw up the excavated rock (limestone lies everywhere just below the surface) in an embankment to form the new roadbed.

A clear, cold sunrise found us outward bound from Coot Bay on the Fish and Wildlife Service patrol boat, *Osprey*. We were off on a 100-mile cruise to Shark River. (Before the park took over, this section was part of the Everglades National Wildlife Refuge.)

At the launch's helm stood big, weatherbeaten Warden Barney Parker. He cants a ranger's felt on the back of his head, rests a generous paunch against the wheel, handles a revolver like one of the James brothers, and has a heart soft as a June sunrise.

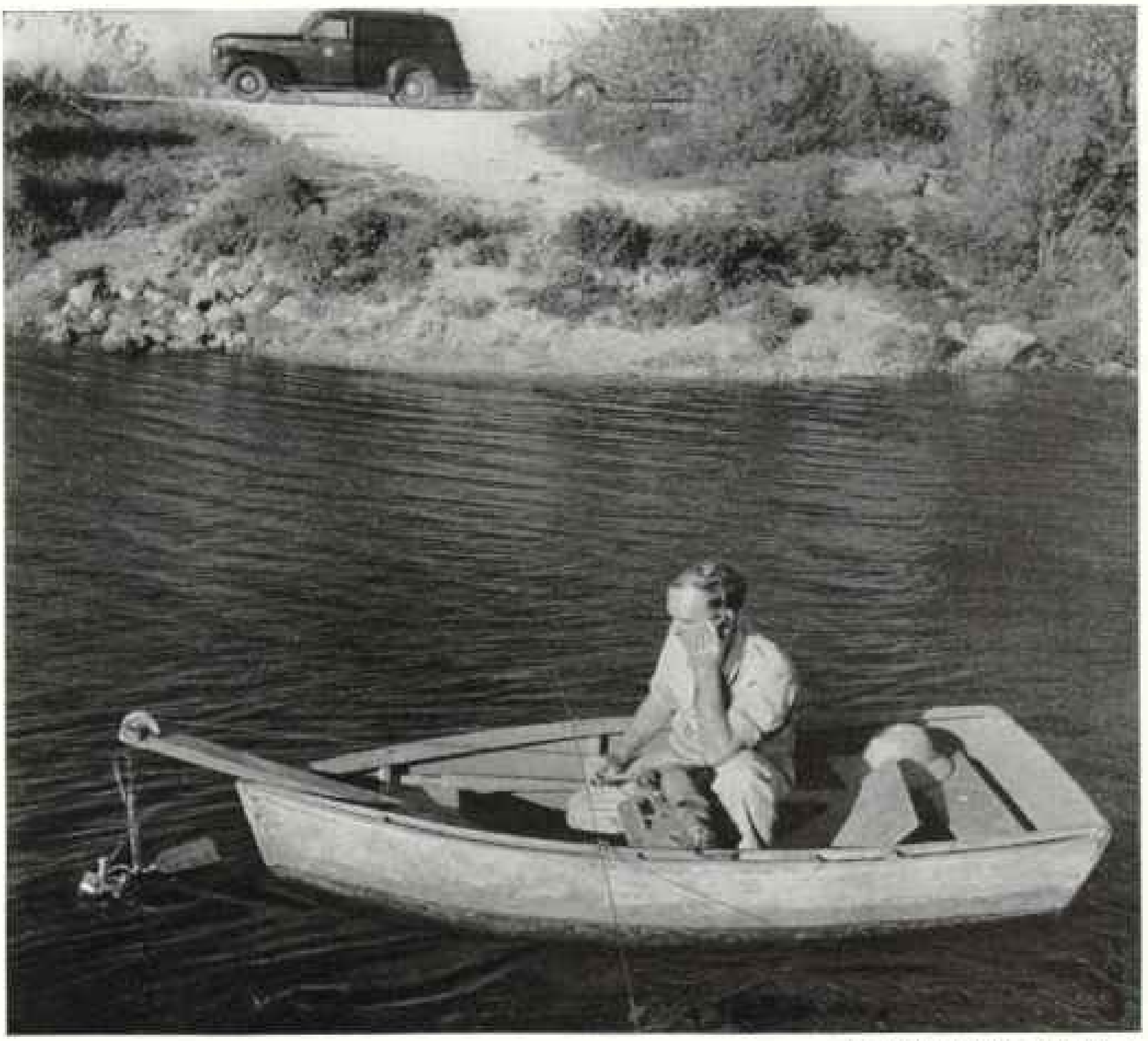
Even Barney has been lost in the maze of winding creeks that patterns this area.

Far up Shark River, where the tranquil stream splits into two reedy branches, we hove to off the Little Banana Patch, a favorite camping spot for a century. Here Daniel B. Beard, then Refuge Superintendent, now Superintendent of the Everglades National Park, and Walter Weber, wildlife painter, set up a base camp to use while Walt sketched birds in their native habitat.*

A few banana trees, planted long ago by Indians, name the place. Under a vine-hung Ficus tree was a flat site for a tent (Plate I). Giant ferns gave Weber and Beard a soft foundation for the floorcloth.

Leaving Weber and Beard to feather their new nest, Barney, Culver, and I whisked upstream in the outboard dinghy. A big alligator slid off a mud bank (page 172). The winding creek unveiled an amazing abundance of birds.

*Walter Weber's paintings of wildlife of southern Florida, with descriptive text, will appear in a subsequent issue of the National Geographic Magazine.



Staff Photographer Willard R. Culver

Through Headphones He "Hears" How Much Water Flows Past

His boat held in place by a cable, a hydraulic engineer of the U. S. Geological Survey counts clicks caused electrically as the current of Miami Canal turns the rotor suspended from the boom (left). By taking readings at varying depths and at several stations across the stream, the technician computes the volume of fresh water passing this point. Geologists recommend keeping selected areas of the Everglades wet, by use of control dams on drainage canals, to help maintain a high water table along Florida's populous Atlantic coast.

Flushed by the whine of our motor, clouds of hundreds of snowy egrets, white ibis, little blue herons, and Louisiana herons rose from trees along the stream. They flew upriver ahead of us, alighted again, only to flap away when we buzzed around the bend (page 171).

Lesser numbers of ducks, wood ibis, white pelicans, black-crowned night herons, cormorants, anhingas, skimmers, kingfishers, and grebes added to the rich variety of this ornithological field day.

Indian Villages Flank Tamiami Trail

Returning to Miami, we drove west across the waist of the Everglades.

Our highway was the famed Tamiami Trail, the name a contraction of Tampa and Miami, terminal cities of the 270-mile-long nature-way (page 150).

Apart from the road, planted Australian pines, and canal there were few signs of man's intrusion. We visited Seminole Indian villages which stand opposite the infrequent filling stations (Plate III).

Colorful natives, descended from survivors of the Seminole War of bitter memory, lived much in the manner of their more aloof cousins back in the bush.

Facing the highway were counters laden with cypress boat models, with multihued aprons, capes, and skirts, with dolls fashioned in their makers' image.

Just east of the boundary between Dade and Collier Counties saw-grass prairie merged

Staff Photographer Willard R. Culver

A Mechanical "Mole" Digs a Pipeless Conduit to Drain and Water Fields

A tractor pulls this caterpillar-tread device across vegetable fields near Lake Okeechobee. The worker lowers the thin vertical blade, at the bottom of which is a torpedolike cylinder closed at the forward end. As the caterpillar clanks along, the blade cuts the soft muck as a knife slices cheese, and the cylinder burrows through the ground two to three feet below the surface. In its wake it leaves a tunnel of the same diameter as the "mole." Soil here is so adhesive that the excavated tube does not collapse and may last for years. Spaced at intervals across a field, these subterranean channels drain farm lands that are too wet, and irrigate the soil from canals when drought prevails.

into open woods of scrub cypress and scattered palms, like parkland. Then the road plunged into real forest, mostly cypress, but with more and more palm and pine as we rolled west (page 146).

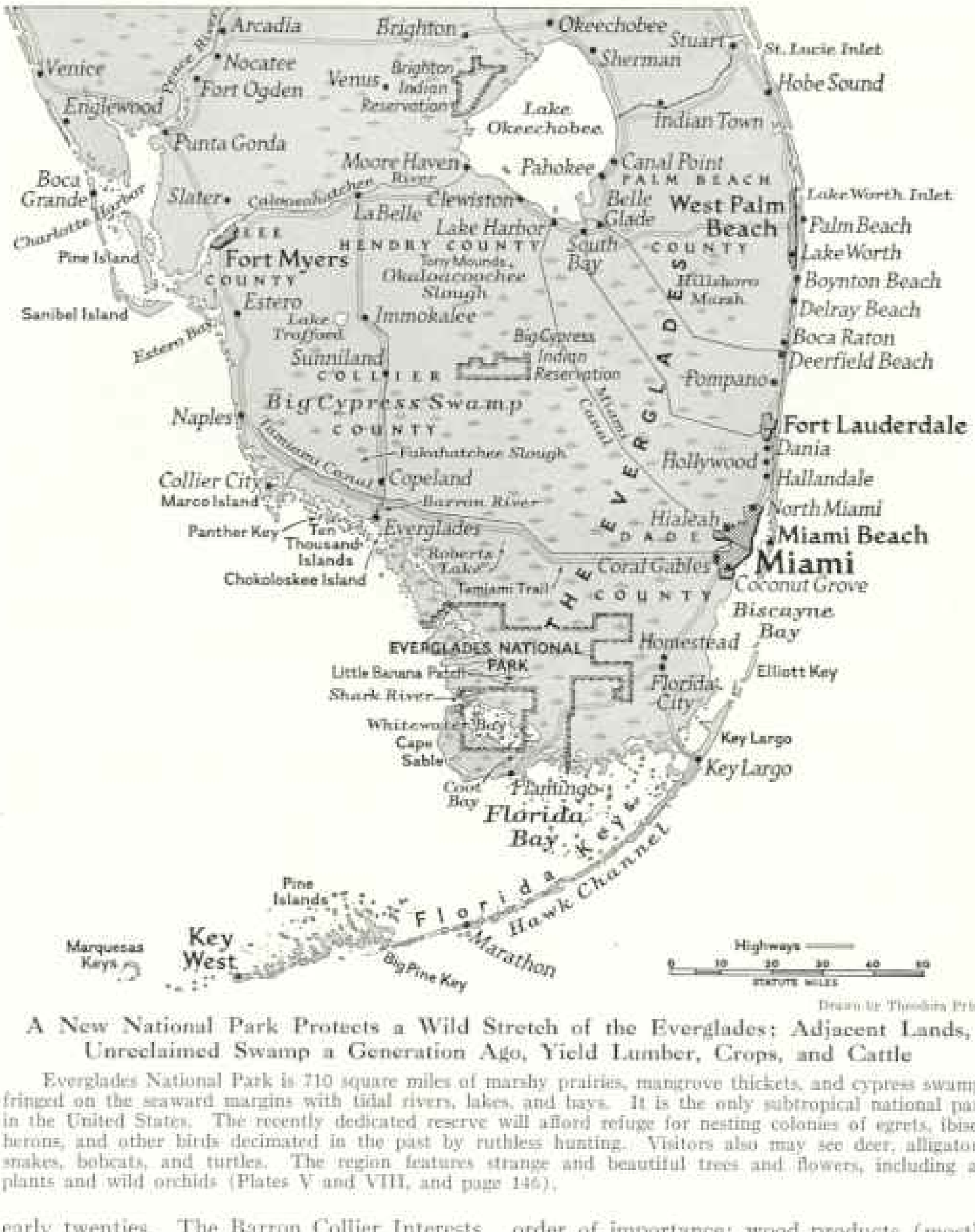
We came to the remote and shady town of Everglades (population 518), seat of Collier County, just as a fleet of brightly trimmed sponge boats chugged up the sweeping curves of Barron River (Plate XVI).

It was a warm sunny evening with a skyful of fluffy clouds. I watched the return of weary but triumphant anglers, guests of the famous Rod and Gun Club, sport fishing center for the Ten Thousand Islands region.

A gleaming tarpon tipped the scales at 40 pounds. Snook, redfish, red snapper, amberjack, and other kinds lay on the sea wall.

County Named for Car-Card Booster

Collier County, established in 1923, takes its name from Barron Collier of streetcar-card advertising fame, who bought up tens of thousands of acres of southwest Florida in the



Drawn by Theodora Prim

A New National Park Protects a Wild Stretch of the Everglades; Adjacent Lands, Unreclaimed Swamp a Generation Ago, Yield Lumber, Crops, and Cattle

Everglades National Park is 710 square miles of marshy prairies, mangrove thickets, and cypress swamps fringed on the seaward margins with tidal rivers, lakes, and bays. It is the only subtropical national park in the United States. The recently dedicated reserve will afford refuge for nesting colonies of egrets, ibises, herons, and other birds decimated in the past by ruthless hunting. Visitors also may see deer, alligators, snakes, bobcats, and turtles. The region features strange and beautiful trees and flowers, including air plants and wild orchids (Plates V and VIII, and page 146).

early twenties. The Barron Collier Interests helped complete the Tamiami Trail, and planned a second Miami Beach on Marco Island, a project still in blueprint stage.

The Collier Interests' land holdings of one-and-a-quarter *million* acres (an area the size of Delaware) include 60 percent of Collier County and overlap into adjacent Lee and Hendry Counties.

D. Graham Copeland, recently retired resident manager of the Collier Interests, listed the sources of Collier County's income in order of importance: wood products (mostly pine and cypress lumber), early truck crops, commercial fishing, cattle ranching, and tourist trade. Only producing oil wells in Florida are at Sunniland in the north of the county.

Collier County was the scene of last engagements of the Seminole War. To document early events, Copeland has assembled a six-foot pile of reminiscences, statements, newspaper clippings, and letters. I was allowed to look through this absorbing material.

Staff Photographer Willard R. Culver

Telephone Poles, Road, and Canal Seem to Merge in the Flat Distance of the Everglades

From Miami on the Atlantic coast to Naples on the Gulf of Mexico there are no sharp turns and only a few tiny hamlets to slow down traffic speeding across the Tamiami Trail. The highway (named by contraction of Tampa and Miami, its terminal cities) was completed in 1928 at a cost of $8,700,000.

Andrew H. Brown

Grass Higher than a Man's Head, Stretching to Horizons of the 'Glades, Ripples Like Wheat in the Wind

Among the region's memorable characters was Juan (Old John) Gómez, claimed by many to have been a pirate with Gasparilla. When he died early in the 1900's, estimates of his age varied from 115 to 137 years!

Born a Roman Catholic, he became a Methodist at the age of 110 or 115. The local minister was so impressed that he designated every fifth Sunday of months that had five Sundays "Gómez Sunday." On those days Methodists of the vicinity piled into boats and went out to worship at Gómez's home on Panther Key.

An article in the *American Eagle* of Estero, Florida, published on January 20, 1927, added these details: "He (Juan Gómez) had heavy calluses on his feet and could run across an oyster bed as comfortably as on a hardwood floor. He was uneducated but spoke seven languages. . . . He declared when his age was discussed, 'God has forgotten me; it is past my time to die.'"

Reckless Harvest of Birds and Gators

"Wildlife was incredibly abundant hereabouts last century and even in the early part of this one," Copeland attested.

"Early settlers told me of shooting enough plume birds in one day to furnish aigrettes worth $500, then in demand to decorate women's hats. Plume hunting was prohibited by law in 1891, but there was no attempt at enforcement for years after that. I heard of hunters slaughtering 77 deer in one drive, and 135 alligators in a single mudhole."

Some men only pulled the gators' teeth. For these ivory fangs, used for watch fobs, earrings, charms, bracelets, and other gewgaws, the reptile dentists got from $1 to $5 a pound.

Mr. R. B. Storter of Naples told me: "I carried over 10,000 alligator hides to Tampa in February, March, and April of 1898. They were shipped to Boyer Brothers in New York. About 1,000 of the skins were taken from Roberts Lake alone—one of the most fabulous gator 'mines' in the country.

"That was an unusually dry year, and the big creatures collected in places where water could be found. Crowded in small areas, they were easy victims of hunters."

Egret shooters would search for rookeries. When they found one, they ruthlessly wiped it out—destroying up to 15,000 birds.

On near-by Chokoloskee Island, C. S. (Ted) Smallwood, island patriarch, led me cheerfully up and down dim aisles of his big store. It stands on pilings above the tide wash. Counters and shelves bulged and overflowed with masses of jumbled merchandise in a picture of country-store abundance the like of which I had never seen. He cut me a generous slab from a huge wheel of yellow cheese.

"I've turned over the shop to my children," he said, introducing two daughters, a son, a son-in-law, and two grandchildren.

Smallwood, whose keen blue eyes give the lie to his 74 years of age, led me over the heart of the strange island. Little sand and shell-mound hills framed the steepest landscape I had yet seen in south Florida.

"Once I had a lot of good fruit trees." My guide turned back the years. "Most of them have gone to seed."

Like a friendly old pirate, Smallwood favored one leg as he climbed firmly up and down the hillocks, showing off scattered wind-tortured guavas, avocados, olives, papayas. Shade trees were native gumbo-limbos, palms, and Australian pines he planted long ago.

I met 90-year-old Susan McKinney, whose late husband, C. G. McKinney, opened the first general store on Chokoloskee Island in 1886. A sound, if firmly negative, business policy used to be emblazoned on his billhead: "No Banking, No Mortgaging, No Insurance, No Borrowing, No Loaning. I must have cash to buy more hash."

North from the Tamiami Trail, the Immokalee road, State Route 29, bisects Big Cypress Swamp, then straightens and arrows through range land to meet the Fort Myers-West Palm Beach road.

Big Cypress Going Fast

East of Route 29, lumbering is gobbling up big chunks of mixed pine and cypress forests. West of the highway, in the almost impenetrable Fakahatchee Slough, a long strip of virgin cypress is the largest remaining single stand in the United States.

A black plume of smoke from a tall stack guided us to the Copeland camp of the Lee Tidewater Cypress Company, which owns most of this magnificent forest.

J. R. Terrill, logging superintendent, showed us the operation.

We saw one of the semiweekly 40-car trains puff out of the yard, hauling away 400,000 board feet of huge rusty-hued logs to the sawmill at Perry in north Florida. Weather-resistant cypress is in demand for siding, shingles, and wood trim as well as for paneling and other interior finishing.

Terrill piled us on a gasoline speeder and we rattled up the line into the woods. Gray stumps dotted a logged-over area, where thick vines trailed on the ground.

"The fallers claim the vines are so tough," Terrill said with a smile, "that if one clings

Watercolor by Willard R. Culver

A Famed Wildlife Painter Studies Wing Detail of an Egret, Once Hunted for Its Plumes

Walter Weber inspects an American egret picked up dead from Shark River, deep in Florida's Everglades. The artist made sketches for bird and animal paintings especially for the NATIONAL GEOGRAPHIC MAGAZINE.

Ektachrome by Willard R. Culver

A Power Derrick Plays a Giant Game of "Pick-up-Sticks." Flatcars Roll Huge Cypress Logs Out of Fakahatchee Slough

The Lee Tidewater Cypress Company ships the big russet boles of weather-resistant wood to its sawmill at Perry, Florida.

Car and Passengers "Refuel" Together in Mid-Everglades. Beyond the Tamiami Trail Seminole Indians Welcome Travelers to Their Village

Kodachrome by Willard R. Culver

Showy Roseate Spoonbills, the Adult White and Pink with Carmine Patches, Crown a Mangrove with a Living Frieze

Using a Smoker, Barehanded Keepers Dope Bees

Drugged by the fumes, Collier County bees are easily shifted about on the frames. Everglades hives yield thousands of pounds of honey every year.

Red-spiked Air Plants Are Miniature "Hanging Gardens"

The striking bromeliads favor rough-barked trees, but also grow on stumps and fence posts. They draw sustenance from the air.

Kodachromes by Willard R. Culver

Kodachrome by Andrew H. Brown

Flames Race and Crackle Through Sugar Cane to Burn Off Excess Leafage Just Before Stalks Are Harvested

Firing the cane saves much labor in cutting and does slight damage. In these fields of the United States Sugar Corporation, in the "sugar bowl" area around Clewiston, sugar cane planting is staggered so harvesting continues for seven months.

Steel Claws Dump Bunches of Cane into Tractor Wagons. Rail Cars Will Carry It the Last Lap to the Sugar Mill

Kodachrome by Willard R. Culver

Kodachrome by Willard R. Culver

A Gumbo-limbo Tree Writhes Skyward from Shell Mounds Where a Digger Probes for Relics

Archeologists have uncovered important artifacts of early Indian dwellers from shell beds on Marco Island. Mysterious piles, some 30 feet high, apparently were discards from aboriginal shore dinners.

Sledlike Craft Push Air to Speed Through Water Only Inches Deep

Appropriate to the sky-and-water landscape of Hillsboro Marsh are ingenious air boats. Old auto engines turning airplane propellers drive the flat-bottomed boats. Screening prevents injury from whirling blades.

Reconstruction by Willard R. Culver

An Air Boat Roars Faster over Grassy Shallows than Across Open Water

Grass and reeds, leveled by its passage, provide a slippery "runway" and reduce water drag. Skimming over such shoals the craft may speed at 50 miles an hour. Big rudder, deflecting the slipstream, is plywood.

Kodachrome by Willard R. Culver

Sonny Turns the Sewing Machine to Help Mama Make a Skirt
Daughter fits a doll with a hair-do just like mother's. The family sits cross-legged on the table in their cool, thatched *chickee*. Rainbow-hued handicrafts tempt motorists along the Tamiami Trail.

Kodachrome by Willard R. Culver

Proud of His Fine Saddle, a Seminole Cowboy Relaxes During a Lunchtime Break

"Ten Little, Nine Little, Eight Little Indians" Find School Can Be Fun
One young lady watches to see that teacher sticks to the lesson! W. D. Boehmer, Government instructor at Brighton Reservation, teaches a first grade group. Girls wear native costume or modern dress, as they please.

Watercolors by Willard R. Culver

Earnest Young Day Pupils Go Home at Night to Forebears' Age-old Way of Life

Kodachrome by Willard R. Culver

Straight-backed Seminole Women Prepare the Evening's Food with Dignity and Grace

In fastnesses of Big Cypress Swamp thatched family *chickees* cluster on cleared, drained land. Close by looms the wild, wet forest. Pots, pans, and sacks of white potatoes come from stores in the distant town, but bananas, pork, chicken, yams, lima beans, and sugar cane are grown in the village.

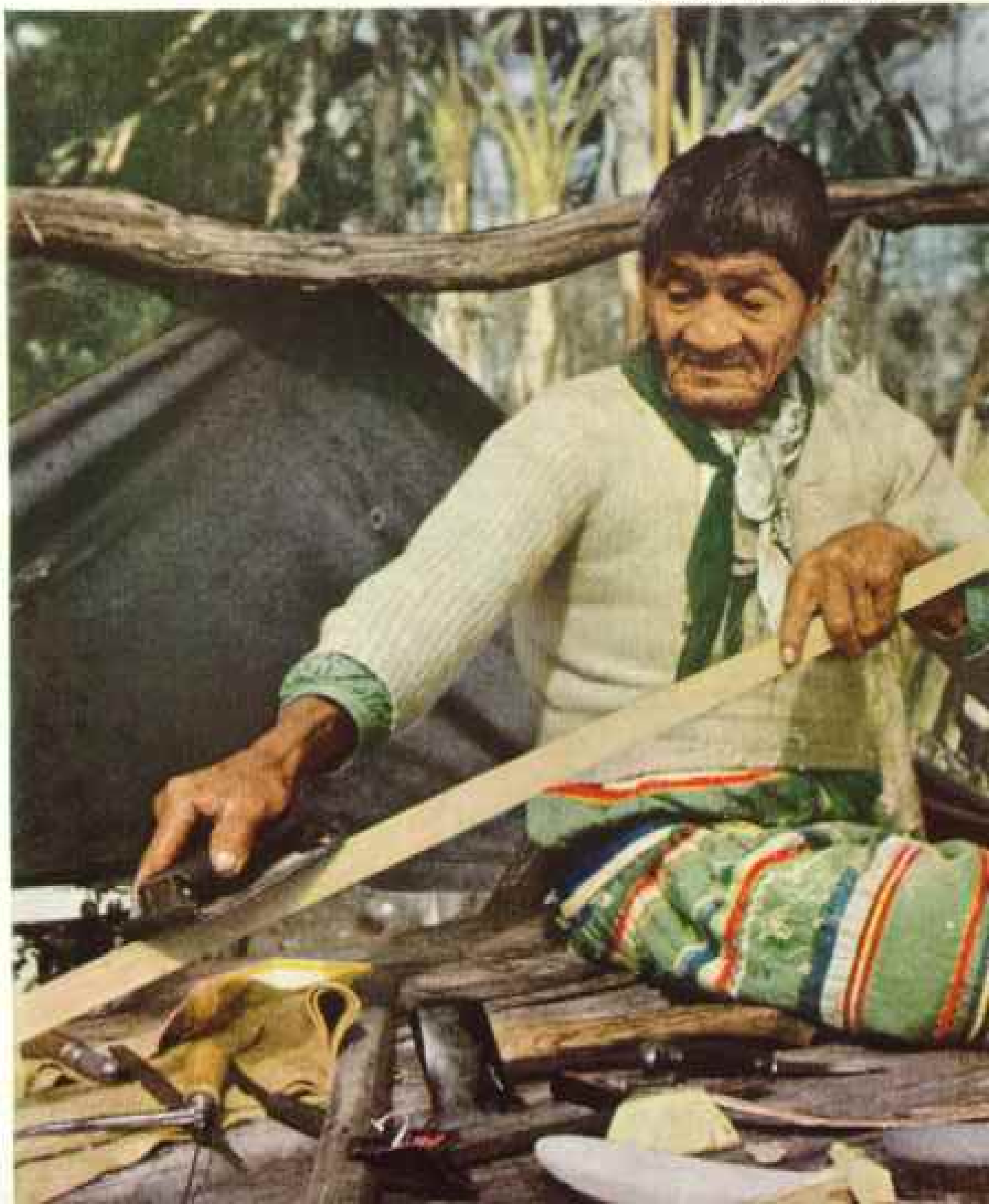
Stolid Face Softens as a Junior Tribesman Soaks Up Lunch

Jimmie Boy, motherless soon after birth, basks in gentle care of his aunt.

Charlie Cypress Works the Skill of Ages into a Bow

Like other Seminole elders, he clings to old-time tunic (under the sweater).

Kodachromes by Willard R. Culver



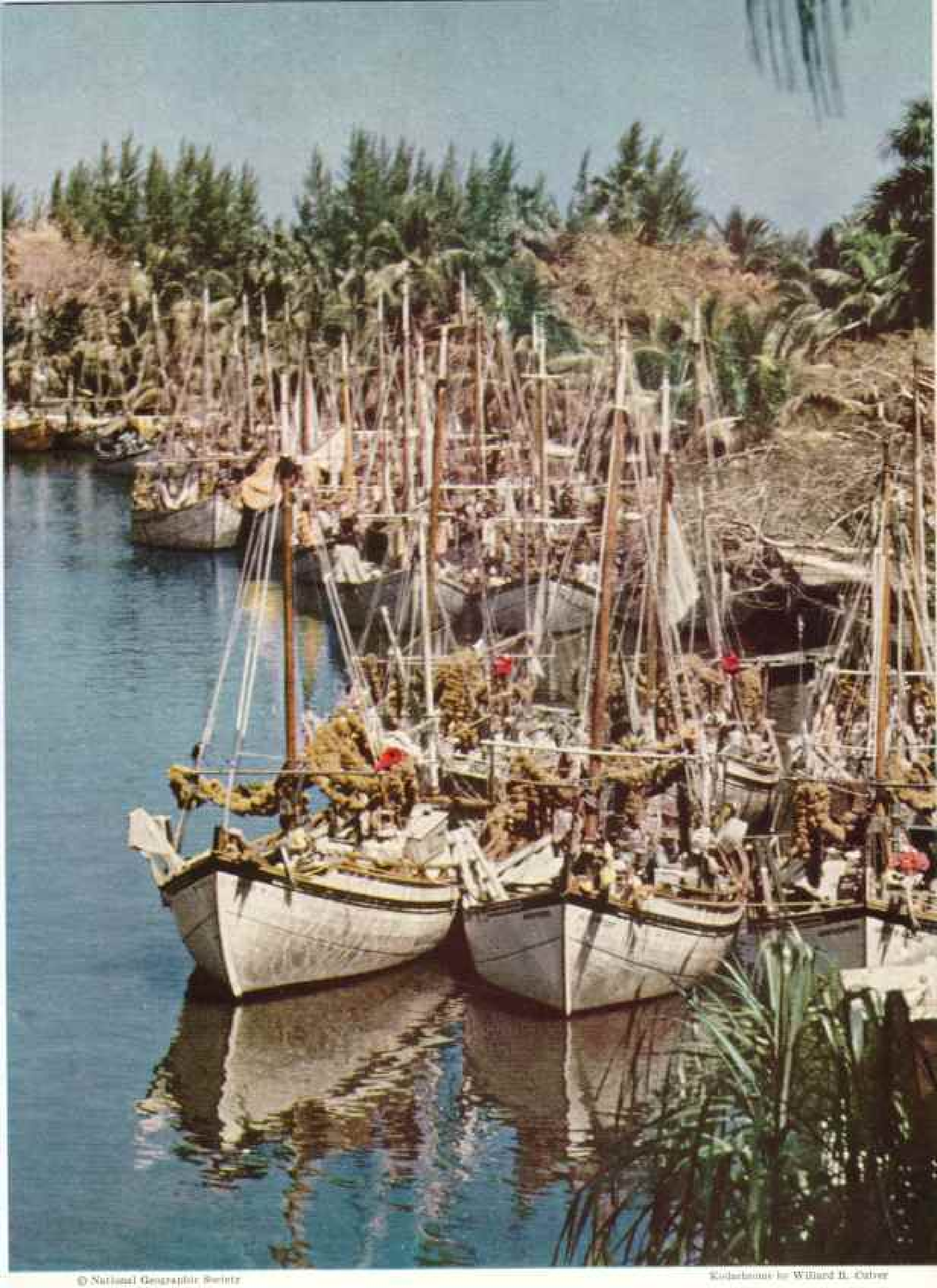
Everglades Cattle "Were Lapping Blackstrap Molasses with All the Gusto of Pickaninnies Ear-deep in Watermelon"

The author thus reports the zest of beef cattle for a molasses-enriched diet on the United States Sugar Corporation's Sugarland Ranch near Clewiston. Steers grow fat on the novel ration. The company has developed four purebred herds on choice pasturage reclaimed from marsh.

A Wildlife Refuge Superintendent Sculls Photographer Culver Close to Tangled Mangroves along Shark River

Daniel B. Beard guided THE GEOGRAPHIC's field men through the maze of channels in Whitewater Bay and Shark River areas. Mangroves in almost impenetrable ranks hedge the streams, thrusting arching, stiltlike roots into the salty or brackish waters. Near the river's mouth groves of giant mangroves reach a height of 80 feet.

Kodachrome by Andrew H. Brown



Kodachrome by Willard R. Culver

Fresh-caught Prizes Festoon the Gay Sponge Fleet, Moored in Barron River

Fleeing a storm in the Gulf of Mexico, the colorful vessels found shelter in the flowing "Main Street" of the town of Everglades. Manned by Greek-Americans, almost all the boats were out of Tarpon Springs, Florida sponging center.

to a log it'll stretch from woods to camp without breaking!"

We reached the cutting area. A high line run from a skidder was snaking fat trees out of jungle so thick we could see only a few yards into it. Native royal palms lifted 100-foot-tall green crowns (Plate II).

"It would give a rattlesnake a headache to try to run in that bush," the speeder driver commented.

We watched a team of fallers topple a big cypress with a double-handled saw. With a sound like close thunder the soaring giant crashed through lower growth to smite the ground with a booming thud.

"That one is between 500 and 750 years old," stated Terrill. "Not a very old one. It's surprising how sound and healthy they are, after standing up to their knees in water all their lives—and without their rubbers!"

As we rode out of the swamp, Culver asked, "Isn't it hot and miserable in the woods in summer?"

"Well, the heat's bad, but the bugs are awful," Terrill replied. "One man's whole job is just to sweep flies off the backs of the men operatin' the levers on the high line.

"Horseflies get so thick in late April, if you're settin' on a screened porch, you can't see a person walkin' by in the street. Why, I know a man whose chicken run was beside a street light. Horseflies and other bugs flew into that light at night and fell so thick, he didn't have t' feed his hens for two-three weeks!"

Reservations Are Indians' "Kingdoms"

That evening we drove northwest to Fort Myers where we looked up Kenneth A. Marmon, Superintendent of the Seminole Indian Agency.*

Marmon offered to show us the two major Seminole Indian reservations in south Florida: Brighton, northwest of Lake Okeechobee, and Big Cypress, 30 miles south of the Lake. On the latter reserve 90 to 120 Indians live on 42,663 acres—or 356 acres, minimum, per Indian!

These lands are the Indians' exclusive hunting and cattle grazing domain.

Of the 700 Seminoles in south Florida, only 42 are mixed bloods. About 15 or 20 percent understand English. Some won't talk the white man's language, but they understand it well enough.

Receiving no dole, proud aborigines must work for their living. Many, therefore, have left the reserves to get jobs ranging from wrestling alligators in Miami animal exhibits to cutting sugar cane, and picking tomatoes, beans, and fruit crops. Others work on ranches or in lumber mills, drive trucks, or sell handicrafts along the highways.

In 1936 Florida's Governor David Sholtz and his cabinet met an assemblage of 273 Seminoles and asked them what they would like from the white man.

After a brief huddle, the native spokesman answered succinctly, "Just let us alone!"

"We have high hopes for cattle raising on the reservations," Marmon told us. "We've undertaken the range program to improve the Indians' lot.

"The Seminoles face a dilemma," Marmon explained. "Instinct and custom make them cling to the traditions of their ancestors, while civilization knocks at their door, urging them to join the big parade of progress."

Wednesday, March 5, was dipping day for cattle on Brighton Reservation. Marmon drove us out to see 2,000 Hereford cattle run through the tick-killing bath.

Crisp Beef Spareribs—Delicious!

Lunch break was half over when we drove up to the camp. Great fire-crisped hunks of fresh beef spareribs were proffered us by Fred Montsdeoca, white extension agent who supervises all cattle operations. Live-oak firewood imparted spicy flavor to the meat.

Plump, cheerful Seminole women, clad in their usual modest, rainbow-colored capes and vast skirts, brought us hot biscuits and black coffee. A coonskin stretched on palmetto ribs hung on a near-by tree. Tripe from the steer whose flesh had fed us was drying in the sun. Lunch out of the way, the women got busy on bead bracelets and dolls' clothing.

"At present we have a tribal herd," Montsdeoca said. "Everybody has an equal interest in it. Our aim is to build up the herd to a level that'll allow us to deal out a number of animals—say 20 head—to individual Indians."

We met Charlie Micco, Frank Shore, John Josh, and John Henry Gopher, Seminole trustees of the cattle enterprise. They were appointed by the tribe and approved by the Commissioner of Indian Affairs.

"Indians make fine cowboys," Montsdeoca commented. "They take naturally to horseback and are fearless riders."

We watched the slim, wiry men rounding up the cattle. They wore checked shirts, broad-brimmed hats of felt or straw, boots and spurs, dungarees and neckerchiefs, like any Western cowpoke (Plate X).

Sunset silhouetted islands of cabbage palms

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Indians of the Southeastern United States," by Matthew W. Stirling, January, 1946.

Homer Rhode, Jr.

When Rains Flood the Glades, a Deer Needs Wings or Fins

Thrashing through the deep water, this exhausted yearling deer was found up to his neck in trouble 35 miles north of the Tamiami Trail. After torrential downpours, such as drowned out vast stretches of the Everglades in the fall of 1947, deer may easily be captured alive.

scattered over the green land. The Indians packed their women into a truck and followed them home, sitting their horses with the loose-limbed, straight-backed grace of men grown to the saddle.

Another day Marmon led us 30 miles south of Lake Okeechobee through Okaloacoochee Slough to the second Seminole reservation in the Big Cypress Swamp.

The primitive road grade was washed out, so we plunged across the open countryside, navigating by tree clumps and larger ponds and sloughs.

What a ride!

A young Seminole buck, Willie Tommie, drove us over a trail half-submerged by recent rains. Willie got us there and back, proving as trailwise as his pathfinding forebears.

Far from towns or traffic the pattern of life was primitive but peaceful. An Indian mother beat dirt from her family's clothing on the shore of a pond. Another woman pounded corn to meal with a cypress pestle in a mortar cut from a live oak log. Everyone went barefoot, from beady-eyed toddler to most ancient tribal patriarch. Pigs and friendly brown dogs roamed at will around the cook table (Plate XII).

Between La Belle and Lake Okeechobee we were wizarded from the Florida of palm and pine, cypress swamp and saw-grass marsh, to what looked like rangeland of eastern Wyoming. Cattle by the thousand, many of them pearl-gray Brahmans, grazed on flat land that had been cleared almost to the last palmetto patch.

Brahmans, introduced from India, are remarkably tolerant of heat and resistant to ticks and mosquitoes.

Horsemen cantered across the distance to tie up at weather-beaten cattle camps. At a modest ranch house we stopped for a visit with one of the leading Everglades cattle men. On 80,000 acres (there is nothing small about *this* country!), Joe B. Hendry runs about 8,000 head of cattle.

Homer Rhode, Jr.

An American Egret (Right) Deftly Flips a Small Fish into Position for Swallowing

The bird at left, a snowy egret, seems to sulk because his larger angling mate has all the luck. The fishing hole is an Everglades canal.

With vast cattle ranges, early truck crops, and sugar cane the Everglades are discrediting early prophets of gloom who called the region useless. The future is evoked with caution, however, for in many sections thin soils, fire damage, and vexing water control problems put a checkrein on landlords' rosy dreams.

Land Suffered from Overdrainage

Land use history in the Everglades may be divided into two periods identified by a "B.C." and an "A.D." of special meaning. "Before Canals" land was too wet to cultivate. "After Drainage" it sometimes was too dry.

In the last 40 years, and particularly between 1913 and 1929, the Everglades were furrowed with hundreds of miles of costly canals. Drainage was overextended—at least from the farmers' point of view. Under construction today are check dams and locks which promise better balanced water control (page 147).

Largest agricultural operator in south Florida is the United States Sugar Corporation at Clewiston, on the southwest shore of Lake Okeechobee. The U.S.S.C. is the major producer of raw cane sugar in the continental United States (Plates VI and VII).

East and west of Clewiston, in an arc around the lake shores, the company owns 150,000 acres of land. A fifth of these holdings are in sugar cane production.

"We ship enough raw sugar every year," vice-president Josiah Ferris, Jr., informed me (before the end of sugar rationing), "to cash the civilian ration coupons of every man, woman, and child in the United States for 30 days."

The company cuts a million tons of cane a year, which yield approximately 100,000 tons of raw sugar.

The corporation devotes 20,000 acres to cattle pasture and agricultural crops other than sugar cane. For Newport Industries, Inc., it grows ramie, versatile "new" fiber that seems destined for large-scale development for

William H. Bischoff

Motionless as a Floating Log, a Big Alligator Lies in Wait for Unwary Waterfowl, Fish, or Small Mammals

He is not choosy about his diet; he will eat anything that flies, walks, crawls, or swims, and is small enough for him to kill. This specimen, now in captivity, was taken in the Everglades. Alligators more than four feet long still may be hunted in many Florida counties during a nine-month open season. Nine counties give the long-victimized creatures year-round protection by law.

nets, twines, fabric fire hose, packings, and upholstery—even for cigarette papers and vitamin A.

A sign beside farm buildings just west of Clewiston read: "Sugarland Ranch, Home of Molasses Fed Beef."

"What's this about cows eating molasses?" I asked Mr. Ferris.

"Come out on the range and I'll show you," was the rejoinder.

Astride his favorite horse, Cracker Boy, Ferris followed the jeep I shared with the head rancher. We took a sack of cottonseed pellets to throw as bait to the bovines.

A mixed group of Brahman, Angus, Hereford, and Shorthorn cattle had their heads in a feed trough.

"There you are!" grinned Ferris.

Sure enough, the blocky animals were lapping blackstrap molasses with all the gusto of pickaninnies ear-deep in watermelon (Plate XIV).

"We've found that blackstrap, supplemented with proper roughage, adds pounds to steers like bonbons plump a dowager," Ferris stated. "Sweets spoil human appetites; molasses makes our cows hungrier."

U. S. Sugar's Sugarland Ranch pampers 5,000 cattle in four purebred herds on 4,400 acres of improved pasturage.

Truck Gardening Is Big Business

Agriculture has boomed all around the south and east shores of Lake Okeechobee, ringed with a broad band of deep, organic muck. Bumper winter crops of green beans, cabbage, escarole, celery, radishes, peppers, eggplant, lima beans, peas, potatoes, and lettuce are annually bringing wealth and work to this thriving region.

Farming still is something of a gamble, however, for floods and frosts inflict heavy damage almost every year.

Despite climatic uncertainties, demand for south Florida winter truck crops has made Belle Glade one of the largest vegetable shipping points in the United States.

Palm Beach County, where most of these Everglades agricultural lands are situated, is one of the major vegetable-producing counties in the United States. Last season, 13,300 carloads of fresh vegetables rolled away from the lake area alone. Truck shipments swelled the totals cleared to hungry markets.

R. Y. Creech, Belle Glade farmer, took me out to black-soil fields where workers were cutting the last of a whopping crop of Pascal and Golden celery. They were taking out 700 crates to the acre!

George Espenlaub of Clewiston guided me to ancient Calusa Indian remains "lost" in the Everglades south of town.

The pre-Seminole Tony Mounds rise only five to ten feet above surrounding flatlands. Built along one of their canoe routes by aboriginal Calusas, the primitive earthworks are eroded and grass-grown.

Returning, "we" captured alive a three-foot cottonmouth moccasin with snake hook and bare hands. (My part in this exploit was simply to "let George do it!")

George regaled me with yarns of snake-hunting trips. He sells reptiles to live snake exhibitors.

Capturing Snakes by the Mile

Later, in Miami, I met a man who lives on snakes—not eating them, but selling them, made up in handbags, shoes, hats, belts, and wallets.

Edward B. Mulloy, owner of the Florida Reptile Craft Company, does a volume trade in snakeskins mostly taken in the Everglades.

"Last year," he told me, "I handled over seven miles of snakeskins, mainly cottonmouth moccasins, green and banded water snakes, and king snakes. They have the handsomest patterns and are very strong.

"On a five-day trip, with two helpers and three days of hunting," Mulloy calculated as he spoke, "a good catch would be 900 snakes. It's a fair take if we get 3,000 feet of skins."

"How do you catch 'em?"

"We capture all except rattlers and kings at night, spotting our quarry with lights strapped to our foreheads. We pick up snakes in the water with tongs like the grocery hook the clerk uses to pull down boxes of cereal. On land, we press down on the snake's neck with the curved wire head of a T-stick, then grab him with thumb and forefinger."

"If you get stuck in the swamp and run out of grub, what can you eat?" I inquired.

"Well, roast wild pig is nice. I've killed them with bow and arrow. Spearing frogs is easy, and their kickers are mighty sweet.

"In canals and sloughs we jump soft-shelled turtles. Tail of gator makes good stew [alligator hunting is legal in many counties], and I wouldn't pass up rattlesnake fillets.

"Heart of cabbage palm, cooked or in a cold salad, soothes my palate. And in season wild turkey and deer are not too hard to come by. Then, if you like fish . . ."

"Stop, please!" I implored. "My mouth's watering!"

C. Kay Davis, at that time district conservationist of the U. S. Soil Conservation Service, wanted us to see the Hillsboro Marsh area west of Delray Beach, a "valueless" area scheduled for protection as a wildlife refuge.

"How do we get around out there?" I asked.

"We have a brace of air boats," Davis said. "They can step over that half-drowned grass."

On the "shores" of a vast swamp we met the air boat, water plane, or "whooshmobile." This is a flat-bottomed, square-ended craft with an old auto engine mounted astern in a latticework of rods and struts (Plate IX).

The motor drives an airplane propeller which blasts air backward and thus shoves the boat forward—at speeds up to 50 miles an hour! It took both craft to hold our party. Our pilots were old hunters, Lewis ("Cal") Henderson and Johnny Lamb.

From a narrow reedy channel we suddenly burst out upon the open marsh. A film of water lay on the land. From the saw grass wild carrot lifted dry flower clusters. Islands of myrtle, bay, and Florida holly framed lakelike expanses strewn with waxy spider lilies.

Lamb and Henderson opened the throttles. Like huge angry water bugs the yellow air boats leaped across the shallows. White wakes foamed to either side.

"The Ashley gang of bank robbers hid out here," Johnny Lamb shouted. "They wuz never caught till they went outside."

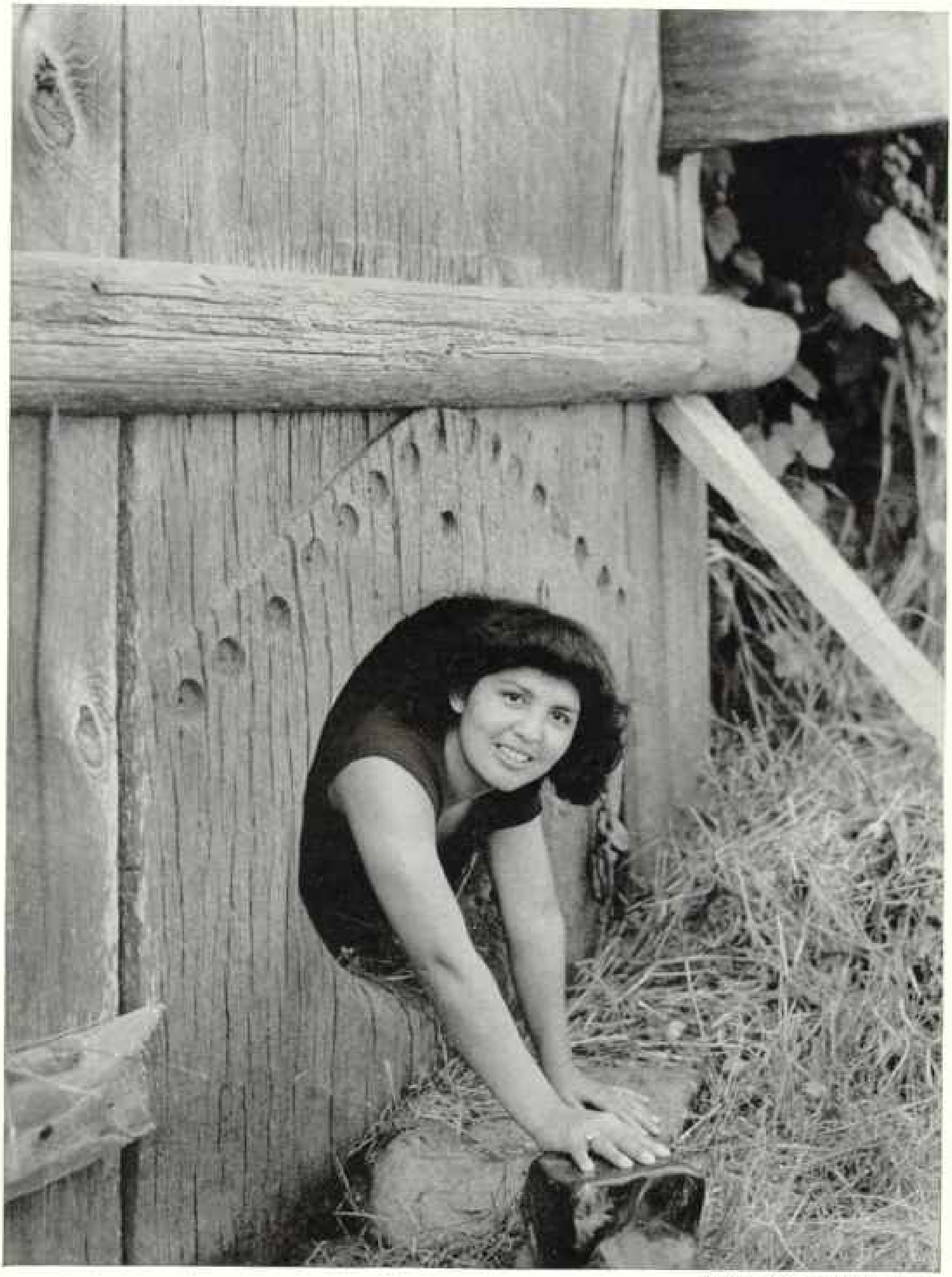
"Recently as the early twenties," Davis added, "if you ran into a stranger in these swamps, you didn't just casually ask his name. If he volunteered his moniker—O.K.!—but it probably wouldn't be his right one, anyway."

Weeks before, an old Seminole headman had given us a placid ride in his cypress dugout canoe, vanishing symbol of the Everglades. Now here we were skating along in an ingenious travel contraption at 40 miles an hour!

While the whooshmobile trip certainly was tops for speed, zing, and thrills, it ran a poor second to the cypress pirogue for a quiet, restful cruise.

Perhaps the contrast epitomized the Everglades, where the new Everglades National Park strives to restore "waste" land to unspoiled conditions of 60 years ago, and where farmers and ranchers rush production of cattle, truck crops, fruits, fibers, and sugar cane.*

* See, in the National Geographic Magazine, "Florida—The Fountain of Youth," by John Oliver La Gorce, January, 1930; "South Florida's Amazing Everglades," by John O'Reilly, January, 1940; and "How We Use the Gulf of Mexico," by Frederick Simpich," January, 1944.



Staff Photographer B. Anthony Stewart

Northwestern Indians Built Hewn-plank Houses Long Before the White Man Came

A Yurok girl emerges from the "doorway" of a 200-year-old lodge in northern California. From there to Alaska, natives used horn wedges to split planks from fir or redwood trees for this type of house. Wall boards, lashed by grapevine cords to horizontal "beams," stand two feet in the ground. Door panel is four feet wide.

Indians of the Far West

By Matthew W. Stirling *

Chief, Bureau of American Ethnology, Smithsonian Institution

BETWEEN the Wasatch Range of Utah and the foothills of the Sierra Nevada the traveler gazes down from his high-flying plane upon what seems to many a panorama of complete desolation—the great American desert.

Mile after mile of saline flats and sagebrush plains unfolds west of Great Salt Lake, where a century ago hundreds of covered-wagon pioneers left their bones and those of their oxen to bleach along torturing trails.

The Great Basin was an implacable enemy to white men then. Even now, though crossed by railroads, airlines, and motor highways, much of it seems unfit for habitation by man or beast.

Indians Prospered Where White Men Starved

Yet from this forbidding, inhospitable waste, a generation before the white man came, some 10,000 Indians wrested a living and in their way prospered.

They did this without agriculture; without irrigation; without tools, save crude implements fashioned from sticks and stones; without horses and cattle; without even adequate clothing or shelter from the severe cold of winter or the blazing heat of summer.

Nowhere in human annals can be found a more striking example of man's adapting himself to an unfriendly environment than that furnished by the tribes of the Great Basin.

The Indians of the Far West, living between the Rocky Mountains and the Pacific coast, were in general the most primitive within the present boundaries of the United States. Of all the Far West tribes, those of the Great Basin, which embraces Nevada, part of Utah, and portions of bordering States, were most backward.

Tribes living in the region drained by the Columbia River and its tributaries had better sources of food and therefore reached a slightly higher level.

In the Pacific coast region between the Sierra Nevada-Cascade Range and the ocean abundant natural resources and genial climate made living conditions easy.

Unlike the forest-dotted and low level region east of the Mississippi River, the Far West is a land of tremendous topographic diversity. For instance, in the corner of the Great Basin which extends into southern California, Mount Whitney and Death Valley, highest and lowest points in the United States, are within sight of each other.

The Indians of the Far West were as diversified as the topography.

They lived principally on nuts, wild seeds, and roots. They had no buffalo to lead them afar on the chase, as had the eastern tribesmen. Rugged topographical barriers circumscribed their movements.

Great Basin Indians belong almost exclusively to one linguistic stock, the Shoshonean. The principal tribes were the northern Paiute of western Nevada and southeastern Oregon, the Shoshoni of central and eastern Nevada and near-by Utah, the southern Paiute of southern Nevada and adjacent Utah, and the Ute of eastern Utah and western Colorado.

Not until about 1840 did the real period of white immigration into the Far West begin. Starting with the caravans following the Oregon Trail and the Mormon settlements around Great Salt Lake, this white invasion reached its peak in the California gold rush. The most direct routes traversed the heart of the Great Basin.

Tens of thousands of gold seekers crossed the desert during the years of the rush, but their passing had little effect on the Indians. The white men, sticking to the main trails, were concerned only with their goal beyond the Sierras.

The diaries of these pioneers make little mention of the natives save to call them "Diggers," a contemptuous name referring to their root gathering.

Within a few years after the discovery of rich mines in western Nevada prospectors penetrated to every corner of the Basin, and

* This is the sixth in a series of authoritative articles by Dr. Stirling on the American Indian, illustrated with W. Langdon Kihn's paintings. For many years Mr. Kihn has been acclaimed in America and Europe as a distinguished painter of Indian subjects. He was commissioned by the National Geographic Society to illustrate the comprehensive series on American Indians. To gather data, he traveled to Indian reservations, excavation sites, and over areas populated by Indians long before the white man came, noting costumes, customs, scenic backgrounds, utensils, and jewels of the tribes shown. Thus the paintings combine artistic beauty with a wealth of accurate information. See, in the National Geographic Magazine: "America's First Settlers, the Indians," November, 1937; "Indian Tribes of Pueblo Land," November, 1940; "Indians of Our Western Plains," July, 1944; "Indians of Our North Pacific Coast," January, 1945; and "Indians of the Southeastern United States," January, 1946.

in their wake came settlers to occupy the limited watered areas.*

Grazing livestock reduced the edible plants, and the white man began cutting down for fuel the piñon trees, the red man's most important source of food.

With recently acquired horses and guns the Indians put up a stern resistance for a while. But when the transcontinental railroad across Utah and Nevada was completed in 1869, the aboriginal way of life was doomed.

Wovoka, Originator of the Ghost Dance

In this period was born in Mason Valley, western Nevada, a Paiute of lowly origin who became known as Wovoka, "the Cutter." He never left his little native valley. Although industrious and of good character, he was undistinguished as to intellect and was not particularly aggressive.

Nevertheless, in his early thirties he became one of the most influential Indians in North America. From the Gulf of Mexico to the Canadian border pilgrims came to see him in his little dome-shaped tule hut.

Wovoka was the originator and prophet of the famous Ghost Dance movement, which excited great unrest among the tribes of the Plains.

About 1888 Wovoka, already a medicine man of local reputation, had his great revelation. While he lay ill with a fever, an eclipse of the sun caused much superstitious awe among the Indians.

Wovoka believed that his soul had traveled to the spirit world and there consulted with the god of the Indians.

It was revealed to him that the Indians would regain their ancient inheritance and would be rejoined by their departed relatives and friends (Plate III).

Wovoka was given a set of songs and dance ceremonies which he was to instruct the Indians to practice so that they might be ready for the great day of deliverance. He attributed no supernatural powers to himself, but considered that he had been chosen as prophet to herald the coming restoration.

The new movement spread like a conflagration from Nevada to the tribes east of the Rockies, and culminated in the massacre at Wounded Knee and the killing of Sitting Bull in 1890.

Among the American Indians many such messianic movements arose in the wake of white domination. The great Pontiac Conspiracy (1763-65) had such an origin.

Travelers who had encountered the colorful Plains and Pueblo tribes expressed scorn for the lowly Shoshoni of the Great Basin.

They described them as living at the level of animals, always half starved, hibernating without food like bears in caves, whence they emerged in the spring, crawling on hands and knees to eat grass.

In most of the Great Basin rainfall was scanty and food scarce. Summers were extremely hot; winters, extremely cold. The Indian had to utilize every form of food he could obtain.

To the disgust of early observers the Shoshoni ate crickets, lizards, snakes, gophers, and roots. However, since the selection of items of diet is determined largely by custom, a Shoshoni might be just as annoyed at seeing a white man eating a crab or a lobster.

Vegetarians of Necessity

Nuts of the pine tree, or piñon, were the most important food. Abundance of this fall crop determined whether the Indians would pass the winter comfortably or in semistarvation. The entire family participated in gathering pine nuts during a period ranging from 10 to 20 days. If the crop was abundant, an adult could gather approximately 50 pounds a day.

In the southern part of the Great Basin, where the elevation was lower and the climate warmer, the mesquite bean and the agave, or century plant, were valuable foods. Seeds of many grasses, such as wild rye, also were eaten.

Mesquite beans were gathered in the summertime. The seeds were taken from the pods and ground into flour on crude stone mortars.

The agave was prepared in the south by roasting in stone-lined pits. When cooked, the stringy flesh of the plant is almost molasses-sweet.

Big game animals were relatively scarce and hard to obtain.

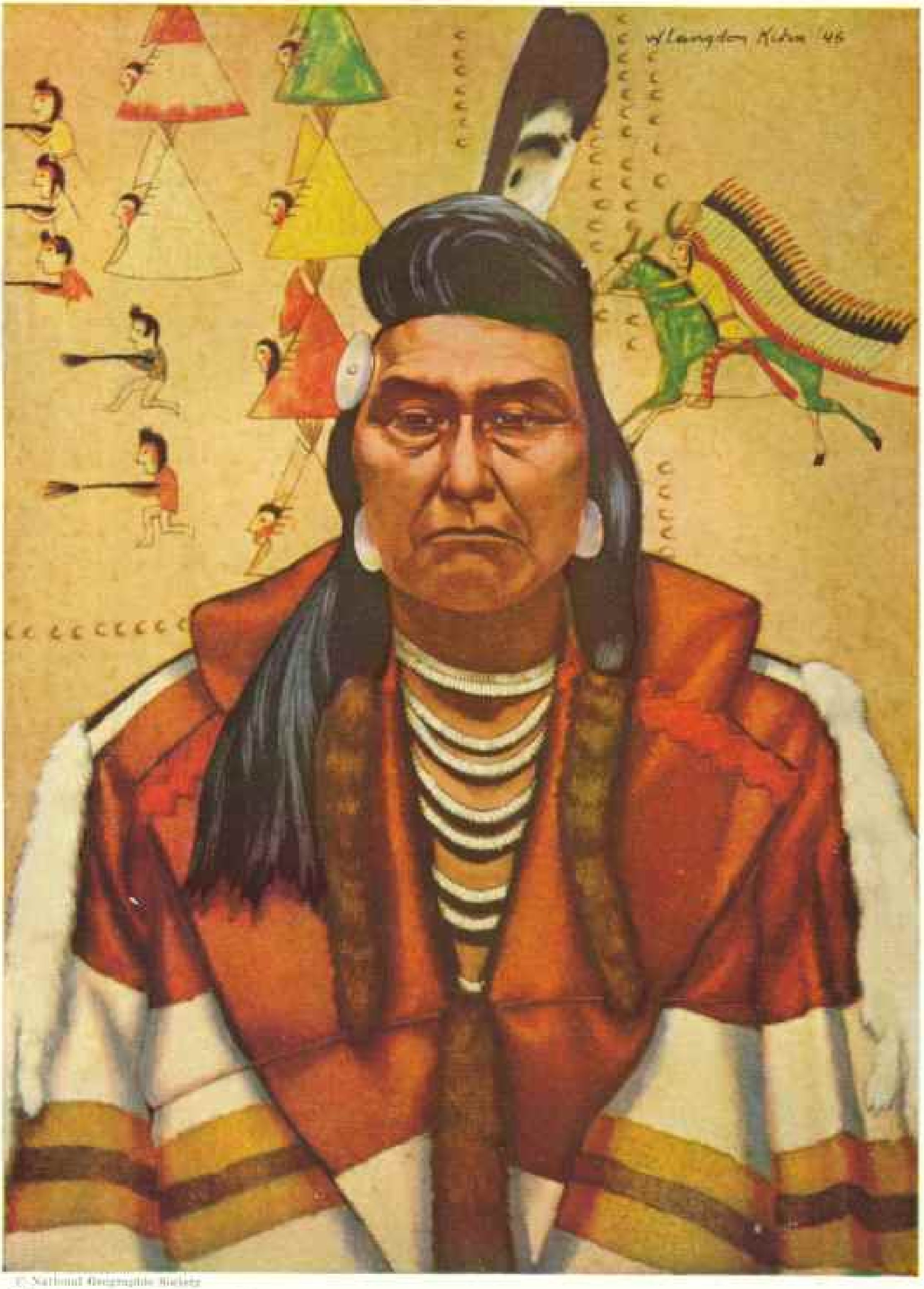
Families Joined in Jack Rabbit Drives

Over most of the Great Basin jack rabbits were abundant and easily caught. From their skins were made robes, the principal winter garment of the Indians.

The rabbits were usually taken in community drives. Nets made of cords of twisted grass were strung in a quarter-mile arc. Entire families spread themselves out in a line. Approaching the net, the hunters beat the brush and drove the rabbits before them into the barrier.

When the unrolled ends of the nets were

* See "Nevada, Desert Treasure House," by W. Robert Moore, National Geographic Magazine, January, 1946.



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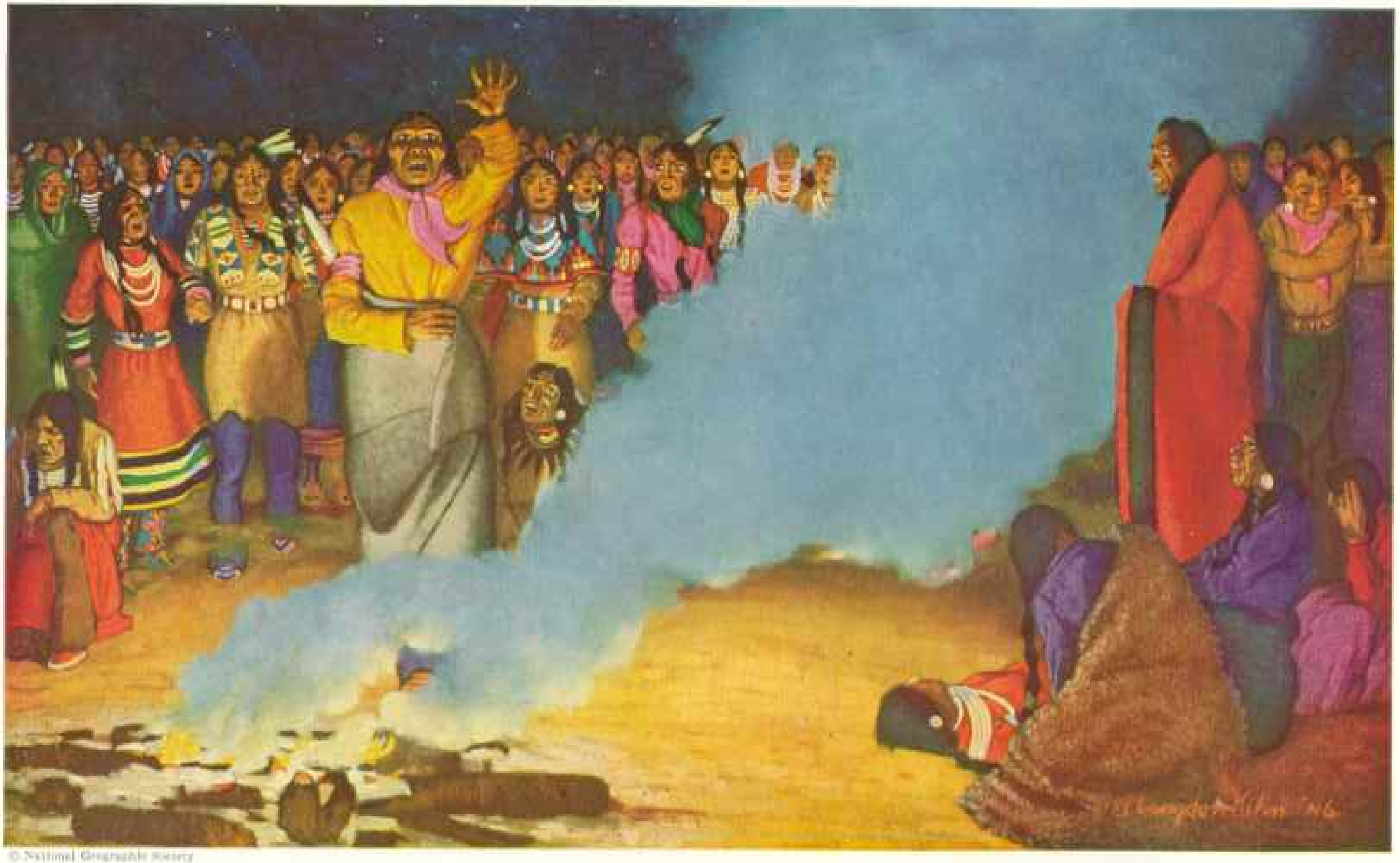
Chief Joseph, Somber Leader of the Nez Percé, Was the Xenophon of American Indians

His masterful retreat of more than 1,000 miles in a war with U. S. troops in 1877 has been compared to the ancient Greek's famous retreat of the Ten Thousand. Military and tactical skill won Joseph the title "greatest of Indian strategists." He was noted for humaneness in warfare. The "pierced noses" lived along the lower Snake River and its tributaries in parts of present Idaho, Oregon, and Washington.

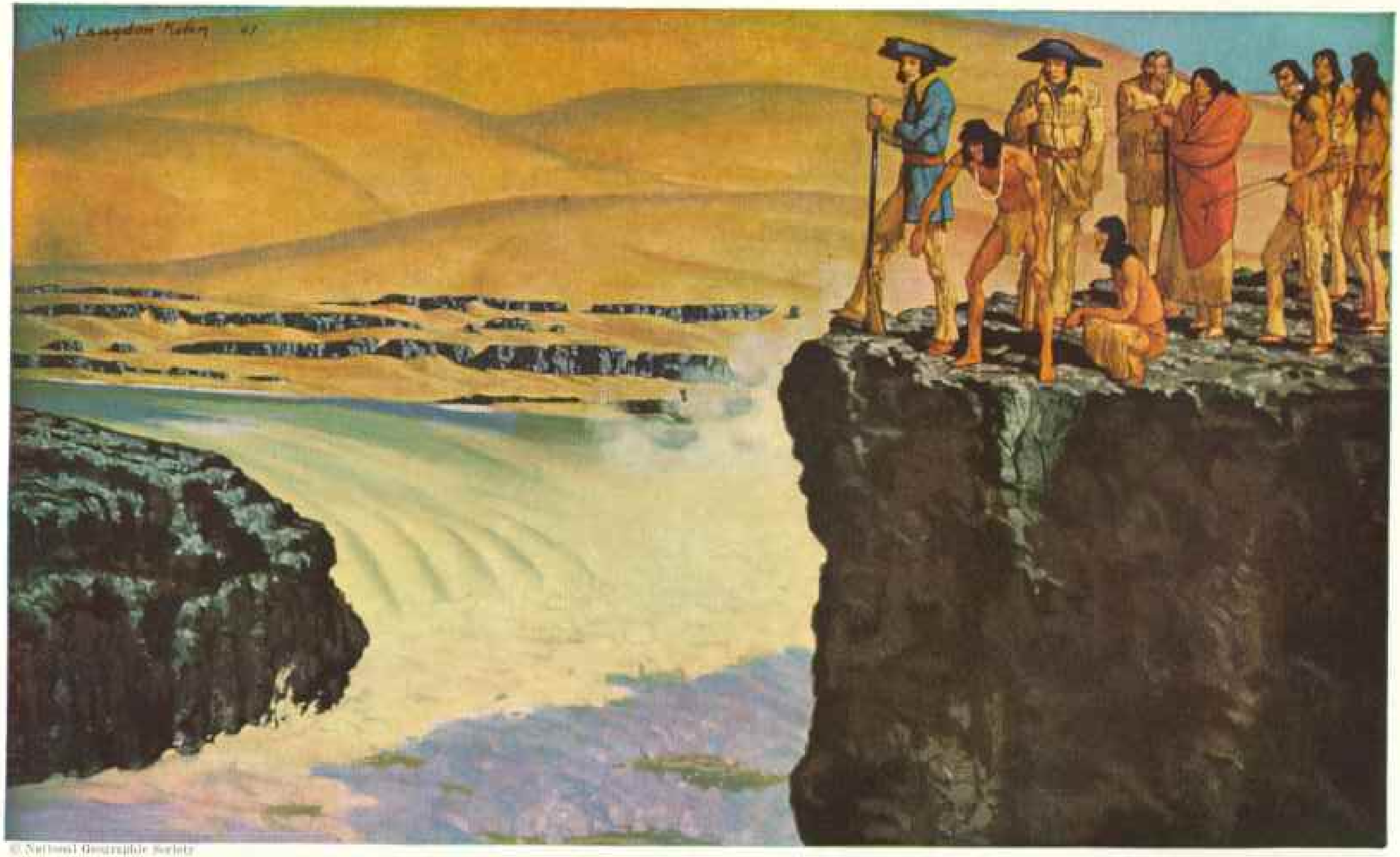
Umatilla Indians Sing and Sway in the Red Man's Version of "Button, Button, Who's Got the Button?"

Players sit in two facing lines; "buttons" are small bone cylinders. Members of one team, chanting and swaying, pass them along. The opposing leader guesses who holds an unmarked one. If successful, he wins a counting stick and leads his team in concealing the bones. The side capturing all the counting sticks wins. Players pile bets—money, blankets, beads—before them; winning team divides the spoils. Indians are inveterate gamesters; their games often stem from remote religious ceremonies. This "hand game," known to 81 Western tribes, is still played. Man at right beats on a log to keep time.



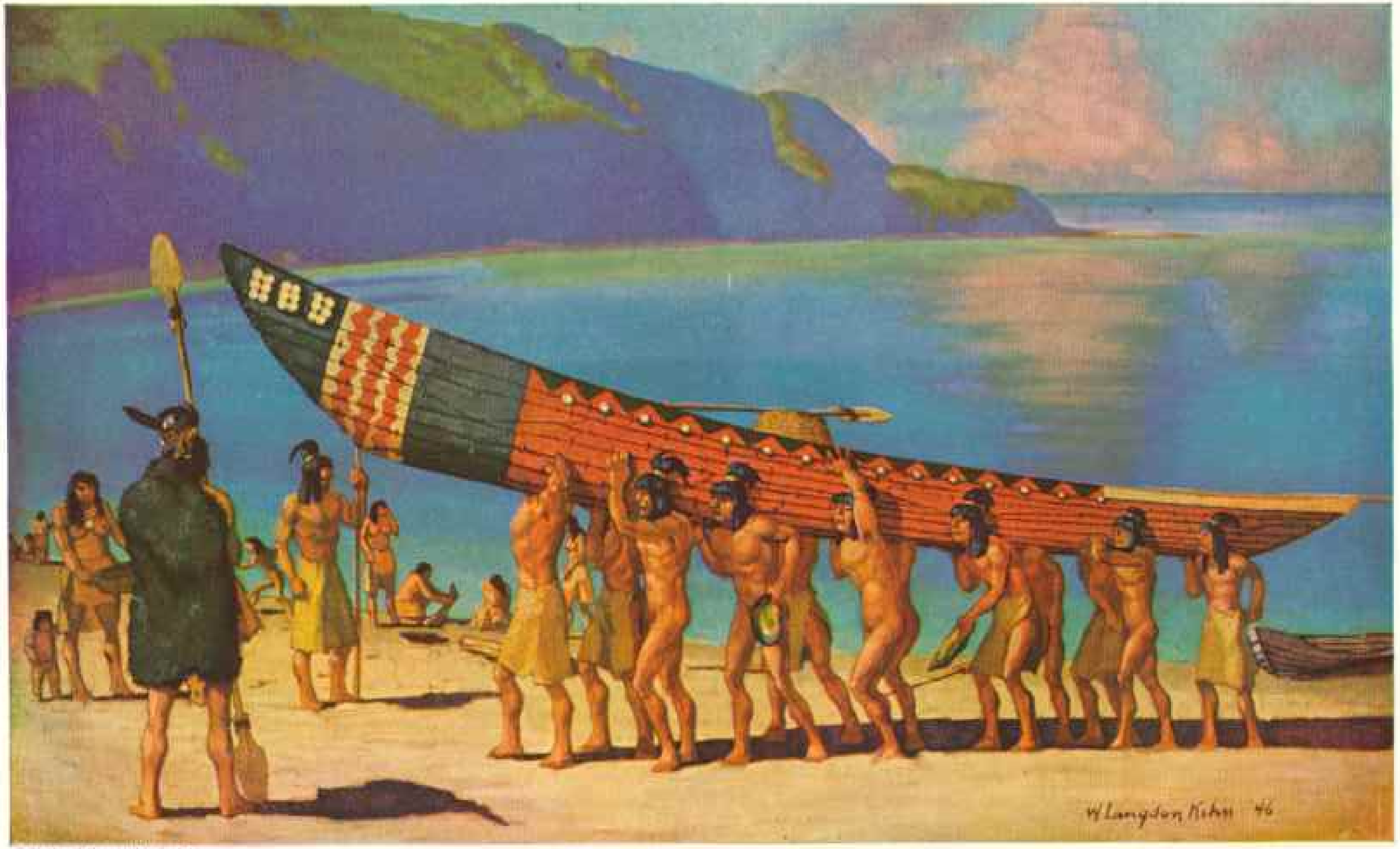
By a Campfire's Eerie Light the Prophet Wovoka Spellbinds His People with Promises of Life after Death

Late in 1888 the moody young Paiute medicine man fell ill. During a solar eclipse his fevered brain imagined a journey to the spirit world. He "returned" to preach that peace and virtue would reunite Indians with departed loved ones in a happy land. Chief ritual of the cult was an elaborate Ghost Dance, during which frenzied devotees often went into lengthy trances. From Nevada the new religion spread east to the Missouri River. Its doctrines helped cause a Sioux uprising in 1890. At times local agents prohibited the dance to avoid disorder. Many Western Indian dances still use Ghost Dance features.



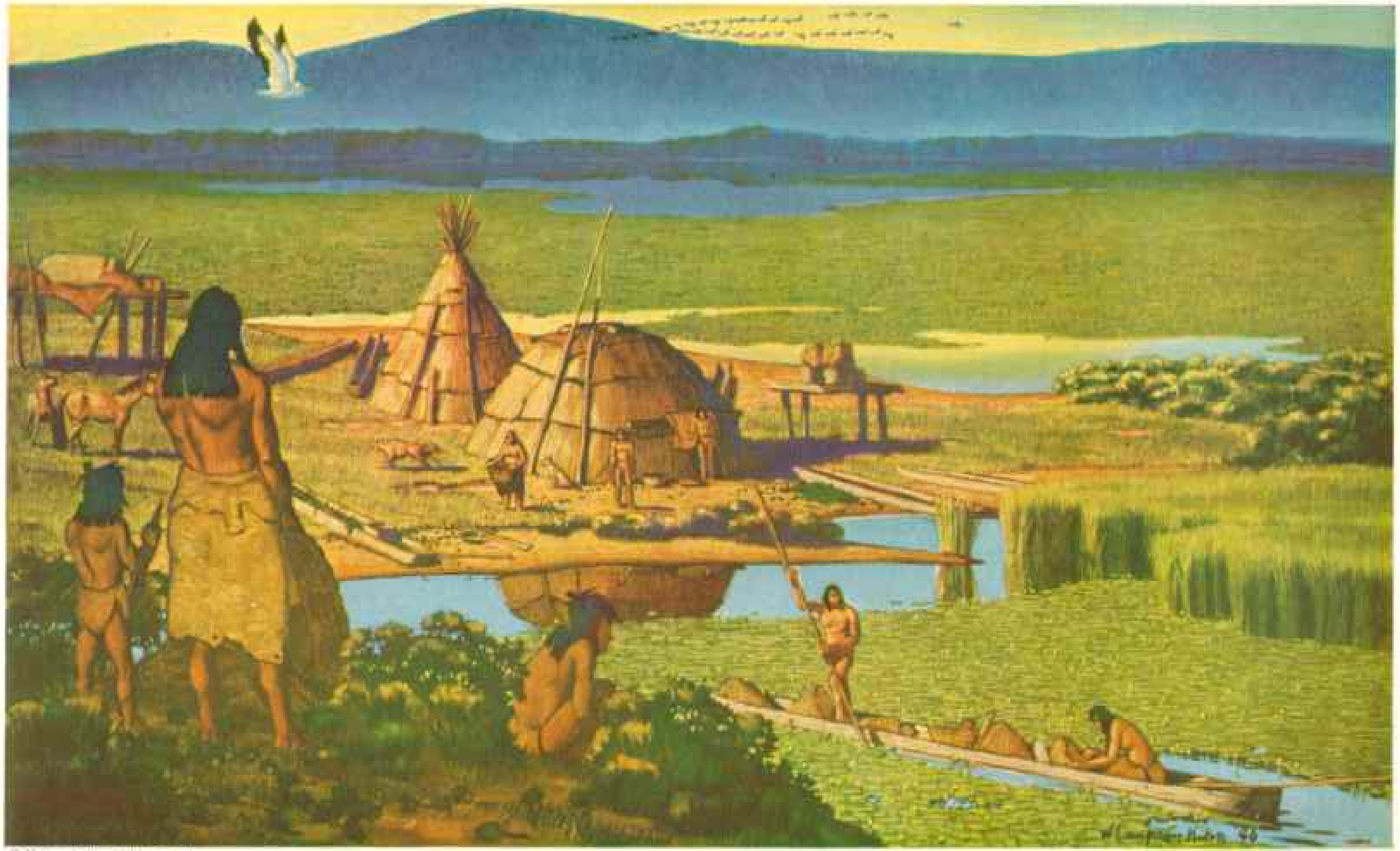
High on the Columbia River's Black Basalt Banks, Dalles Indians Show Lewis and Clark a Way Through Its White Water

Some 200 miles from its mouth the mighty river swirls and boils through The Dalles, a narrow gorge it sliced through ancient lava flows. Here in October, 1805, the intrepid explorers arrived on the last leg of their westward trip. Guided by local braves, they scaled the lofty rocks, decided to shoot the roaring rapids. Their report understates: "This we attempted, and with great care were able to get through." The expedition brought back the first detailed information on Northwest Indians. Behind Lewis and Clark stand Charbonneau, an interpreter, and his heroic, papoose-carrying wife, Sacagawea.



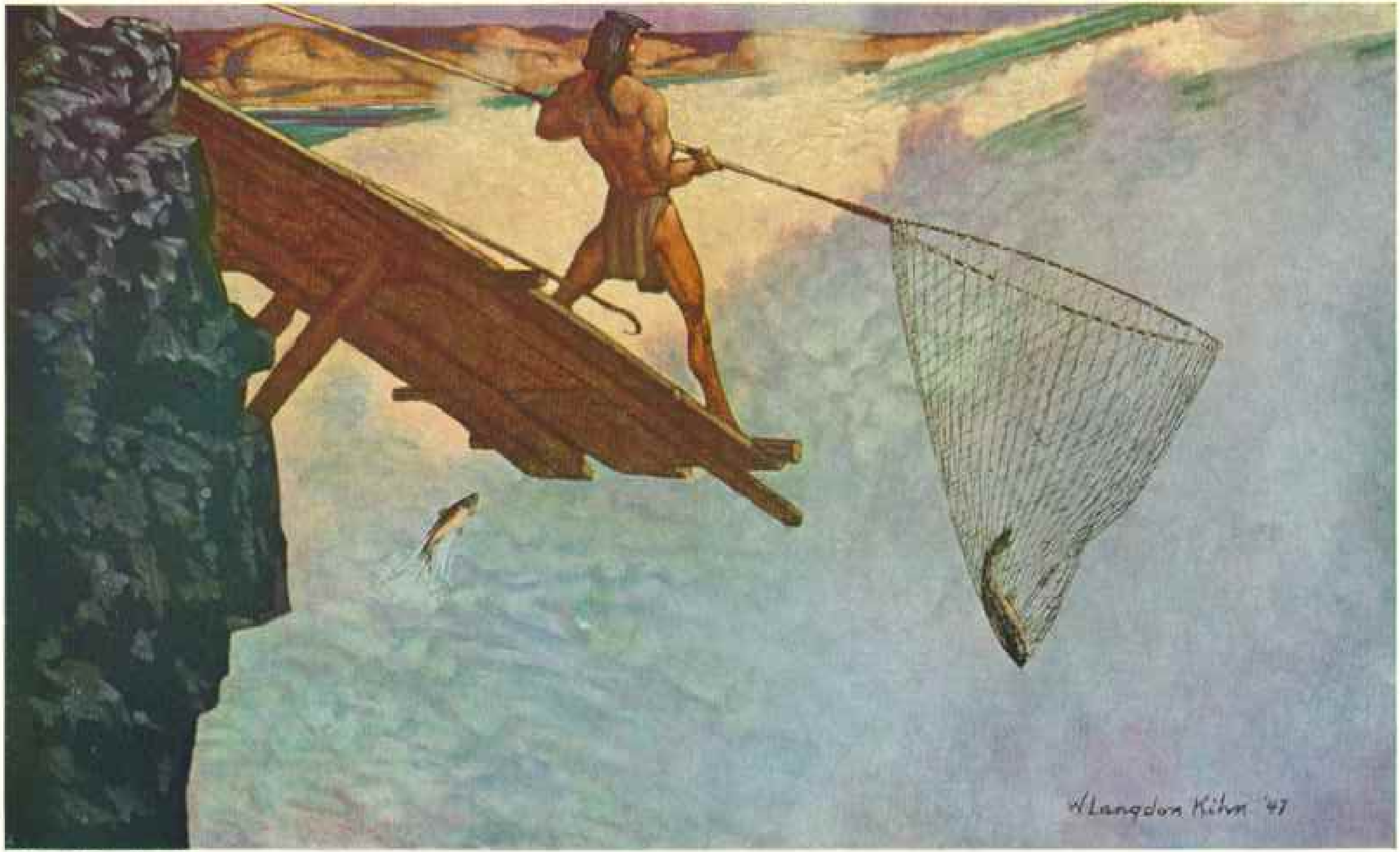
With Flint Tools and Patient Skill Chumash Indians Made the New World's Only Planked Canoes

The west coast's foremost mariners, the Chumash inhabited the mainland and large islands of southern California's Santa Barbara Channel. Lacking big trees for dugout canoes, they split planks from driftwood. These they shaped, scraped, and smoothed. Along the edges they drilled holes, "sewed" the planks together with fiber cords. Asphalt caked the seams and holes; shells and paint provided decoration. Flat-bottomed "keel," sternposts, and a thwart amidships formed the frame. Double-bladed paddles shot the light craft through the water. They varied from 12 to 22 feet in length, carried from two to 10 fishermen. Bearskin-clad figure is the skipper.



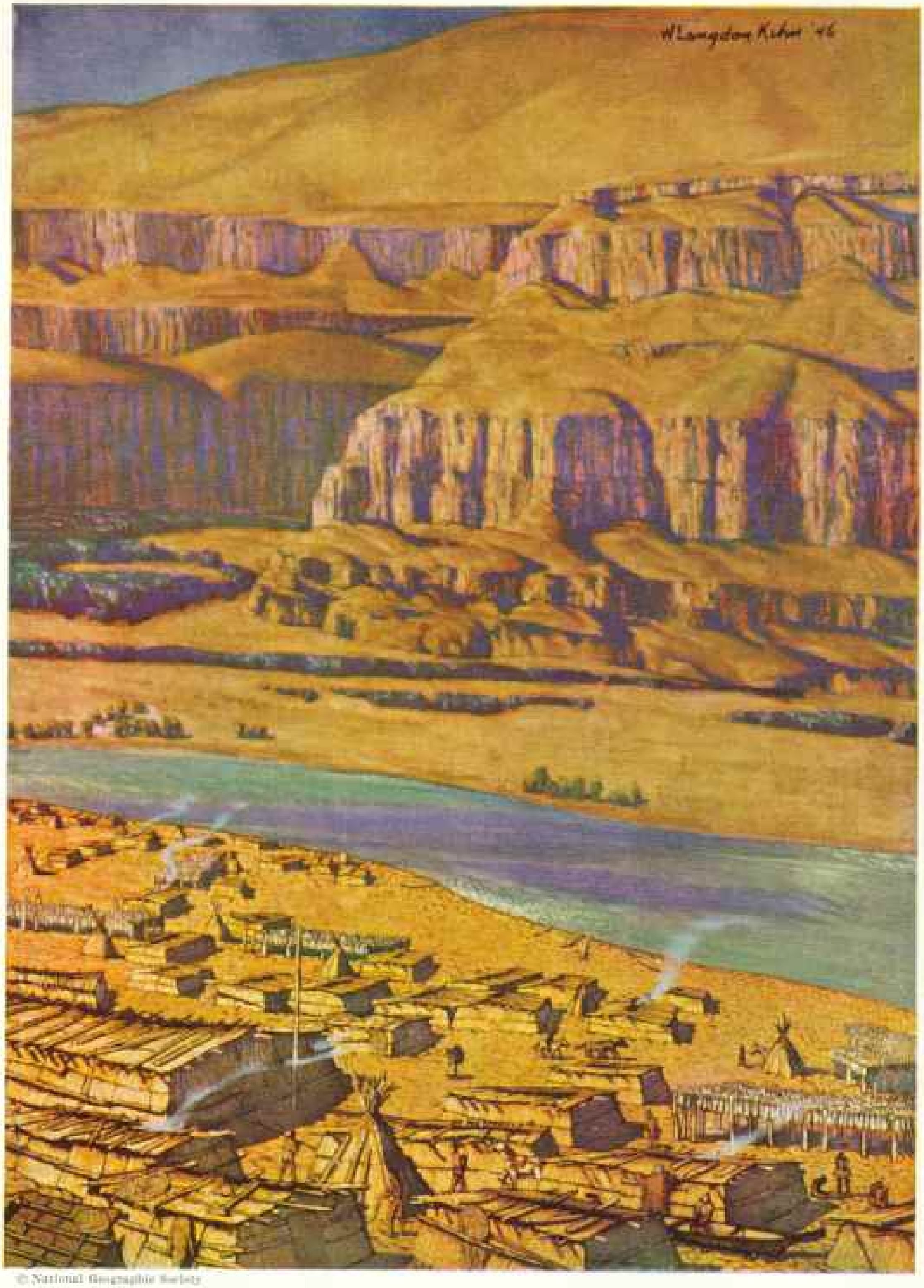
From the Seeds of the Great Yellow Water Lily Oregon's Klamath Indians Made *W'okas*, a Highly Prized Cereal

The supply was enormous; Klamath Marsh alone had 15 square miles of solid water-lily growth. Here workers in long dugout canoes pick unripe seed pods. They will sun-dry, pound, and winnow them. The meal was a vital staple which could be stored for a long time. Pickers averaged four to six bushels of pods a day, which yielded only six or seven pounds of wokas. The Klamath were a hardy people, who never took the warpath against the white man. Before 1864 they raided other tribes to capture female workers. Slavery was a notable institution among them.



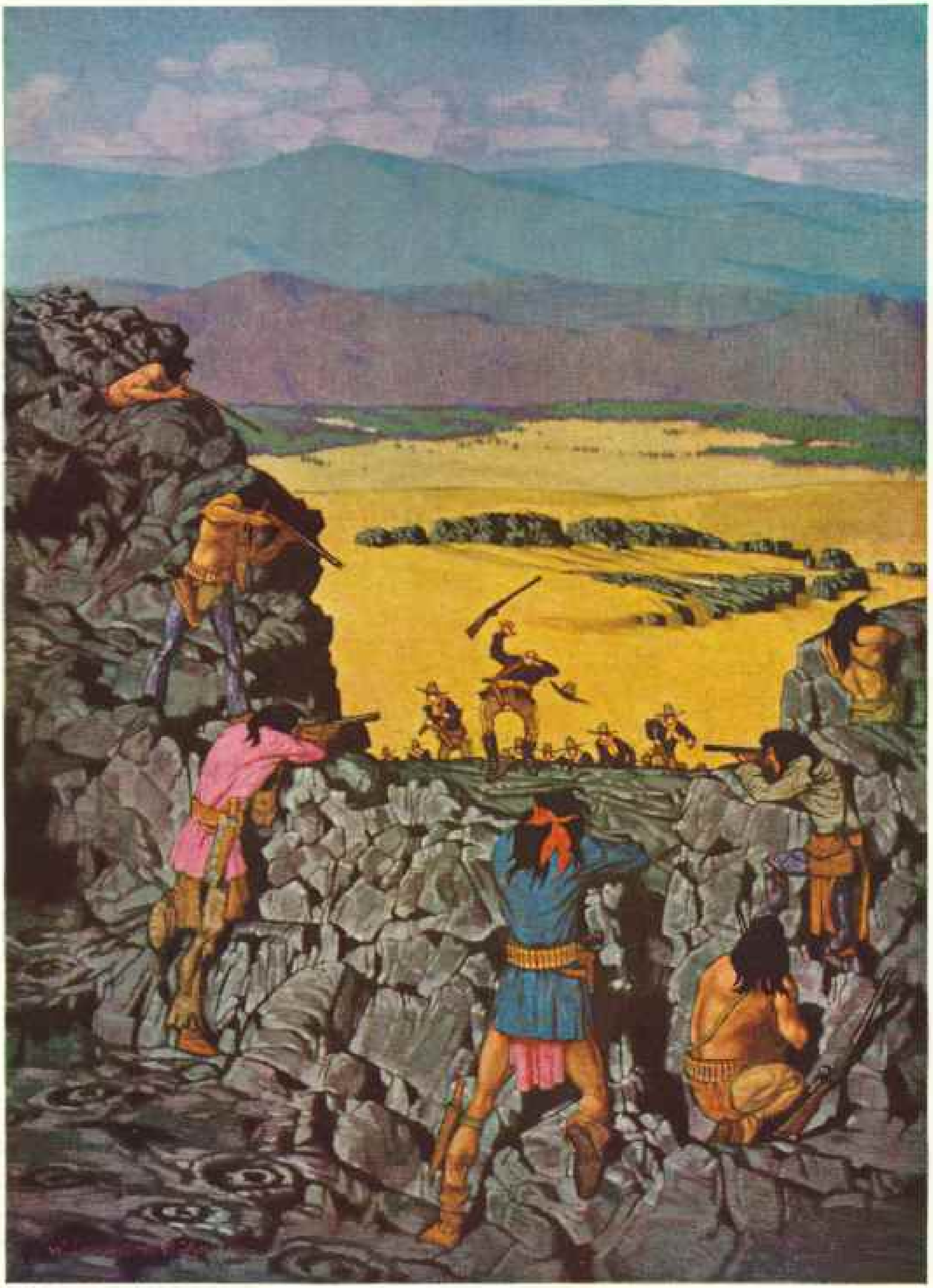
Braced on His Ancestral Fishing Stand, a Columbia River Indian Nets Salmon in the Churning Waters of Celilo Falls

Long before Lewis and Clark portaged around the falls aboriginal fishermen handed down these outjutting platforms from father to son. From similar platforms on the same sites modern Indians, dressed in dungarees and crew shirts, scoop up fish. By an old treaty they enjoy exclusive and perpetual fishing rights at this spot. In the spring, when salmon run and water is high, the narrow Dalles downstream back the river up until Celilo Falls becomes a short, watery arc (Plate IV). Salmon was Columbia River Indians' chief food and commodity of trade.



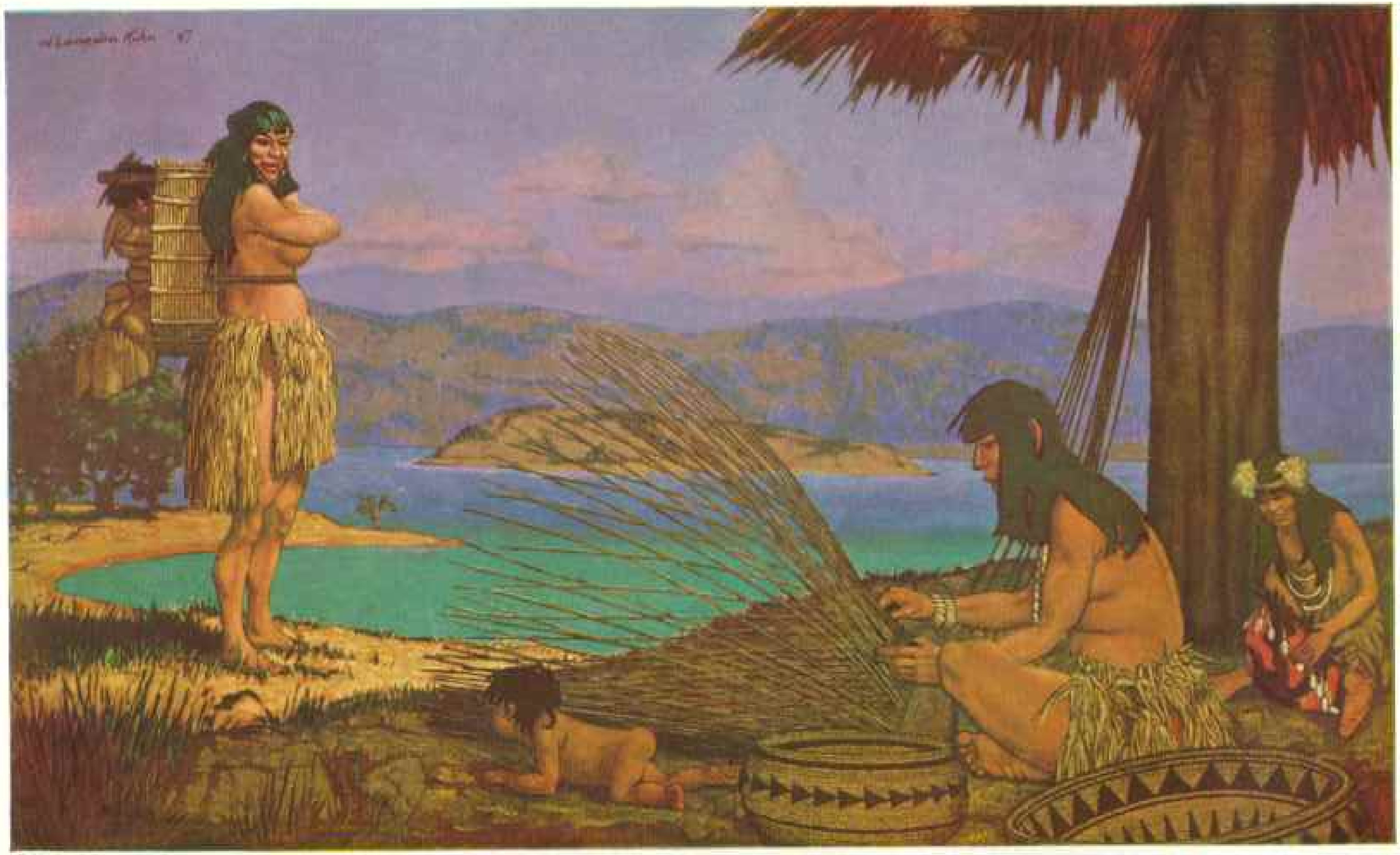
Rush-mat Lodges and Drying Salmon Mark a Peaceful Wanapum Fishing Village

It stood on the Columbia River in eastern Washington. The single-room lodges, supported by forked poles, were 15 to 60 feet long. A foot-wide opening ran the length of each roof to let out smoke and admit light. The vast quantities of fish drying on scaffolds amazed Lewis and Clark when they visited this village in 1805.



In the Natural Trenches of California's Lava Beds Warlike Modoc Made a Bitter Last Stand

Resentful of reservation life, they defied Uncle Sam and returned to ancestral lands astride the northern California border in 1872. When blue-coated U. S. troops arrived, the wily Modoc took to the lava beds. There they held out some four months, inflicting heavy losses on the attackers. The Modoc were related to more tractable Klamath Indians of southern Oregon (Plate VI).

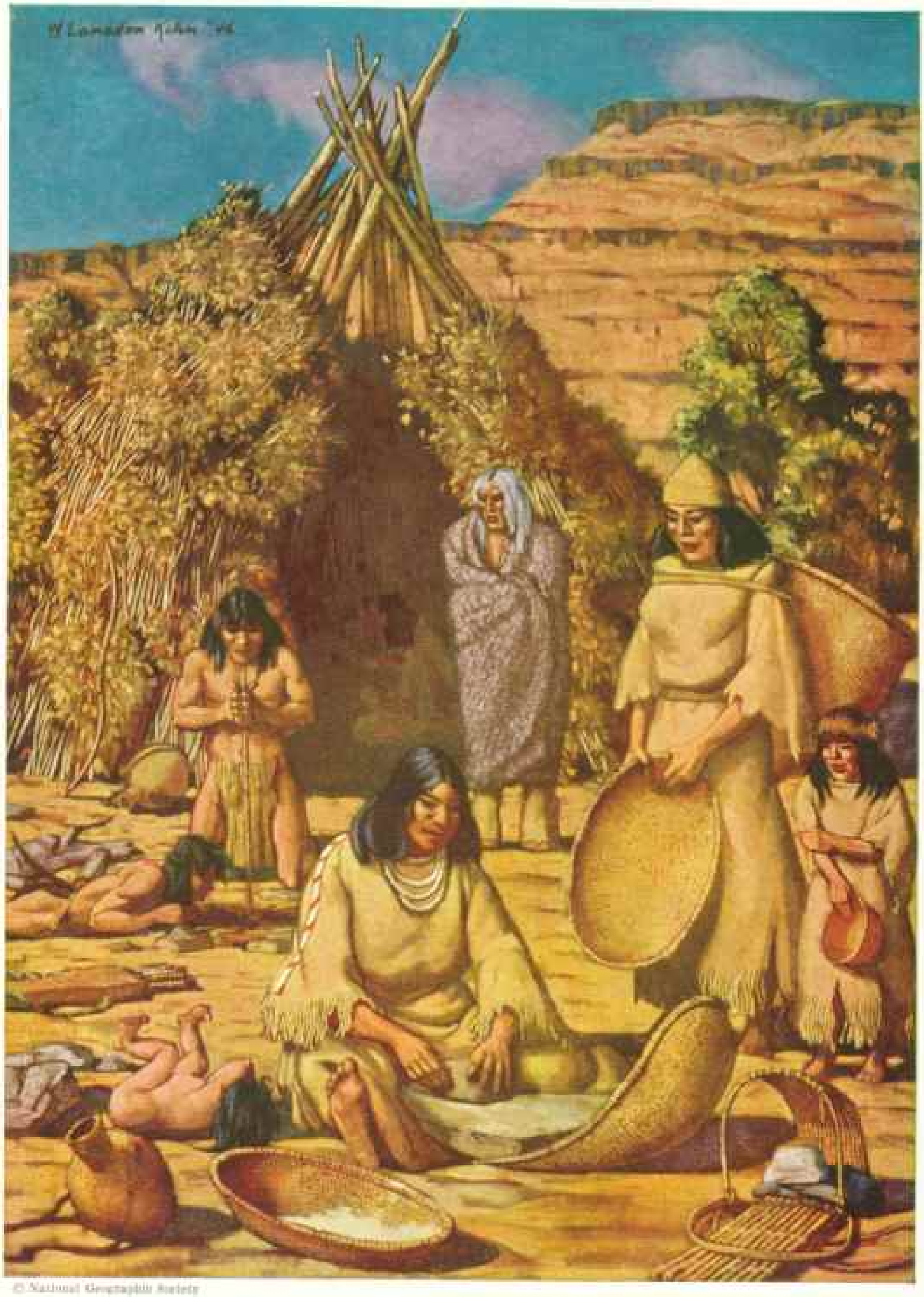


Stocky, Bark-skirted Pomo Women of Coastal California Were the Continent's Star Basket Weavers

They were probably unrivaled among North American Indians in variety of technique and range of patterns. Feathers, beads, and stone pendants embellished their best work. Men did the coarser weaving jobs, leaving their spouses free to achieve real art. Peace-loving Pomo were also chief minters for a large area, making highly valued currency from giant clamshells and magnesite. They also developed a moon calendar and a counting system which used a unit of 100 fours. Although a coast and mountain-lake people, they were content with crude rafts instead of boats. The girl at right fondles a feathered masterpiece.

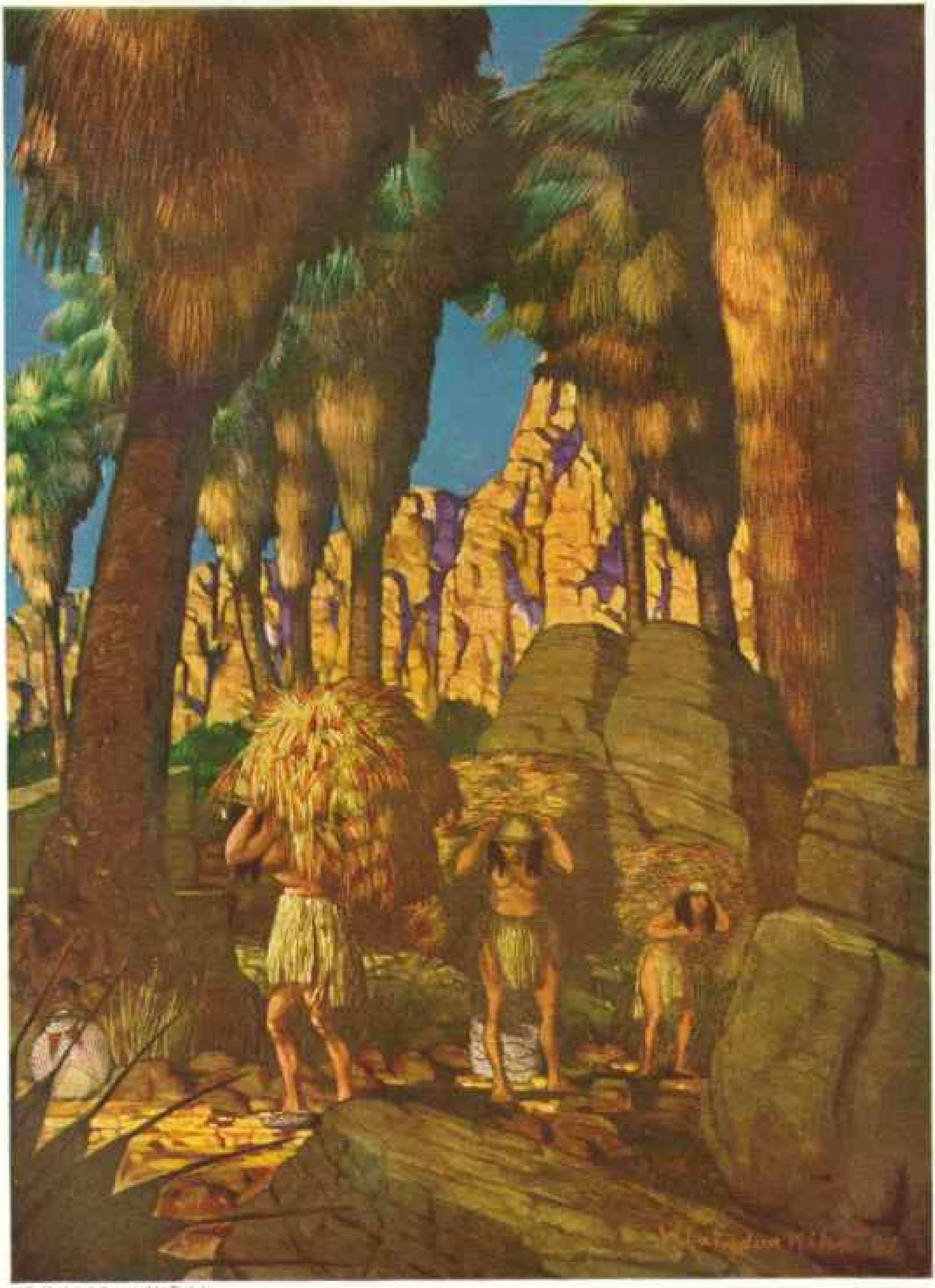
Arrayed in Savage Splendor, Dancers of a Secret Cult Meet Before Their Round House for an Earth-preserving Ceremony

Begun by southern Wintun Indians, the cult flourished in central California. Members held a series of dances from October to May. Indians believed the world would disintegrate if they ceased. Kuksu, or "big head," Dance gave the cult its name. Pincushionlike headdresses measured four feet across; feathers or poppies tipped the slender rods. Dancers carry flag, bird-bone whistle, magic staff, gourd rattle, and bow and deer-head quiver. Stamping on a large foot drum, they danced inside the ceremonial lodge. Selected boys became novices at a tender age and were initiated on reaching manhood.



Seeds Gathered from Their Semiarid Plateau Were the Staple Food of Wandering Paiute

They roamed the high lands between California's Sierra Nevada and the southern Rockies. Into the 1870's they lived a primitive existence, unchanged for countless centuries. Their few utensils, even to water jars and cooking pots, were woven. Woman in center grinds hard-shelled seeds into meal; her supplier carries two-bushel gathering basket on back. At lower right is child's hooded cradle.



Beneath Verdant Palms Strong-backed Cahuilla Women Bow under Stacks of Golden Reeds

Carrying-nets with forehead straps, an innovation of southern California Indians, hold the loads. Basket hats prevent chafing. With their teeth the women will split each reed three ways for use in making baskets. Nonfarming Cahuilla, like the Paiute, were food gatherers; their varied desert-and-mountain region provided more than 60 plant foods. Palm is the native *Washingtonia*.

Thatch-topped Hupa Tribesmen, Skillful Hunters of the Deer, Ushered in the New Year with the White Deerskin Dance

Carrying treasured albino skins on long ceremonial poles, they line up for the finale of the colorful 10-day ritual. Hupa lived in pleasant Trinity River Valley in northwest California. Each September, dancers progressed along the river giving various "acts" of the dance in tribal villages en route. To get within easy bowshot of game, Hupa hunters removed man odor by bathing and smoke, and disguised themselves in common deerskins. So well did they play the part that panthers sometimes pounced upon them. Chief dancers, wearing crowns of sea-lion tusks, carry sacred obsidian knives. Shell beads adorn the dancers' necks.

After Mass on Sundays Costanoan Converts of the Mission of St. Francis Kept Alive Their Ancient Tribal Dances

Founded in 1776 by Spanish priests, the mission gave the city of San Francisco its name. Now known as Dolores Mission, its well-preserved chapel still stands within the city's limits. A lithograph by the artist of Russia's first round-the-world expedition, which stopped here in 1805, is the basis for the scene above. Vultures' tail and wing feathers made the dark ceremonial bonnets. The two middle tail feathers of a species of woodpecker formed the white headbands; as many as 450 were required for a single band. Costanoans, now extinct, lived along the California coast from Monterey to the Golden Gate.

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Dressed in Beaded Finery, a Yakima Girl Rides High in Her Spanish-type Saddle

Her people lived on both sides of the Columbia River and along the Yakima and Wenatchee Rivers in Washington. She wears a beaded elkskin cape, basket hat, and marine-shell earrings. Otterskin wraps her long braids and forms the wrist loop for a quirt. A high, decorated pommel stands up before her. Among Indians only women used saddles.

drawn across the opening of the arc, they were easily dispatched with wooden clubs.

In another method the hunters carried torches and formed a large circle. The brush was fired to burn toward the center. The hunters converged until they could kill the dazed rabbits with clubs.

Cottontail rabbits, gophers, squirrels, rats, and marmots were also eaten. Deer were stalked singly and shot with bow and arrow, as were mountain sheep.

The fast and wary antelope was taken in community drives. A stout corral about 200 feet in diameter was built in a valley where the animals were expected. Wide converging wings of brush were put up for the entrance. The antelope, driven by the hunters and guided by the wings, entered the corral and were shot with bow and arrow.

In long-past geologic ages the Great Basin was a region of lakes and lush forests. When man first entered the scene we do not know, though scattered excavations in caves and near the old lake terraces indicate that it was several thousand years in the past.

Until A.D. 1500 bison ranged most of Utah and northern Nevada, but by the middle of the 19th century they had entirely retreated from the Great Basin area.

Indians Ate Grasshoppers

There were occasional seasons when Mormon crickets, or longhorn grasshoppers, appeared in large swarms. When this happened, the Indians collected enormous quantities for food by encircling an area with converging fire. The singed insects accumulated in piles in the center.

Lizards and snakes were staple articles of diet. The chuckwalla, a large lizard which lives only in the southern part of the Basin, was most eagerly sought (page 195). Strangely, the rattlesnake, one of the largest and more palatable snakes of the region, apparently was not used.

Indians fished along the Humboldt River and the streams near Great Salt Lake. In these areas fish could be caught in the winter, when other sources of food were cut off, by spearing or in weirs.

Most Great Basin tribes were skillful basket weavers. They collected wild seeds and roots in large conical carrying baskets and processed them in basketry trays (Plate XII). To carry water on long trips into arid sections, the Indians wove watertight baskets.

Living in widely scattered groups, the Great Basin tribes were so preoccupied with the food quest that they had little time for dances, which were held infrequently, usually when the food supply was temporarily abundant. For these occasions many families gathered at a rendezvous for a week or two. Participants in the simple round dance joined hands in a circle. Games of chance were a favorite pastime.

These gatherings were the normal time for courtships, and most marriages resulted from them.

Since the two sexes were not always equal in number, it was common for a man to have two or more wives; sometimes a woman would have more than one husband. The taking of sisters or brothers as plural spouses was considered a wise precaution against jealousy.

The Coming of the Horse

The horse, which had been introduced by the Spaniards into the Southwest in the 16th century, reached the Great Basin Indians early in the 19th century and profoundly affected their manner of living.

The Ute were a warlike people with considerably more tribal organization than their western Shoshonean neighbors. At one time the seven divisions of the tribe in Utah were organized under a single leader.

Horses increased their warlike activities and brought them more into contact with the Plains tribes from whom they learned to use clothing, tepees, and rawhide and leather containers (page 197).

The horse had already reached the Columbia before Lewis and Clark arrived there in 1805.

A Shoshoni Heroine

When the explorers reached the Hidatsa villages on the upper Missouri they hired Toussaint Charbonneau, a French-Canadian voyageur living among the Indians, to act as interpreter and guide.

Charbonneau's wife was the famous Shoshoni Sacagawea (Plate IV).

The Hidatsa had captured her when she was a young girl and had sold her to Charbonneau when she was about fourteen. Because of her knowledge of the Shoshoni country and her good character, she was extremely useful to the expedition and won the high regard of its captains.

The first band of Shoshoni encountered was in charge of Sacagawea's brother. Through her intercession the explorers obtained horses from the Indians.

Speaking of the fight during which Sacagawea was captured, Captain Lewis wrote in his journal: "Sah-cah-gar-we-ah our Indian woman was one of the female prisoners taken at that time tho' I cannot discover that she

C. Hart Merriam

To His Secret Round House Goes a "Big Head" Dancer

He will back in with head bowed to protect his four-foot bonnet. Inside he will light the ceremonial fire for a dance of the secret Kuksu cult of central California Indians (Plate XI). Dr. C. Hart Merriam, who saw the dance and took this picture, was a widely known naturalist and authority on Western Indians. He was a founder and for 54 years (1888-1942) Trustee of the National Geographic Society.

shews any immotion of sorrow in recollecting this event, or of joy in being again restored to her native country; if she has enough to eat and a few trinkets to wear I believe she would be perfectly content anywhere."

A son was born to Sacagawea in the course of the journey, but this event did not hinder her services to the party.

The northeastern Shoshoni had penetrated to the upper Missouri River. There they had taken on many of the traits of the buffalo-hunting Plains tribes, using tepees and dancing the characteristic Sun Dance.

Farther west in the sagebrush country they lived more like their neighbors of the Great Basin. Their dwellings were rude brush shelters, often merely roofless semicircles, which served as windbreaks and gave only scant protection against snow and rain in winter. They also used caves in the lava beds as shelters.

The Nose-piercing Tribes

Traveling westward from the Shoshoni, Lewis and Clark encountered the Nez Percé tribes, which occupied the valleys of the Snake River and the Columbia as far as The Dalles. French trappers so named them because of their custom of piercing the septum of the nose to receive a shell ornament.

West of the Nez Percé, the other principal tribes were the Walla Walla, the Palus, the Umatilla (Plate II), the Tenino, the Yakima (Plate XVI), and the Klikitat.

When Lewis and Clark reached the Nez Percé, these Indians were living in community houses containing as many as 50 families. They also used underground houses, roofed over with sticks and earth, which accommodated from two to four families each.

Variations of the semi-dugout house were typical of the Northwest and extended well into California.

A large ceremonial or dance house was usually built for each village.

The Nez Percé believed in many Nature spirits and private guardian spirits which could be obtained by any individual through fasting.

They were courageous fighters and produced Chief Joseph, one of the most admired American Indian leaders (Plate I).

By the treaty of 1855 they ceded much of their tribal territory to the United States and were assigned to a reservation in the Wallowa Valley in Oregon and part of Idaho. With the sudden increase of white immigration they were still further restricted and ordered in 1863 to a much smaller reservation in Idaho.

Those living at Wallowa Valley refused to recognize the new treaty. Under the leadership of Joseph they won several decisive victories over United States troops.

When, outnumbered and underarmed, they were obliged to give way, Joseph conducted a retreat with his entire band of men, women, and children that remains a masterpiece of generalship.

With Col. Nelson A. Miles and his troops ahead of him, with Gen. O. O. Howard at his rear, and Col. S. D. Sturgis on his flank, he led his little party more than a thousand miles through Montana to within 50 miles of his objective, the Canadian border. Here he was finally cut off by fresh troops and surrendered.

Staff Photographer B. Anthony Stewart

Prized Delicacy of Great Basin Indians Was a Fat Chuckwalla

Tom Wilson, a Paiute, examines *Sauromalus obesus*, a lizard which lives among the sun-baked rock ledges of the Southwest (page 193). Excepting the Gila monster, it is the largest species definitely known from the United States. Herbivorous and egg-laying, it grows to 17 inches in length. When attacked, the chuckwalla scurries into a crevice and blows himself up until his scaly hide is tight against its rock walls. To get him out is a problem.

Joseph's speech at the time of his surrender expresses the hopelessness that came to tribe after tribe as they retreated before the inexorable tide of white advance.

"I am tired of fighting," he said. "Our chiefs are killed. Looking Glass is dead. Toohulhulsote is dead. The old men are all dead. It is the young men who say yes or no. He who led the young men is dead. It is cold and we have no blankets. The little children are freezing to death.

"My people, some of them, have run away to the hills and have no blankets, no food. No one knows where they are—perhaps freezing to death. I want to have time to look for my children and see how many of them I can find. Maybe I shall find them among the dead.

"Hear me, my chiefs.

"I am tired. My heart is sick and sad. From where the sun now stands I will fight no more forever."

The Flatheads, a Salishan tribe, occupied most of western Montana. The name flathead was bestowed, not because they deformed their heads, but because, unlike their neighbors to the west, they left their skulls as Nature formed them—flat on top.

They relied largely on fish for food but were active hunters as well. Their houses were underground dugouts with poles converging to form the roof. Cedar-bark mats were laid over these poles and covered with earth.

California's Complex Tribal Patterns

California comprises one of the most complex ethnological areas in the New World. Formerly it was supposed that as many as 22 different languages were spoken within the boundaries of the present State of California. But in more recent times linguists have grouped a number of these local languages into two chief stocks, Hokan and Penutian, and thus reduced the total number to 12 at most.

On the northwestern coast of the State two of the great linguistic stocks of America, the Athabascan and the Algonquian, are represented by a few small groups.

Just south of the Athabascan tribes are two small groups, the Yuki and the Wappo, who speak a language which so far as can be determined is related to no other in the world.

The physical structure of the Yuki also sets them apart from all other tribes. They are exceptionally short in stature and have unusually long heads.

Typical in northwestern California are semi-subterranean plank houses and dugout canoes with raised prows.

Money consisted of shells or strings of clam-shell beads. Big flaked obsidian knives symbolized large sums of money (Plate XIV).

The distribution of this type of culture corresponds more or less to the high redwood and fir forests of northern California, which are a continuation of the heavy forested area of the Northwest coast,*

If any tribes were typical, they were those in the central part of the State speaking Penutian dialects—the Maidu, the Wintun, the Miwok, the Yokut, and the Costanoan.

Farther south the Shoshonean linguistic stock of the Great Basin pours across the eastern border of the State. It includes such tribes as the Mono, the Chemehuevi, the Cahuilla (Plate XIII), and the Gabrieleño. The latter took up residence on the southern Santa Barbara islands.

Central California an Indian Promised Land

From the tribes of northern Mexico and the Pueblo tribes of the Southwest the extreme southern California tribes, the Mohave, the Yuma, the Kamia, and the Diegueño, learned to grow maize, beans, and squash and to make pottery of good quality. These were the only groups in California possessing real tribal solidarity.

Central California is the area lying between the foothills of the Sierras and the coast. The principal topographic features are the great Central Valley drained by the Sacramento and San Joaquin Rivers and the relatively low Coast Ranges which separate it from the ocean.†

The climate, as has been hinted by many chambers of commerce, is delightful.

Here were nearly perfect living conditions for primitive man. Deer and elk abounded; rabbits and squirrels were everywhere. Marshes and lakes teemed with waterfowl, the rivers were full of fish; and along the seacoast, in addition to fish, there were clams, mussels, abalones, crabs, and crayfish.

In the Plateau area to the north, if the salmon run failed, famine followed. In the agricultural Pueblo region to the south, if the rains did not come in time, starvation resulted. But famine was virtually unknown in central California.

Wild grass seeds and roots and bulbs were gathered in season. When the aborigine wished to vary his diet, there were also grasshoppers, angleworms, caterpillars, yellow-jacket larvae, and delicious beetle grubs.

Although the region is now one of the most productive in the world, the practice of agriculture was unknown to the Indians of this part of California. With such a variety of food sources the Indian here did not need to fear the failure of any one crop.

Acorns the Staff of Life

Numerous oaks produced each year large quantities of acorns, the staff of life of the California Indian. There also were pine nuts and buckeyes and the nut of the California laurel.

Acorns were gathered in the fall and carried to camp or village in baskets. They were then dried and stored in large baskets or granaries placed on platforms.

When ready for use they were hulled and ground to flour in the stone mortar, or in later times on a slab of rock.

Since the acorn in its natural state has a high tannic-acid content, making it extremely bitter, a leaching process was necessary before cooking. This was usually done by placing the meal in a basin of sand and pouring water over it. A lazier way of accomplishing the

* See "California's Coastal Redwood Realm," by J. R. Hildebrand, NATIONAL GEOGRAPHIC MAGAZINE, February, 1939.

† See "More Water for California's Great Central Valley," by Frederick Simpich, NATIONAL GEOGRAPHIC MAGAZINE, November, 1946.

Bureau of American Ethnology

Laced to the Chin in His Elkskin Cradle, a Small Ute Brave Naps while Sister Poses Him

J. K. Hillers, famed early photographer of Indians, made this picture some 75 years ago while accompanying Maj. John W. Powell on his explorations of the Southwest. His results were excellent despite cumbersome equipment and difficult field conditions.

Bureau of American Ethnology

The Tepee-dwelling Cayuse of Washington and Oregon Bred Tough Little Ponies Which Took Their Tribal Name

The wiry "cayuse" pony became famous throughout the West. Full-blooded Cayuse Indians had disappeared by 1902. Blaming white men for an epidemic in 1847, they massacred the famous missionary, Dr. Marcus Whitman, his wife, and 12 others, and destroyed his mission. Its site is now a national monument.

leaching was to bury the hulled nuts in the mud of a swamp for a year.

After the meal had been leached, it was mixed with water in a basket until it had the consistency of a fairly thick soup. Hot stones dropped into the container caused the mixture to boil. Thus cooked, it was ready to eat.

In central California the buckeye was pounded and leached in much the same fashion as the acorn.

Indian Fashions of California

In keeping with California's mild climate, the clothing of the Indians was simple. In aboriginal times men as a rule wore nothing. When the weather was cold they wore a skin wrapped around the hips.

Women in all parts of California wore double aprons. A small apron was suspended from the waist in front and a larger one behind.

Where deer were available, these were made of buckskin, usually with a fringe along the bottom. Shredded bark, grass, or fiber cordage had to suffice in localities where leather was lacking.

The usual footwear of the central tribes was a sock made of a single piece of dressed deerskin and sewed up the front and back. Moccasins were worn only on special occasions, such as war expeditions and long trips.

The tribes of southern California wore sandals, often made of twisted ropes of agave fiber.

As basket weavers, the California tribes are without peers in all the world.

In the north, weaving or twining techniques are used; in the south, coiling is the predominant form.

Basket weaving reached its peak among the Pomo, who practiced a wide variety of weaving techniques and produced the beautiful feathered baskets generally considered the finest examples of the basket-weaving art (Plate X).

Despite this weaving skill, nothing resembling cloth was produced in California. The twisting of rabbitskin strips or feathered strips of bird skin into robes and the twining of tule mats are the nearest approach to it.

Medicine Men and Specialists

Many California tribes had chiefs whose position was hereditary. The individuals with the most power were the medicine men, who could make their fellows believe they could cure or inflict disease. Many were supposed to gain the aid of spirits; others were specialists.

For example, there were medicine men whose only function was to cure or prevent snake bites. Some snake doctors performed a ceremony in which live rattlesnakes were handled.

The bear doctor claimed the power of killing enemies by turning himself into a grizzly bear. Such practitioners were greatly feared.

In the northern part of California the medicine man diagnosed illness, which he cured by sucking out of the patient the object which had caused the disease by invading the body. Such objects might be a piece of flint, a live lizard, or a spider.

By collecting poison from reptiles, insects, and plants and mixing it with some part of the intended victim, such as a hair or a nail paring, the poison doctor, it was believed, could cause death.

This idea of parts of the body being connected with controls by other persons was widespread in California. An old Indian woman of my acquaintance had a bag filled with toenail and fingernail parings which she had saved all her life, fearing lest they fall into the hands of an unscrupulous person who might harm her.

The medicine man claimed his power from a vision, produced by fasting or drugs, in which he met and conversed with some animal who instructed him in the method of keeping in touch with the spirit world.

Most Indian dances and ceremonies were rituals of religious cults. In central California costuming for these affairs was elaborate, involving the lavish use of feathers and flowers (Plate XI).

War and Victory Dances

Throughout California special and elaborate public ceremonies were held for girls when they reached adolescence. There also were war and victory dances.

In 1542 Juan Rodriguez Cabrillo sailed among the channel islands and along the Santa Barbara coast, where he encountered the Chumash Indians.

These interesting natives were in many respects the most advanced in California, and among the most unusual. The Spaniards considered them superior to others in the region.

They occupied the mainland and the three northern islands of the Santa Barbara Channel. On one of these islands, San Miguel, Cabrillo died.

Their canoes were remarkable creations made of planks, fitted and lashed together and calked with asphalt. They were up to 25 feet in length and were capable of ocean navigation. Both double- and single-blade paddles were used (Plate V).

The Chumash territory, with its ideal climate and abundant food, was the most densely populated section of California. The villages consisted of large dome-shaped communal houses up to 50 feet in diameter, accommodating 40 or 50 persons.

They were built by placing the butts of a series of willow poles in a circle and bending them so that the tips were tied together at the top. Crosspieces were attached in the manner of a frame, and the whole structure was then covered with tule mats.

Chumash Housing Features

The houses were partitioned into rooms, and platform beds covered with tule mats were used. These two modern features were unique among California tribes.

The Chumash were fine basket weavers and skillful wood carvers. In addition, they made beautifully formed and polished globular pots of soapstone, often very large, as well as excellent stone carvings of animals, birds, and fish.

The earliest description of the Indians of the more northern section of California is that written by Francis Fletcher, chaplain of Sir Francis Drake's ship which landed on the coast north of San Francisco in 1579. These Indians were undoubtedly the coast Miwok.

The natives received the Englishmen with elaborate ceremonies and loud wailings. The women tore out their hair and lacerated their bodies until they were covered with blood.

Drake was crowned with an elaborate feather crown, and around his neck were placed yards of shell beads. The puzzled Englishmen did not realize that the Indians considered them to be their departed ancestors returned from the land of the dead.

Visits of explorers and buccaneers to the California coast for more than two centuries after the time of Drake were so infrequent that the life of the Indians was unaffected.

The first Franciscan mission in California was founded at San Diego in 1769.

Following this, twenty other missions were established along the coast by 1823, finally extending north of San Francisco Bay (Plate XV). The Indians were not warlike and were easily brought under the influence of the missions.

They were compelled to work at strange tasks. Discipline, to which they were unaccustomed, was rigid; refusal to work or attend church was punished. The natives were clothed, and their health and spirits began to fail. There were many attempts to escape, but there were always troops to round up the recalcitrants.

In 1834 the Mexican Government began taking over the missions, making token provision for the Indians.

By this time the Indians had lost the self-assurance that went with their own culture, but had not learned to adapt themselves to the new. They soon lost their restored belongings, their numbers began to decrease rapidly, and the mission tribes were on their way to extinction.

The gold rush in 1849 concentrated in the north and along the Sierras where the missions had not penetrated.

Gold Seekers Clashed with Indians

There was some resistance from the more warlike northern tribes such as the Modoc and the Shasta, but the opposition was short-lived (Plate IX). The lot of these tribes in the early days of the gold rush was hard. In some instances miners hunted them like wild game for sport.

Following the mining period came the amazing agricultural development of the State. As the white population increased, the Indians steadily decreased. Many tribes are now extinct; of others only a handful of survivors remains.

A few tribes in the northern part of the State and a few in the interior section of the south are still extant.

To the white man California may be a paradise gained, but to the Indian it is a paradise lost.

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

Rubber-cushioned Liberia

By Henry S. Villard*

OUT of the morning mist the African coast rose in low outline, disclosing the rocky promontory of Cape Mesurado. As we drifted nearer, the city of Monrovia took on form, giving the unmistakable impression of architecture transplanted from our Southern States.

At 8 o'clock our United States war vessel was thundering a 21-gun salute to the Negro republic of Liberia, the only fully independent Negro state on the African Continent, where only persons of African descent are eligible for citizenship.†

Our greeting was duly echoed with white-puffed accompaniment by the battery at Fort Norris. A courtesy call by the U.S.S. *Boise* was officially under way.

Our cruiser rolled at anchor in the coastal swells while port officials clambered aboard from a longboat rowed by stalwart Kru oarsmen in striped jerseys. At the stern floated the flag of Liberia, patterned on the Stars and Stripes: six red and five white stripes, with a white star against a blue background in the upper left-hand corner (Plate I).

Riding the Breakers into Monrovia

We left the ship's side in a naval launch to negotiate the breakers over the sand bar which blocks the approach to Monrovia and the Mesurado River. An exciting experience always, this landing on the African coast.

With an expert Kru pilot perched in our bow, we took the running waves at exactly the right moment. A breathless second when we seemed to drop to the ocean floor, a dash of salty spray in our faces, and we were riding serenely in the protected lagoon behind the sand bar to a welcome at the customhouse.

Future travelers to Liberia will not experience this thrill of landing through the dangerous surf. Monrovia now has a modern, man-made harbor, just completed by American contractors under a tripartite agreement with the United States Government and under the supervision of the United States Navy. The harbor is large enough to accommodate freighters and small naval craft.

Begun during the war, Monrovia's new port cost $19,000,000 in Lend-Lease funds. Liberia expects its wharf and warehouse facilities to be of tremendous value in helping to open up undeveloped but potentially rich hinterland.

Wedged between the British colony of Sierra Leone and the French Ivory Coast, a few degrees north of the Equator, Liberia occupied one of the most strategic areas on the globe during World War II (map, p. 204).

The country was not far from the British naval bases at Freetown, Sierra Leone, and Bathurst, Gambia, and athwart the route of American bombing planes which were ferried to the British forces in the Middle East.

In recognition of the ideals for which the United States fought, the Liberian Legislature, on January 27, 1944, declared war upon Germany and Japan.

War Brought Modern Airports

A modern airport was constructed above Marshall, on the bank of the Farmington River near Harbel, for the use of landplanes coming from America and as a link in the coastal airdromes of West Africa. It was named J. J. Roberts Field in honor of the first President of Liberia.

Just behind Cape Mount, on a vast natural expanse of water called Fishermans Lake, Pan American Airways established a transatlantic terminal for its Clipper seaplane service from the United States to Léopoldville, in the Belgian Congo.

When Japan attacked Pearl Harbor, all bomber and passenger traffic to the Far East was routed by way of Africa, and Liberian territory became a principal African landfall for these flights.

After the war, the U. S. Army forces pulled out of Liberia. Roberts Field, which cost $5,500,000, no longer was a scene of feverish activity. More recently it ceased to be a regular stopping place for Pan American Airways planes on their route from London and Lisbon to Léopoldville, and to Johannesburg, in South Africa. Fishermans Lake fell into complete disuse.

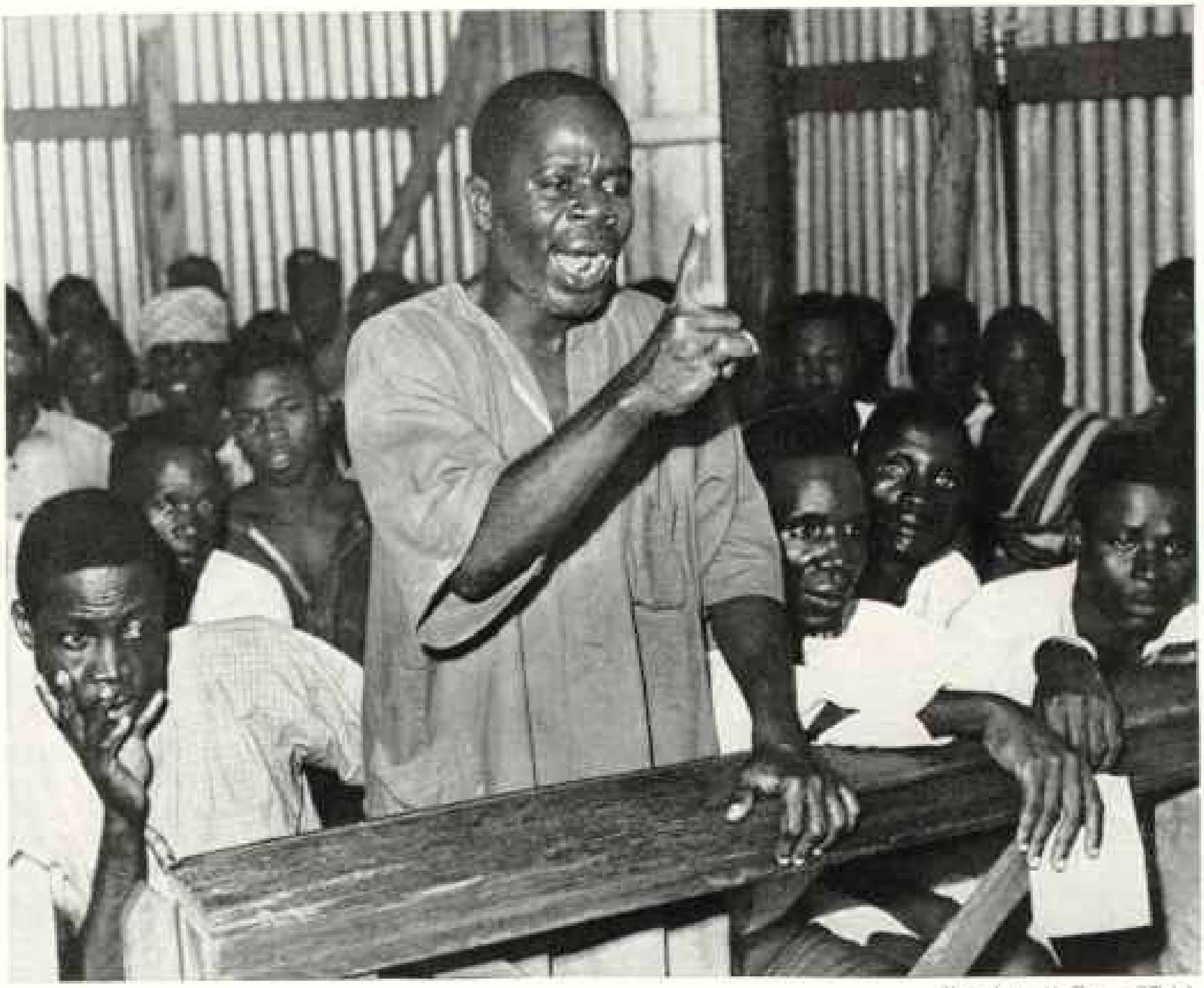
Liberally sprinkled with palm trees and bright flowers, tall pillars and wide verandas, the city of Monrovia with its 10,000 inhabitants suggested to our first glance a miniature Charleston or Savannah (page 206).

Along Water Street, teeming with small shops and markets, crowded with brightly dressed native women and European-clad citizens (Plates V, VI, VII, and page 205), we drove to the American Legation.

The streets were unpaved but neat. Houses in the residential quarter, closely akin in style

* The author, a Foreign Service Officer of the United States, is a former Deputy Director, Office of Near Eastern and African Affairs, United States Department of State.

† See "Land of the Free in Africa," by Harry A. McBride, National Geographic Magazine, October, 1922.



U. S. Army Air Forces, Official

"If It Please Your Honor"—a Liberian Pleader in Magistrate's Court

Such modern methods of handing down justice have not yet penetrated far into the interior, where tribal chiefs often are judge and jury. This courtroom is near Roberts Field, where Liberians came into close contact with American soldiers during World War II.

to those in the warmer sections of the United States, were laid out on well-planned city blocks overlooking the rambling native waterside district of Krutown.

Past several points of interest we rode in a preliminary tour of the city: the attractive Executive Mansion, guarded by members of the Liberian Frontier Force; the white-walled Department of State; Government Square and the Hall of Representatives, all located on the higher ground in the center of town.

From the hour the captain and officers of our vessel set foot on Liberian soil to the moment when we weighed anchor and sailed away into the quick tropical sunset, official hospitality kept everyone busy.

Prominent on the program was a visit to the Firestone rubber plantations, some 53 miles by road from Monrovia in the interior.

First we determined to have a bird's-eye glimpse of the land we had come to visit. Our Navy scouting plane took off from the heavily swelling seas with a minimum of fuss and in a moment Liberia's flat and sandy coastline was unfolding beneath a blue sky broken by gathering rain clouds.

Breakers Block Stream Mouths

The white strip of low-lying shore, 350 miles long, is relieved by three bold capes: Cape Mount, 1,000 feet high; Cape Mesurado, 260 feet; and Cape Palmas, 104 feet.

It was fascinating to watch the indentations of several rivers whose outlet to the sea was impeded by hazardous shoals and the typical sand bar we had found at Monrovia; foaming breakers and swirling currents at the mouths of these streams spelled the lack of safe harbors.

The ground within our horizon—we did not risk an overland flight—could scarcely be considered densely wooded. It rolled away in a gradual climb to an average elevation of 1,000 feet, although in the far interior, which ex-

Earl Parker Hanson

A Shot of Serum, and Mr. Porker Is Immune to Hog Cholera

Here United States agricultural specialists help Liberian farmers improve their hog-raising methods. Since 1944, a U. S. mission to Liberia, first a project of the Foreign Economic Administration and now under the State Department, has been helping that nation build up its agriculture, mining, and transportation.

tends 100 to 170 miles to an irregular boundary, there are mountains that reach more than 4,000 feet.

Liberia has an area of roughly 43,000 square miles, a bit less than that of Pennsylvania.

Wheeling over Fishermans Lake, whose protected sheet of brackish water affords the most nearly perfect seaplane base imaginable, we flew over the jutting Cape Mesurado and its nestled city of Monrovia to look down upon the rubber export center of Marshall on the Farmington River.

Then, satisfied with our quick panorama, we alighted on the sea again, ready for a motor trip to the plantations.

Along Country's Arterial Highway

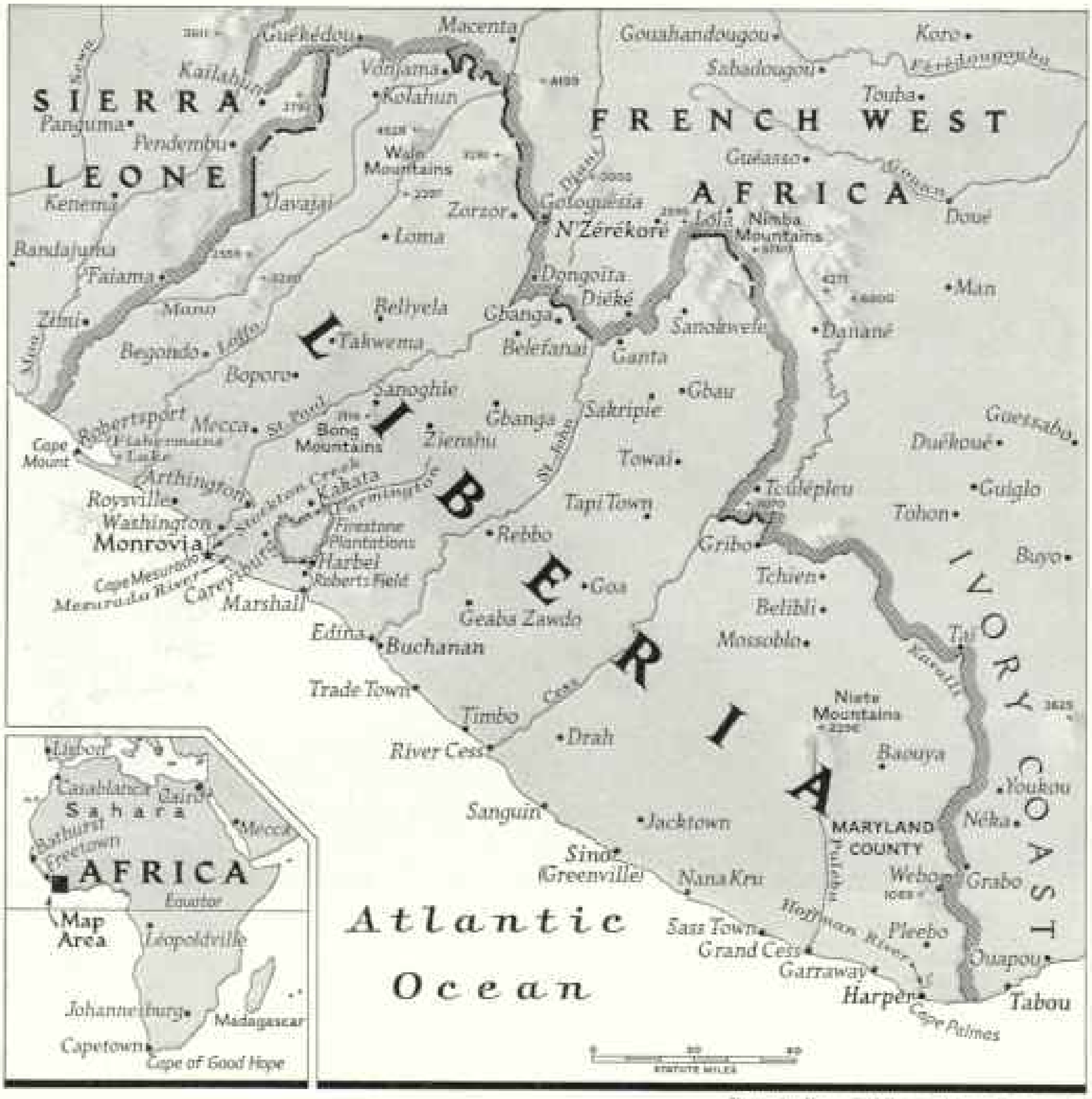
We left Monrovia on a fairly narrow earth-surfaced highway which led through tropical underbrush and occasional stately palm groves toward the great American rubber enterprise which is the economic heart of the country. There was no doubt in our minds that we were in the Tropics. Though the temperature was well below 100 degrees, humidity at the end of the rainy season was still marked.

On the coast the average annual rainfall ranges from 150 to 190 inches annually, while inland the records show a variation from 85 to 100 inches. For contrast, the inhabitants look forward to the winter months when the dry harmattan wind blows in from the Sahara.

Much of Liberia is covered with brush and secondary growth. We sped on as fast as the rain-drenched surface would permit after a sudden downpour. There seemed to be no end to the number of villages. Thatch roofs and mud walls, the simplest African structure, predominated.

All along this arterial highway of Liberia, we were told, native settlements were clustered nearly within view of one another.

There the tribesmen lived in hopes that the present 65 miles of good road surface would



Drawn by Harry S. Oliver and Irvin E. Alleman

Liberia, Africa's Only Independent Negro State, Is Smaller than Pennsylvania

A century ago this Negro republic declared its independence, following establishment of a settlement there 25 years before by freed American slaves. Names like Maryland County, Washington, Monrovia, and Buchanan recall that the United States sponsored Liberia. Lying between Sierra Leone and Ivory Coast on Africa's bulge, the country has a 350-mile coastline and stretches to the border of French West Africa.

one day be extended over the rest of the trail. At intervals we encountered trucks, jammed with native laborers or supplies.

Life in a Tribal Village

Once we wandered into one of the little communities encountered at such short distances in this land of two million inhabitants. Tribal traditions and tribal authority, which grow ever more primitive the farther one journeys into the interior, were plainly enough the basis of this society, where the family group is usually polygamous.

A grizzled dark-skinned local chieftain, clad in loincloth and what might have passed for a soldier's hat, grinned and posed obligingly for his photograph.

In the door of one of the more substantial dried-mud huts, a shoeless young man, comparatively well clothed in shirt and trousers, was industriously weaving cotton cloth on a primitive hand loom.

A comely woman, bare from the waist up, carried a huge basketload on her head, an infant slung at her back, and, obviously, another one on its way.

Pigs and chickens roamed in the background. Patches of cassava and yams were

Earl Parker Hanson

He Can Repair a Torn Garment While You Wait

This outdoor tailor shop attracts customers on the main business street of Monrovia. American sewing machines have penetrated to the remotest parts of the world, including the deepest corners of the African jungle. Mandingo traders, Kru fishermen, Buzi chieftains, Bassa houseboys, and Americo-Liberians of every rank mingle in the capital's trading district.

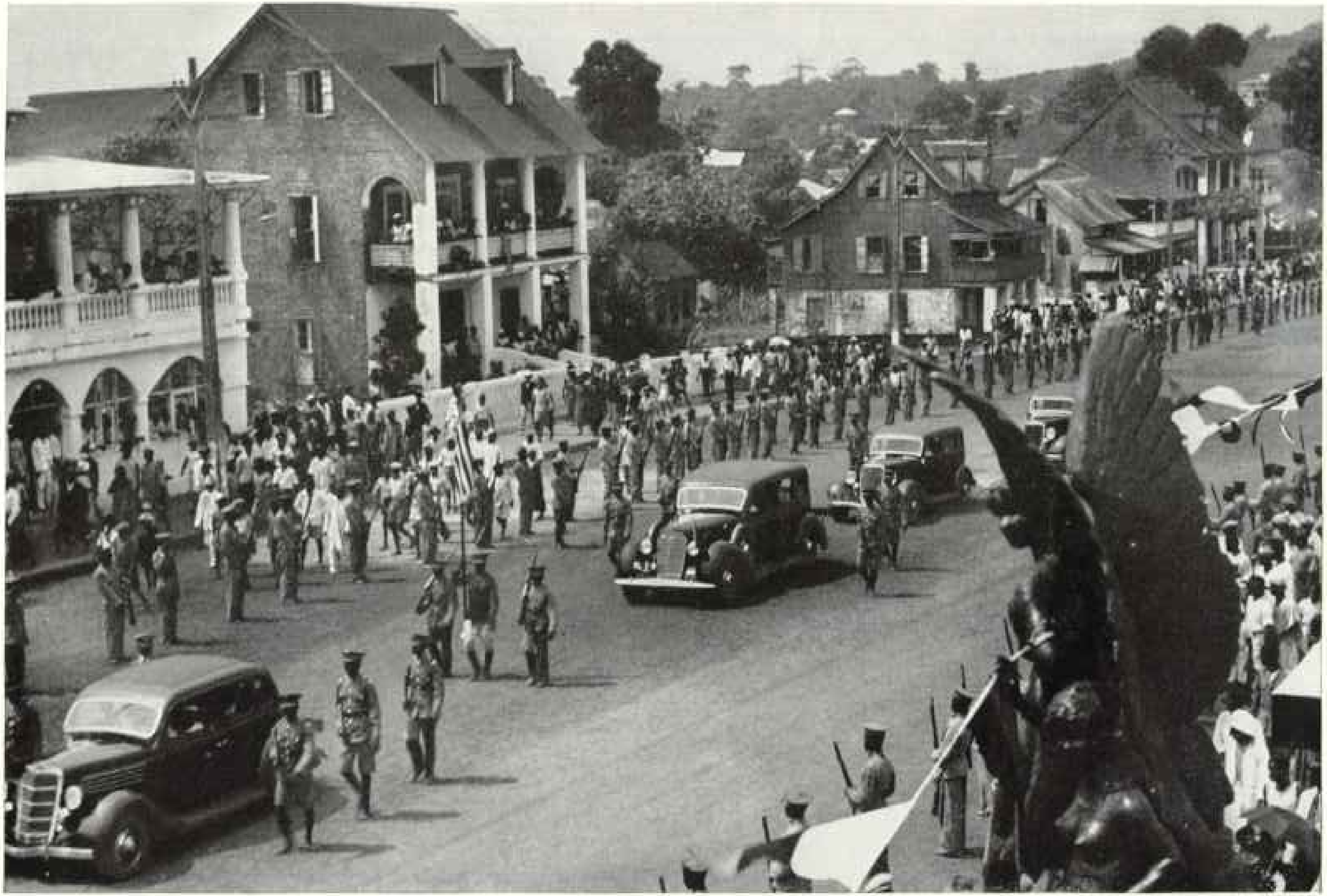
under sketchy cultivation on the outskirts of the settlement.

We had not been an hour at the plantations before we were convinced that the entrance of the Firestone interests on the Liberian scene had contributed enormously to the equilibrium and economy of the country.

Following a wide search for conditions most suitable to the growing of rubber, unhampered by Government restrictions, the late Harvey S. Firestone found in Liberia the exact combination of climate, soil, and political stability required.

In 1926 the Firestone interests literally sowed the seeds of an independent American rubber supply by negotiating the lease of a million acres of land, at the same time concluding an agreement for a loan to the Liberian Government of $5,000,000 and the appointment of an American Financial Adviser to supervise the collection of the Government's revenue as well as its expenditures.

Today, about 27,000 native Liberians are employed on the plantations, and for them and their families Firestone has built nearly 9,000 houses. Prewar employment was about 18,000. At the height of wartime production the figure rose to 36,000.



Monrovia Honors Liberia's Retiring President Barclay and Incoming President Tubman in an Inaugural Day Parade

Harper, Liberia's Southernmost Port, Stretches into the Sea on Cape Palmas, an Arm of Solid Rock

A low, sandy isthmus connects the cape with the mainland. Hoffman River enters the sea to the north (upper right). Near the promontory's tip, Cape Palmas Light warns mariners from atop a white 31-foot-high conical tower. Most of Harper's 7,000 population lives on the mainland.

We were escorted on a whirlwind survey of the area by the American resident manager, who is in charge of the dual task of rubber growing and conducting the company's business relations with the Government.

On cleared ground we inspected the two types of dwellings provided for the laborers—small brick houses with tin roofs and the familiar native thatched hut (Plates XII-XIII and page 228). At last accounts the former numbered 8,017, the latter 905, while the overseer-type houses totaled 128.

For the white staff with their wives and children, numbering about 250, there were up-to-date bungalows furnished with many of the conveniences of home.

Modern Hospital for Workers

Modern medical facilities and sanitation have been provided for both tribesman and foreigner.

The story of rubber has been told too often to bear repetition here, but the sight of trees being tapped for the slow-dripping milky fluid makes the trip of constant interest to visitors (Plates X, XI, XV).*

With some 75,000 acres already planted, of which 62,514 acres were actually in production as of January 1, 1947, and with shipments approaching fifty million pounds annually, the Firestone undertaking is the biggest factor in the economy of Liberia.

Throughout Liberia, Firestone has built 200 miles of first-class earth roads.

Firestone also operates the Bank of Monrovia, sole institution of its kind in Liberia, and has organized the United States Trading Company, which does a lively commissary business not only among the white employees of the company but also among the thousands of Liberians residing on the plantations. Firestone, moreover, built Roberts Field for Pan American Airways.

Returning to Monrovia, we were forcibly reminded of the unique political structure of Liberia. Of the 28 tribes who live quietly today within its borders, from the scholarly Vais and the Mandingos of Arabic heritage to the stalwart Krus who take naturally to the sea as boatmen and deckhands on the ships that touch at the various ports of West Africa, relatively little has been published.

Tribes Cling to Old Beliefs

Basically pagan, with the exception of a scattered Mohammedan following, the bush tribes range through various shades of color, speak a variety of dialects, and adhere to beliefs they have practiced for centuries.

Their principal occupation is the cultivation of rice, corn, cotton, and such essential food products as grow most readily in the tropical climate. Some domestic animals are raised, including goats, sheep, and cattle. Pottery and basket making, weaving of cloth, and working in leather, iron, silver, and gold are the ordinary industries.

As an example of the latter, we purchased from an apprentice goldsmith in one of the wayside villages a finely wrought, though somewhat malleable, pair of cuff links made of gold taken from some near-by alluvial deposit.

Against such an elementary social background, a way of life carried over from American pre-Civil War days had been successfully superimposed by descendants of Negro colonists from the U. S. and West Indies.

Together with some 60,000 of the aborigines whom they have assimilated, the 12,000 survivors of this original American immigrant stock make up the civilized society of the coastal region and carry on the business of the country in government, in trading, and in law.

Freed Slaves Settled in Liberia

The birth of Liberia as a nation was a natural consequence of our Government's decision in the early years of the nineteenth century to prohibit the further importation of slaves. Contraband human cargoes were being seized by naval patrol vessels, and the idea developed of returning the liberated Negroes to the land of their origin.

Most of the early Negro emigrants from America who sought a new life on the shores of what is now the Republic of Liberia were freedmen sponsored by societies formed for their colonization.

Chartered vessels, after the Emancipation Proclamation, transported a large number of Negro agriculturists and small traders to the distant homeland across the waters.

The habits, customs, language, and religion of the Americo-Liberians, are, of course, utterly dissimilar from those of the aboriginal inhabitants who never left their own land.

English was their language in America, and English is the official language of Liberia.

European dress is the fashion in the coast towns they founded. English silver was the prewar medium of exchange, but today it is the American dollar.

Affiliation with some branch of the English or American churches is almost universal among the group. To a considerable extent, education is assisted by American or English foreign missionary organizations.

* See "Our Most Versatile Vegetable Product," by J. R. Hildebrand, NATIONAL GEOGRAPHIC MAGAZINE, February, 1940.

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Kodachrome by Charles W. Allman

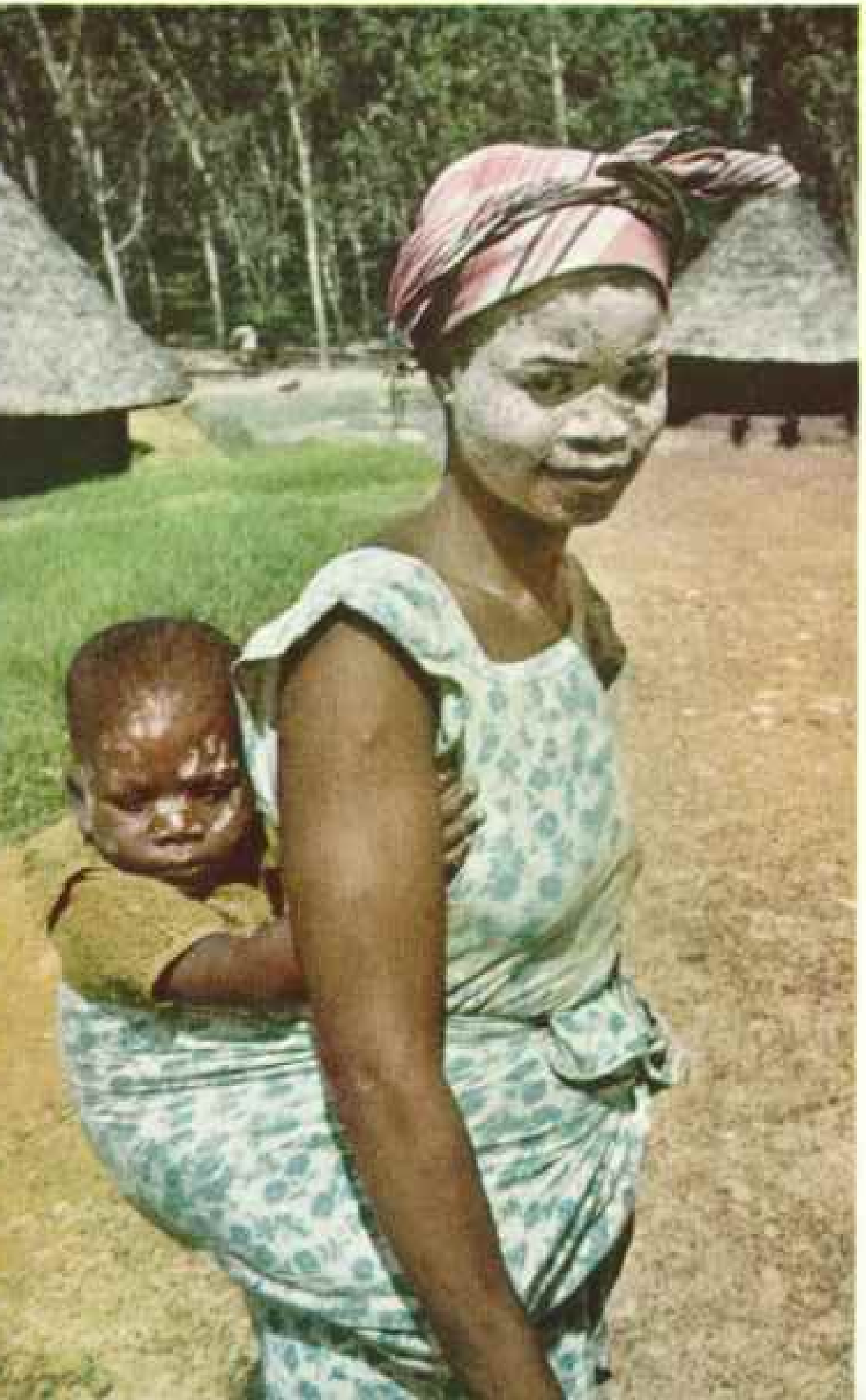
Proudly a Color Guard Escorts Liberia's Flag, Patterned after Old Glory

The national emblem heads a parade through the streets of Monrovia, the capital, at a quarterly inspection of the Liberian Army. United States Army instructors staffed its officers' training school during the war.

An Animated Haystack with Ebony Head Dances to the Throb of Drums. It Drives Away Evil Spirits

Course, shaggy fiber covers even the head of the bush devil inside. Hand-carved mask is held above it on a stick. Most of the tribesmen are unaware that a human being is within the bulky costume. Hinterland Liberians cling to ancient superstitions, but the men have adopted white undershirts and shorts. When the photographer came close, a chief warned him not to point a finger at the dancer. "You'll get sick," he said. "Better not go near the devils. If their breath touch you, it burn!"

Kodachrome by Charles W. Allnutt



Even Baby Is Treated to Daubs of White Clay Make-up

Use of this cheap and plentiful "cosmetic" is a beauty "must" for mother. The thatch-roof Liberian village in which they live borders a growth of rubber trees on the Firestone plantation, where baby's father works.

←

Strings of Beads and a Towel Solve Her Skirt Problem

This village schoolgirl, at 12, is of marriageable age, but before she weds, her prospective husband must pay her family the customary $40 dowry. Like most of the girls who attend native bush schools, she wears shoulder harness and a head scarf.

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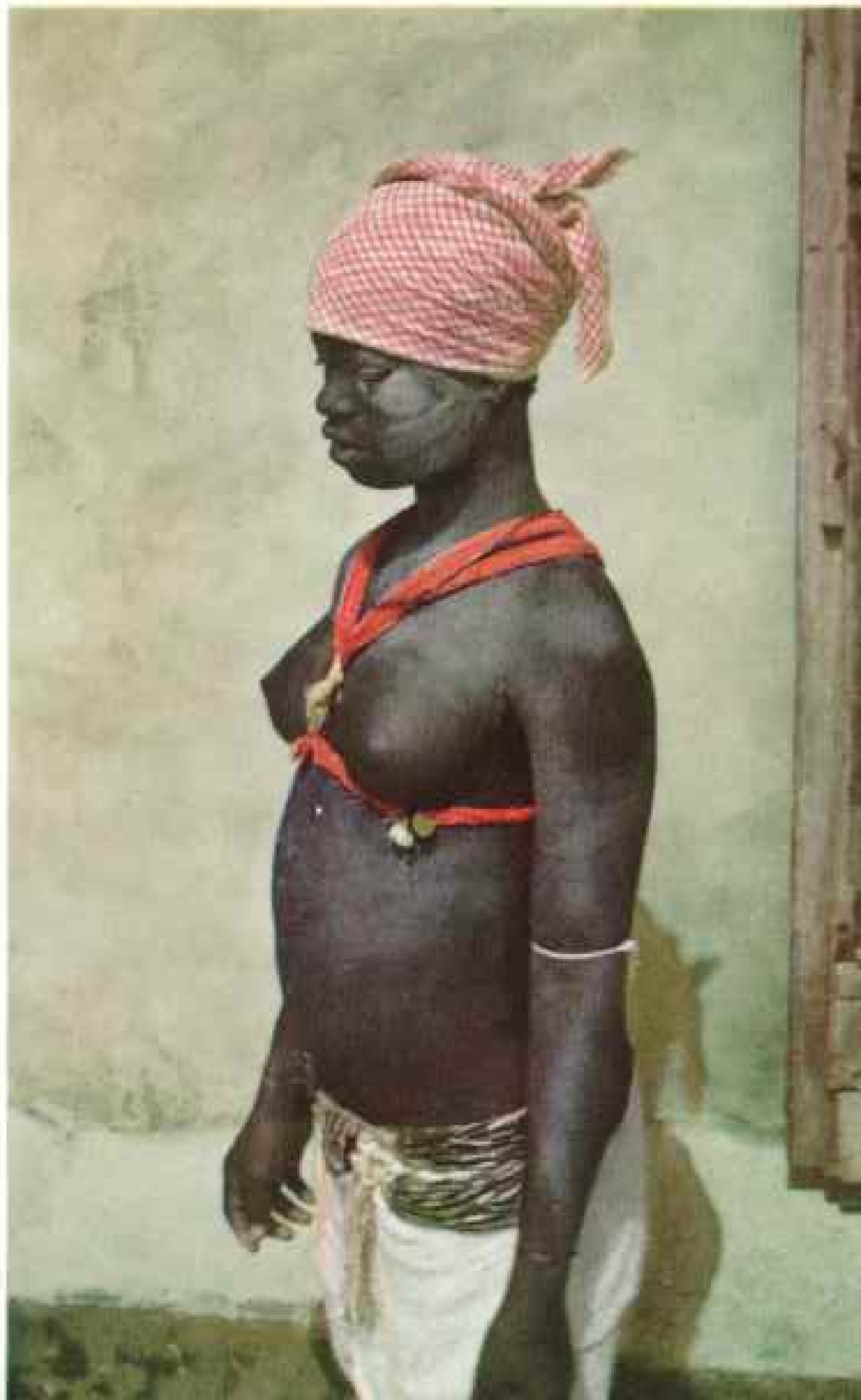
Kodachromes by Charles W. Allison



Tattoo Marks on Foreheads Are in the Height of Fashion

An even more stylish touch among such Gola tribe belles is to dye the scars a dark blue.

Rhodachrome by Charles W. Allman

Gaily Dressed Are a Mandingo Chief and His Favorite Spouse

Two other wives, not so highly regarded, have less elaborate clothing. The chief wears a flowing robe, Mandingo attire for centuries. Pith helmet, with rubberized covering for the rainy season, adds to his prestige.

Kodachrome by Charles W. Allison

A *Gri Gri* Girl Graduate Comes by Bus to Monrovia to See the Sights

Although chaperoned by her mother (left), head wife of a clan chief, and a friend, she is timid in the "big city." In *gri gri* (fetish) bush schools girls learn tribal rituals and domestic arts.

Selling Food in Monrovia's Market Is Women's Work

Papayas and bananas in foreground are common. Back of them lie clusters of reddish palm nuts, which yield an oil that flavors rice. "Ground peas," or peanuts, in the big pan beyond, grow widely in Liberia.

Kodachromes by Charles W. Allmon

In a Wooden Mortar a Kpelle Housewife Pounds the Family Rice

Freed from the hulls, the mixture goes into the large tray the woman on the right is holding. When she tosses the mass into the air, the chaff will blow away, and she will catch the descending grains.

Kodachrome by Charles W. Allmon

In Monrovia's Market a Mohammedan Trader Displays a Native-woven Cotton Blanket, Colored with Natural Dyes

Hundreds of Small Beads Are Strung into a Mandingo Woman's Necklace

Her hair-do is more elaborate than is the style in most Liberian tribes, and she wears undergarments.

Kodachromes by Charles W. Allmon

They Hope to Sell the Ivory Box to a European Visitor for $20

Two Mandingos on the rubber plantation compare the retail values of their wares. Ivory rings and bracelets are common, but during the war influx of American soldiers caused the prices of ivory objects to soar.

Kodachrome by Charles W. Allison

Looking for Jobs, They Start a 150-mile Bush Trek to the Rubber Plantation

A village headman sets off from home with his wife and two village boys, bound for the rubber forests 53 miles from Monrovia. Loads of the boys are heavy, for they have no wife to share them.

"Chop" Time on a Rubber Plantation—a Noonday Meal of Doughy Rice with Fish and Coffee Alongside

In addition to meaning "meal-time," "chop" also means rice, because it makes up three-fourths of the native diet. Here the wives of a rubber overseer have pounded their rice in the mortar, then cooked it in the dishpan. Once Liberia exported coffee, but today the crop is consumed locally.

Liberian women, as susceptible to the enchantment of rhythm as the men, often syncopate the blows of their clubs or pestles when they are milling rice or cassava. The tantalizing rhythm thus set up soon starts an impromptu dance in the village.

Kodachrome by Charles W. Allnutt

A Tapper Brings In Milky-white Latex by the Bucketful

The creamy fluid accumulates in a network of tiny tubes within the tree's inner bark. Tapping requires skill. If the worker's specially designed knife goes too deep into the trunk, it leaves a serious wound.

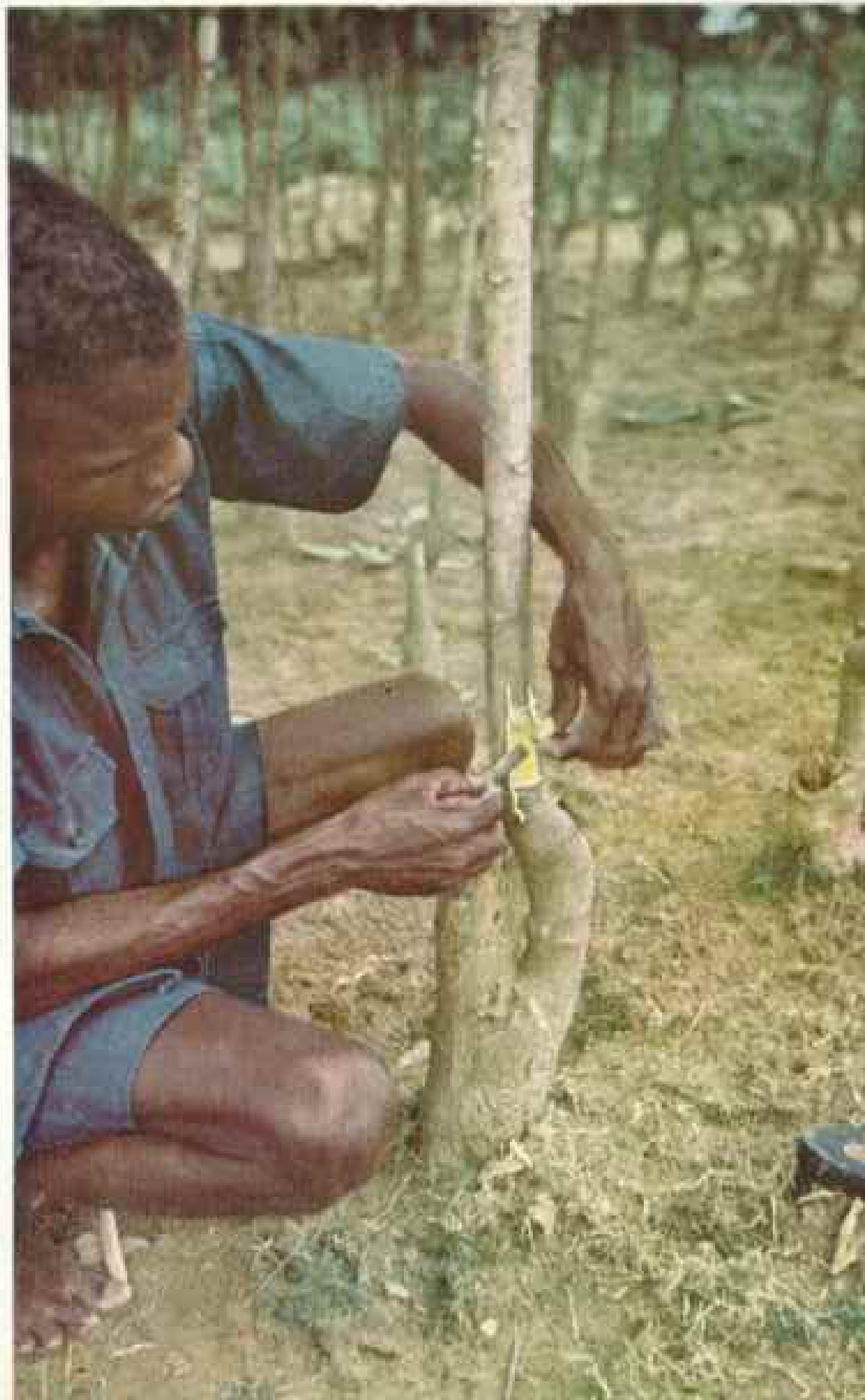
←

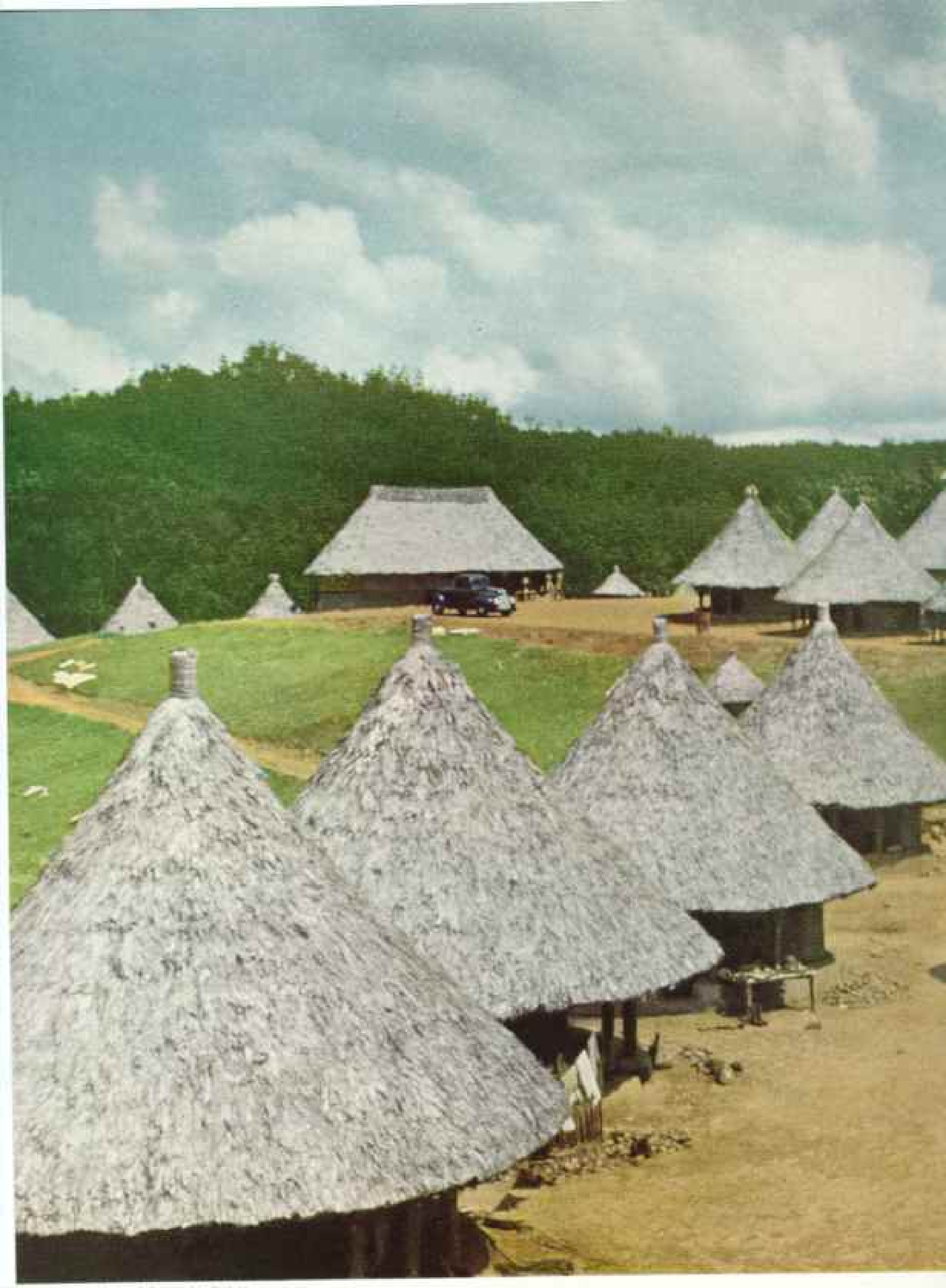
Skillfully He Budgrafts a Rubber Tree to Increase Yield

This operation is performed on year-old saplings. Six years later they will attain proper size for tapping.

→

Kodachromes by Charles W. Allmon





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Firestone Rubber Gatherers Prefer Villages of Thatch-roofed Huts

Workers and their families are housed in the small circular dwellings; overseers occupy the bigger ones. Tiny huts are outdoor toilets. Women do the family washing at near-by streams but bring it back to dry in front of their doors. This is part of a village of 800. Today the company employs about 27,000 Liberian tribesmen.

Kodachrome by Charles W. Allison

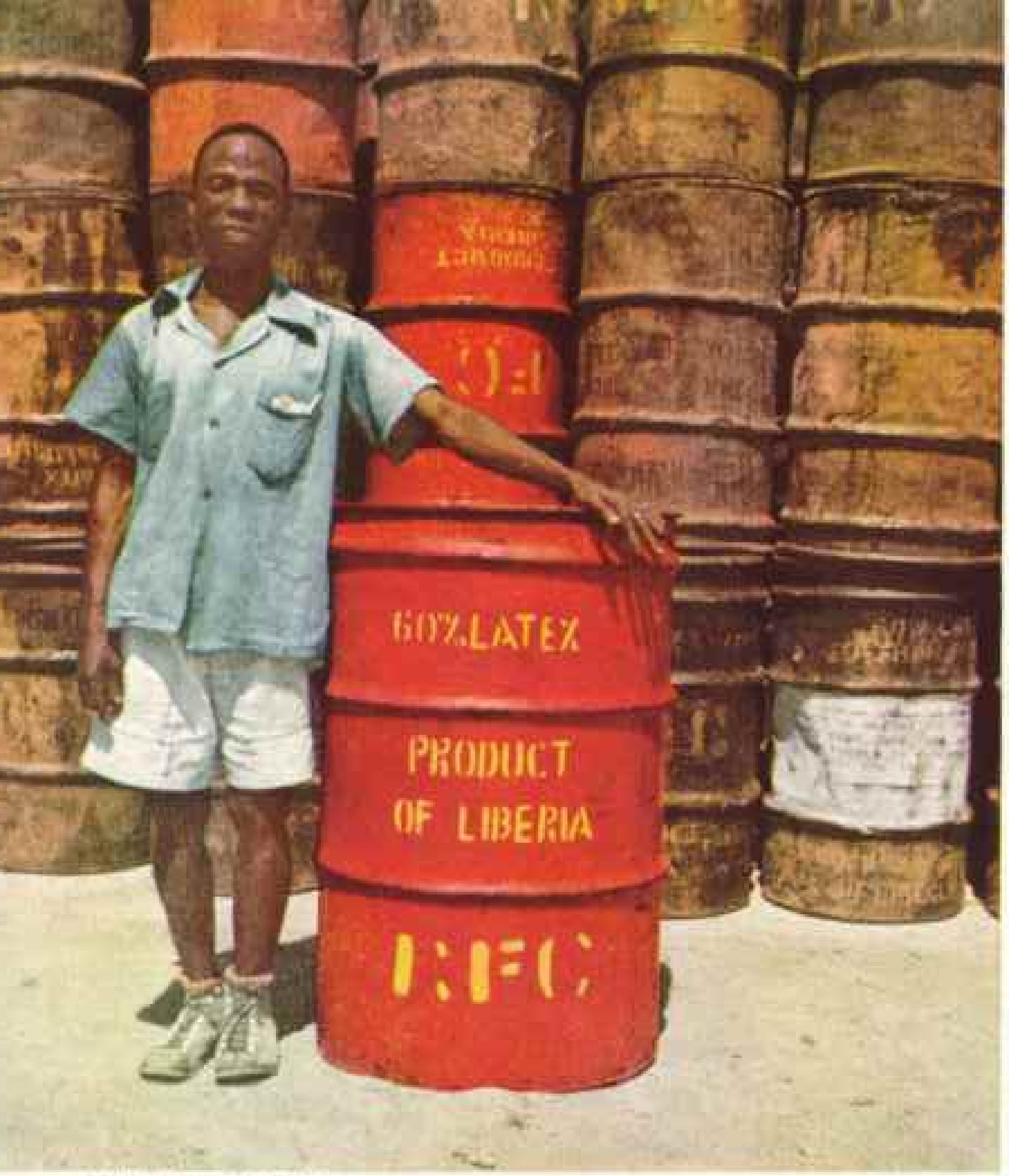
Latex from 75,000 Acres of Trees Helps Meet America's Demand

This rubber plantation in Liberia is one of the largest in the world. Its equipment is thoroughly modern, yet it is set down in a jungle land where the witch doctor and the country devil still hold the fanatic faith of many tribes. Well-kept gravel roads connect collecting stations with the huge processing factory.

Kodachrome by Charles W. Allison

Hurry, Hurry! Gbanga's General Store Has Just Opened a Sale of Newly Arrived Colored Calico

Cast-iron pots, knives, beads, and other bush-country necessities and luxuries are kept in stock at this store near the French West Africa border.



Liberia Exports Part of Its Rubber as Liquid Latex

This shipment belonged to the U. S. Reconstruction Finance Corporation.

Raw Crepe Rubber Goes to the Drying Sheds

It has been coagulated with formic acid at the processing factory.

Kodachrome by Charles W. Allmon

Tribesmen Set Up a Hand-powered Sawmill Wherever They Find a Suitable Log

They raise the heavy timber to a crude platform, then rip off planks for bridge building or other rough construction. In the jungles, mahogany, rosewood, and other valuable trees thrive, but Liberia has not developed a lumber industry.

It would be difficult to tell much difference in appearance today between the towns of Monrovia, Marshall, Harper, or Robertsport, and similar settlements in our Deep South.

Such affairs as the weird tribal dances, which were put on for the benefit of the visitors from our ship, they regarded exactly as any other body from the civilized world would regard native practices of this kind.

Modern Appliances Reach the Bush

In turn, the Americo-Liberians have introduced the radio, the automobile, the movie, the electric light, and the refrigerator into the bush country.

Outstanding example of the civilization transplanted by the Americo-Liberians is former President Edwin J. Barclay.

In the first five minutes of a private interview Mr. Barclay revealed a grasp of international affairs that would gain respect in any chancellery of the world. His keen eyes showed that he was well aware of present-day political trends and developments; of how they may affect the future of his country.

He was educated in his Government's own Liberia College at Monrovia and knew the country intimately through frequent tours into the interior, where he enlisted the cooperation of tribal leaders in keeping peace.

His successor in office, President W. V. S. Tubman, not only has continued the progressive tendencies of Mr. Barclay but has gone even further. His sincere interest in the remote tribes has carried him deep into the interior of the country, which has meant covering many miles over rough trails, either by hammock or on foot.

In May, 1943, President Barclay, soon to retire from office, and President-elect Tubman visited the United States. They were entertained by President Franklin D. Roosevelt at the White House, and Mr. Barclay made brief addresses to the Senate and House.

They came to Washington to repay the visit made to Liberia by President Roosevelt following the historic Casablanca conference.

United States Sponsored Birth of a Nation

To understand fully what prompted the visit of our American cruiser, we must go back to the historic concern of the United States Government for the destiny of a nation which was carved out of the African wilderness by settlers from our own shores.

In Washington, D. C., 130 years ago, the American Colonization Society was formed. Its supporters included Judge Bushrod Washington, nephew of George Washington, Henry Clay, Daniel Webster, Senator John Randolph of Virginia, Francis Scott Key, and President James Monroe, for whom Monrovia was named.

With an appropriation from the United States Congress, two small schooners were fitted out to carry Negro colonists to West Africa. By 1822, under white leadership, the first permanent settlers reached the mouth of the Mesurado River.

The tribulations of the Pilgrim Fathers were paralleled in this equatorial setting. A sullen welcome awaited from the native chiefs, who saw their lucrative slave trade jeopardized. But with the help of Capt. Robert F. Stockton, who had sailed to the Mesurado under United States Government orders, a bargain was finally clinched for a suitable strip of land.

The story goes that a deed was obtained in return for a colorful and miscellaneous collection, embracing nails, iron bars, mirrors, hats, shoes, beads, umbrellas, walking sticks, knives, forks, spoons, rum, and a box of soap.

After Stockton sailed away the colonists cautiously moved to the mainland and, in the face of all cruel discouragements, began to build their homes and till the soil. The torrential rains were a terrible handicap. Fevers, illness, and death came with appalling frequency.

Liberia Becomes a Republic

"The Love of Liberty Brought Us Here," later to become the national motto, was steadily repeated by the staunch band of pioneers as they dug in to stay.

Colonization societies in New York, Pennsylvania, and Massachusetts backed other settlements along the inhospitable shore line, which presently united for mutual protection in the Commonwealth of Liberia.

Official agents of the United States Government assisted in maintaining the enterprise in its early struggles, and arms and ammunition were supplied through them for defense.

Twenty-five years after its founding, the Commonwealth had a population of 4,000 Americo-Liberians. By that time Liberia was experiencing the growing pains of statehood.

On the ground that it was not a sovereign nation and therefore had no right to enforce customs laws, the captains of trading vessels defiantly landed goods at various points on the coast and refused to pay either tariff or fines. Upon the advice of the American Colonization Society, the settlers resolved to put an end to their equivocal status and become a full-fledged independent nation.

On July 26, 1847, Liberia's Declaration of Independence was announced to the world.

Kenneth H. Mosher

Bush Devil Engineers Won't Tell How They Built This Bridge

Secret methods are handed down from father to son by these primitive tribesmen. While a bridge is being constructed, villagers living near by are forced to move, so they cannot discover how the work is done. Here three liana tendril cables, two on the sides and one on the bottom and fastened to tree trunks, span the St. John River. Woven palm fiber makes up sides and flooring. No nails are used. Ten heavily laden men can cross such a groaning, swaying bridge at one time.

Joseph Jenkins Roberts, Virginia-born boatman and barber, was elected President.

Last July the centenary of Liberia's establishment as a republic was observed throughout the nation, as well as in the United States.

On the Anson Greene Phelps Estate in New York City, a group of State Colonization Society members designed, in 1847, the Liberian flag, so closely resembling our own (Plate I). The bunting left over was carefully preserved, destined eventually to find its way also to Liberia on board an American warship.

Made up as a miniature emblem and encased in an insect-and-climate-proof frame, it was entrusted to me for presentation to the Liberian Government on behalf of the trustees of the Phelps-Stokes Fund, a philanthropic organization which has displayed much solicitude for the experiment in Liberia.

During the early years of Liberia's existence, coffee and sugar cane were extensively grown for export, and the Americo-Liberians engaged in profitable trade up and down the African coast, as well as with Europe and America. But other areas, notably Brazil, presently monopolized the coffee market and economic clouds began to darken the horizon.

Liberia became entangled in concessions, promotion schemes, and deals with European interests, which brought to the still adolescent nation the unhappy experience of foreign debt, not to speak of a threatened political disaster. In its hour of need, Liberia appealed to the Government of the United States.

A commission was sent to Monrovia, resulting in the negotiation in 1912 of a loan of $1,700,000 guaranteed by American, British, German, and French bankers, with a receivership of Liberian customs revenues.

But Liberia was to reach maturity the hard way. World War I ruined the program envisaged by this joint fiscal control and once again the United States Government was asked for help.

U. S. Navy, Official

Sailors of U. S. S. *Palau* Man the Rail to Receive Liberia's President

Flying the Liberian flag, the "baby flattop" anchored outside the breakwater of Monrovia's new Lend-Lease harbor in July, 1947, to help celebrate the Republic's 100th anniversary. The harbor, completed only a few months later, is big enough to accommodate the *Palau*, but rough water might have prevented her departure on scheduled time. Great Britain and France sent cruisers for the ceremonies, and detachments from the three warships took part in the centennial parade.

A wary postwar American Senate, however, refused to approve a loan, and the Liberian Government was left in desperate financial straits, from which it succeeded in extricating itself by negotiating in 1926 a loan of $5,000,000 from the Firestone rubber interests.

Rubber Benefits a Bankrupt Nation

The benefits to Liberia under this plan were instantaneous and far-reaching. With the funds available, the Government was able to lift itself out of the financial morass into which it had wandered and to consolidate and bond all its external and internal debts.

While gold production has substantially increased and the exploitation of iron-ore resources has been begun by an American company, the economy of Liberia was nevertheless greatly affected by World War II.

Except for rubber, Liberia's chief trade was with Europe. Germany was the largest buyer of its staple products, such as piassava (a type of fiber), palm oil, palm kernels, coffee, and cacao, and German interests played a leading part in the import trade and in shipping. Now, of course, the Germans don't call there any more.

More than ever, Liberia looks toward the United States. American ships are her principal link with the world. Of the exports of Liberia in 1943, valued at $9,107,902, rubber sent to the United States accounted for $8,059,368. Imports totaled $3,984,341, all but $327,640 of which was of American origin and represented in large measure Firestone machinery and equipment. British West African silver was retired from circulation on December 7, 1942, and replaced by United States currency.

In the wartime dislocation of its trade, Liberia suffered a serious decline in customs duties. Imagine a national budget pared to $675,200 for an entire calendar year! That is what Liberia operated on in 1940. Liberian

Firestone Tire and Rubber Co.

Deep in a Cultivated Rubber Forest Nestles a Firestone Model Village

Each house is built of brick and has a small covered veranda in front. Other workers' villages have thatch-roofed huts (Plates XII-XIII). Space in center of this settlement is a recreation ground. One building houses a dispensary, in charge of a dresser trained at one of the two modern Firestone hospitals in Liberia. The superintendent of this forest, a white man, makes rigid inspections of the village water supply and other sanitation facilities. Negro workers occupy the houses rent-free; the company also pays their Federal hut tax.

officials from the President down took a salary cut to assist in the economy drive and tide the country over the emergency.

Now prospects of increased revenue have brightened through better collection of the hut taxes and additional exports of gold and rubber, so that receipts have reached about a million and a half dollars per annum. The national budget has been balanced.

What is Liberia's present relationship to the United States?

American names decorate the landscape of Liberia: Maryland County, Stockton Creek, the towns of Marshall, Buchanan, Washington, Robertsport, and Careysburg. Treaties of friendship, commerce, and navigation; of conciliation, and of air navigation, have been signed between the two countries.

The able staff of the American Legation at Monrovia, led by Minister Raphael O'Hara Lanier, is entirely composed of members of the Negro race.

As our war vessel sailed away from the tiny republic which has so successfully preserved its independence throughout the years, we felt that the United States more than ever could not forget its sense of responsibility for the welfare and integrity of Liberia.

First American Ascent of Mount St. Elias

By Maynard M. Miller

EVERYTHING was set. On the icy shoulder of the mountain we had stamped out the drop square, 50 yards on a side, in deep new snow.

The U. S. Army Air Forces support plane swept into view on its first drop run. Breathing the thin, bitter air at 13,300 feet, we watched for precious food supplies to hurtle down, rations sorely needed to fuel our tired bodies the rest of the way to the top.

Everything was going well. Above us swirling mists hid, revealed, and hid again the icy crown of Mount St. Elias, fourth highest peak in North America.* A mighty marker post on the Yukon-Alaska boundary, where Alaska's panhandle meets the "pan," the gleaming hulk of rock and ice soars 18,008 feet above the Pacific Ocean (map, page 231).

It was July 13, 1946. We had waded ashore at Icy Bay nearly a month before.

"I Felt Myself Drop"

Then it happened. Unroped, with camera in hand, I stepped back a few feet from one of the tent pits we had dug out of the snow. I wanted to get both camp and approaching aircraft into my picture.

Without warning, I felt myself drop. Instinctively, I spread my arms. By sheer luck, they held on the edges of the hole, abruptly arresting my fall.

I don't think I breathed again until a couple of the boys ran over and hauled me out.

Peering into the pit that had almost swallowed me, I couldn't see bottom. It apparently was part of a buried crevasse behind the cornice overhanging the 8,000-foot cliff in front of our Camp Ten.

Then, after I had shaken the snow from my clothes and the fright from my heart, I looked on in dismay as the silver plane plunged through patchy fog on its last run. Two big boxes of priceless food tumbled from the aircraft's belly and fell, not on the target area, but over the ice cliff, smashing to bits long before they ever hit the glacier far below.

The pilot had overshot, but it was no fault of his. The weather was rapidly "going sour" and he had to let go through the thickening "soup" or not at all.

That was the way it went. The "Saint," as we familiarly dubbed the great mountain, was ever alert to catch us off balance, as it had just caught me! Across our path it threw yawning crevasses, rumbling avalanches, and treacherous ice slicks. All these hazards we met with caution and strict safety technique.

There were eight of us, seven men and one woman, all experienced mountaineers. Through the war we had buoyed our spirits with remembrance of our compact to join forces, after the "unpleasantness," to attack this great peak.

The fruition of long planning and hard labors was now, it seemed, within our grasp. The Harvard Mountaineering Club Mount St. Elias Expedition was close to its goal.

No American had yet stood on the summit of St. Elias. Sole previous conqueror of the peak was the illustrious Italian Alpinist, the Duke of the Abruzzi, who led an expedition to the summit in 1897, by way of the northeast ridge. Our approach was by the southwest ridge, a longer and more difficult route.

Our climbing ropes held mountaineers from four corners of the United States: Andrew Kauffman of Washington, D. C., and his wife, Betty, who constituted the food committee; William Latady and William Putnam, from Cambridge and Springfield, Massachusetts, in charge of equipment and camps.

Then there were the Molenaar brothers, Dee and Cornelius ("Kay"), Los Angeles men, respectively our photographer and meteorologist; Lt. Benjamin Ferris, from the Climatic Research Laboratory, Lawrence, Massachusetts, loaned to us as Army observer and medical officer; and myself, from Seattle, Washington, as leader.

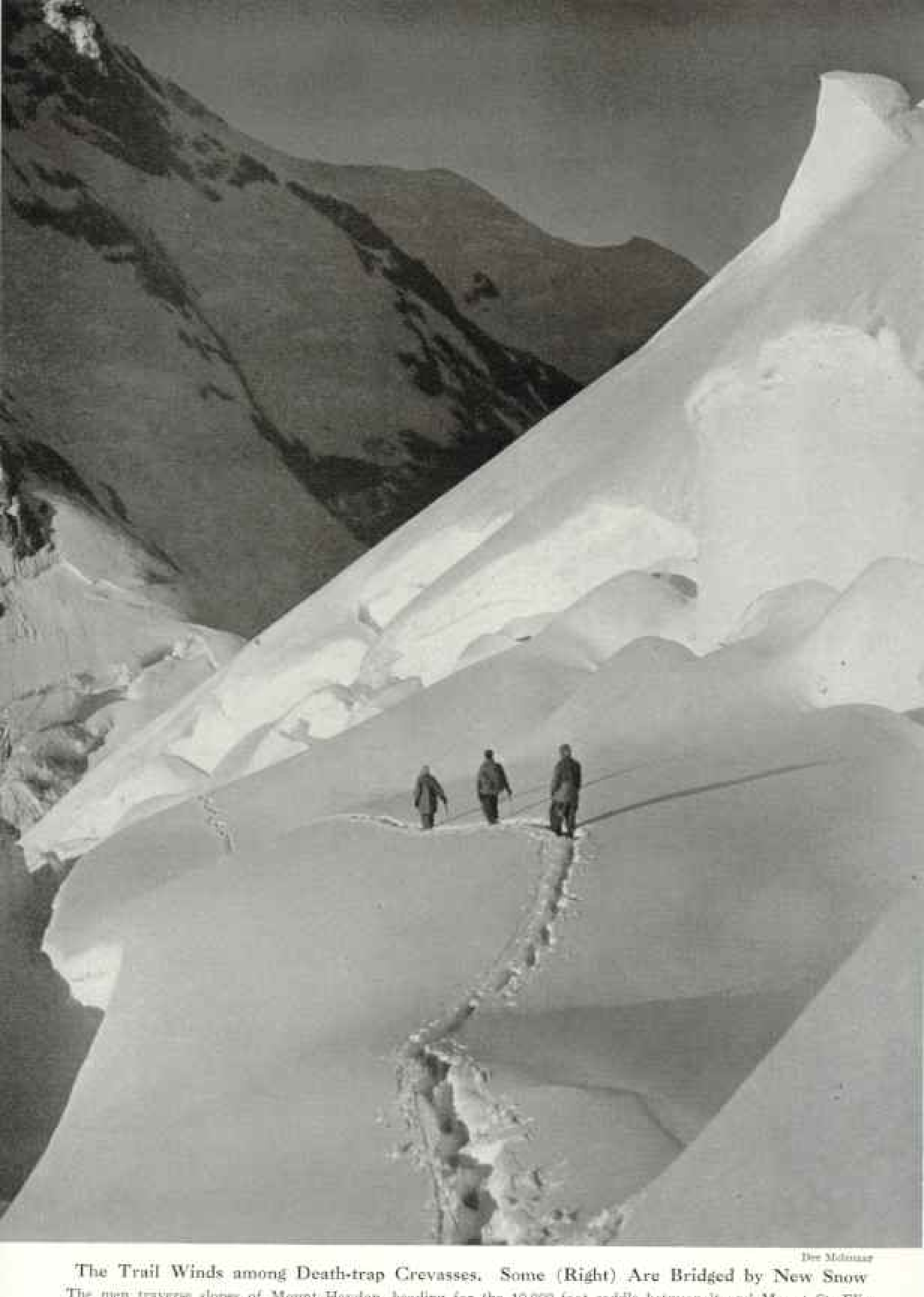
Keyed up with anticipation, our little party had flown from Juneau to Yakutat on the afternoon of June 12.

Air Forces Give Support

Through the interest of Gen. Carl Spaatz, Commanding General of the Army Air Forces, (now Air Force Chief of Staff), and Brig. Gen. Edmund C. Lynch, head of the Alaskan Air Command, the AAF's Tenth Rescue Squadron had been assigned to give us air support as a practical training exercise.

Ours was the first civilian mountaineering expedition to enjoy full-scale military aerial support throughout its progress.

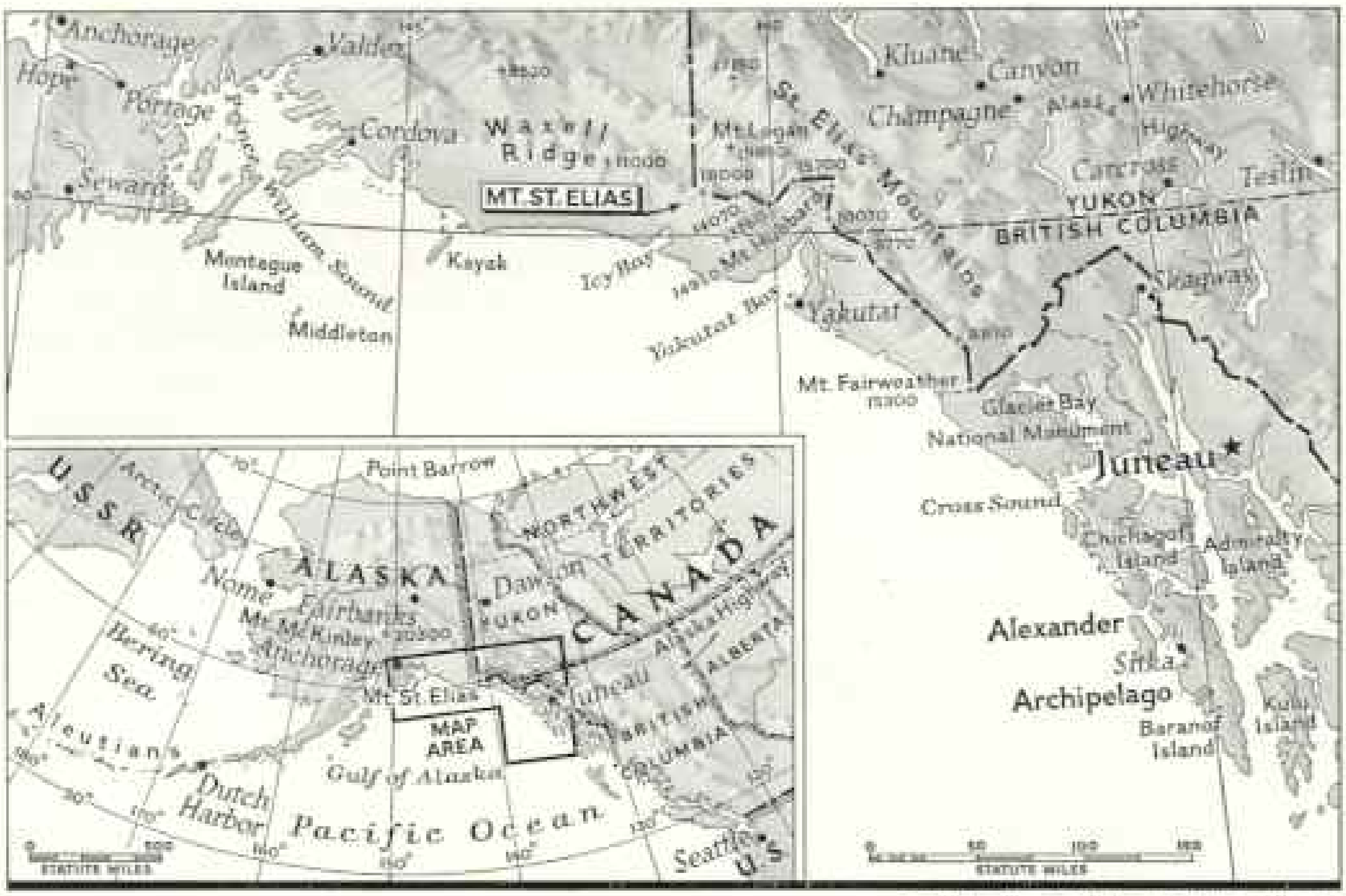
* See: "Mount St. Elias, Alaska, First National Geographic Society Expedition, 1890," and "Mount St. Elias, Alaska, Second Expedition, 1891," in the *Cumulative Index to the National Geographic Magazine, 1899-1946;* also "Monarchs of Alaska," by R. H. Sargent, July, 1909, and "National Geographic Society's Alaskan Expedition of 1909," by Ralph S. Tarr and Lawrence Martin, January, 1910.



Bee Molenaar

The Trail Winds among Death-trap Crevasses. Some (Right) Are Bridged by New Snow

The men traverse slopes of Mount Haydon, heading for the 10,000-foot saddle between it and Mount St. Elias (background). The route ascended St. Elias's southwest ridge (sunlit slope, left center).



Drawn by Theodora Prior and Irvin E. Alleman

Mount St. Elias Rears Its Icy Crown Where Alaska's Panhandle Meets the "Pan"

Vitus Bering, Danish navigator exploring for Russia, sighted Mount St. Elias from far at sea July 16, 1741. He was the first European to view North America's fourth highest peak, towering to 18,008 feet. The Harvard Mountaineering Club Mount St. Elias Expedition reached the summit July 16, 1946, 205th anniversary of Bering's discovery. Main map and inset show the first, second, and fourth of North America's greatest mountains: Mount McKinley (on inset), Mount Logan, in Yukon Territory close to St. Elias, and Mount St. Elias. Third-ranking summit is Mexico's 18,700-foot Citlaltepec.

Capt. Roy Holdiman of the Tenth Rescue Squadron flew his plane from Anchorage to Yakutat one afternoon. In a preview flight over our mountain objective, we arranged sites and signals for the aerial delivery at three points of a ton and a half of equipment and supplies (page 245).

Fragile items, such as radios, cans of gasoline, skis, and instruments, were to be parachuted. Food and unbreakables were stoutly packed for free-dropping (page 248).

A local boatman, Tony Novatney, agreed to take us into Icy Bay, our jump-off point for the trek to St. Elias.

With 3,000 pounds of back burden, we went ashore in a cold drizzle and waved a doleful farewell to the little craft put-putting back to civilization. We were on our own.

Army Equipment Put to Test

The Army Quartermaster Corps and the Army Air Forces had supplied us with a lavish assortment of clothing and equipment which we agreed to test. Much of the material had been designed to take advantage of lessons learned during the war, but had not yet been thoroughly tried out in the field.

In addition to a variety of alpine climbing, camping, and traveling gear, we "modeled" 11 kinds of cold-weather clothing (Plate VIII).

More than three-fourths of our route would be over ice and snow, so we would have a golden chance to study effectiveness of equipment made for Arctic and alpine use.

It proved a time-consuming exploit to move 2,000 pounds of equipment up to the final battle line under Mount St. Elias, after establishing caches for our return. Several trips were necessary between each camp to relay the stuff along. Five rough miles brought us to the Chaix Hills. From there we looked up over broken ice of the Tyndall Glacier to 11,921-foot Mount Haydon, an unclimbed summit whose slopes formed part of our route to the Saint.

Tyndall Glacier interposed a heartbreaking barrier. The direct traverse we had planned proved impossible, for the river of ice was meshed with crevasses. To circumvent these we had to take a zigzag course, traveling several miles laterally for each mile of forward progress.

To save time we cut corners, crossing narrowing crevasses by precarious snow bridges.

The glacier startled us frequently with jerky movements. Jumbled icefalls were too dangerous to set foot on; we skirted these awesome obstacles. Laden with heavy packs often weighing 80 to 100 pounds (Betty carried lighter loads, up to 55 pounds), we were working very hard, even though moving at a snail's pace.

Everybody donned dark glasses as soon as we hit the ice. When the sun shone, the thermometer in wind-free snow basins reached 85°, largely because of glaring reflection.

Desert Heat on Tyndall Glacier

An untaped nose quickly became scorched and red. If we impatiently shed shirts, severe burning was the penalty. There was a good excuse to let beards grow; if we had shaved, sunlight reflected from snow would soon have seared the undersides of our chins.

As I ran back and forth on the glacier above Camp Six taking movies of the relay party, my mouth hung open from exertion. That evening the roof of my mouth was sunburned. My tongue and lips were so sore I could hardly eat. I kept going by sipping cold tea.

Camp Seven, at the base of the main bulk of the Haydon-St. Elias massif, was a perfect spot for a "seventh-inning stretch" before tackling the upper slopes. A lovely sun-bathed meadow of heather, moss, and grasses fringed the foot of a ridge up which our route would pass.

Our name for this camp, "Shangri-la," was descriptive, if not original. Strains of a harmonica, swelling and ebbing across the lonely land, abetted Nature in lulling us to relax in an attitude of "Who cares!" Ben Ferris, stretched out on the warm grass, expressed the general sentiment: "Let's stay here for the summer. To heck with going any higher!"

Ben aroused himself sufficiently, however, to keep up the "step test" and other physiological experiments and observations which we had promised to carry out for the Harvard Fatigue Laboratory. Although the physical condition of our party improved all the way up St. Elias, at our highest camp none of us could complete the step test, because of the oxygen lack three miles above sea level.

This test required each man to step up on a 20-inch box once every two seconds for five minutes, to permit a check on pulse and respiration changes at different altitudes.

On a snow slope near Camp Seven the Tenth Rescue Squadron made the first drop of supplies on June 27, exactly on schedule. It was a joy to see the big DC-3 swoop in at 200 feet and dump more than half a ton of goods squarely within the target area.

But the plane's visit reminded us that we still had 15,000 feet of mountain to scale and that our next rendezvous with Captain Holdiman and his crew was only a few days off.

While some of us completed relaying supplies from Camp Six to Camp Seven, we sent out an advance crew to dig in the next two camps and prepare for the aircraft's return.

Advance Party Scouts Route

Putnam, Latady, and I each took 60 pounds and started up on June 29. Rotten rock slowed our pace on the first ridge, but by sundown we had reached a shelf of shale at 7,500 feet, ideal for a campsite.

Next morning dawned crystal clear. Looking ahead up the chosen route, we saw the glaciated rim of a huge cirque, or ice-floored mountain amphitheater, curving away for miles towards the summit of Mount Haydon. Below the rim lay a great snowy basin.

From Camp Seven the others began to bring up the first relay loads. Latady, Putnam, and I set out to pioneer farther along the avalanche-swept cliffs that walled the cirque (page 245).

Crossing a steep narrow gulley, we became aware of a terrifying sound—at first a distant rumble and quickly a swelling swish—of sliding tons of snow, plunging at us with ever-swifter speed.

But this avalanche was not for us. It thundered past, its powdery fringe burying our feet and ankles. We stood silent for a minute, watching the white swirl of destruction wear itself out on the ice flats below. Too close!

Up we crept over slopes of scree and along cliffs of ice and rock. We plodded through knee-deep snow soggy from the blazing sun. We chopped steps in ice cliffs, leaving safety ropes fixed for future use.

Finally we emerged dramatically through a hole in an overhanging cornice upon the hard-packed upper ridge of Mount Haydon. Near by, at 10,400 feet, we established Camp Nine and crawled into sleeping bags to await the scheduled arrival of the plane in the morning.

Stormbound for a Week

At seven we were awakened by the soft, dispiriting patter of powder snow on the tent wall. The square we had tramped out as aiming spot for the air delivery was completely erased. A strong southeast wind filled the air with blowing snow. We knew the plane would not arrive that day.

We could not have anticipated what came

Kodachrome by Cornelius Molenaar

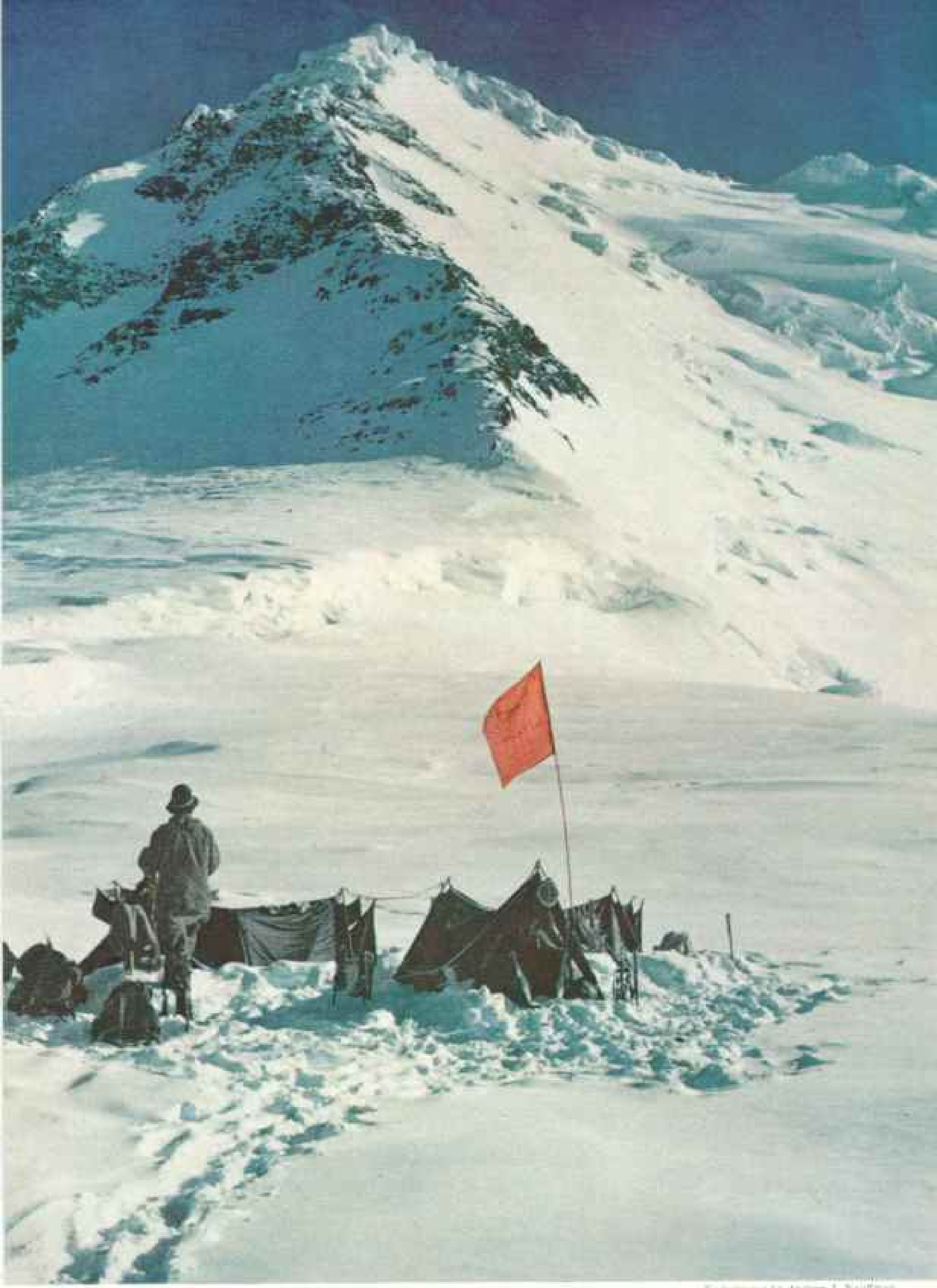
Conquerors of Mount St. Elias Stand on the Highest Point of Our International Boundary

Maynard M. Miller, leader of the expedition which made the second ascent of North America's fourth highest peak (18,008 feet elevation), holds the United States flag. Dee Molenaar extends the Canadian emblem. Before them is Alaska; behind them Yukon Territory. Four members of the victorious party were former presidents of the Harvard Mountaineering Club, whose banner (Plate II) flies between the flags. Clouds mask the landscape below 12,000 feet. The Italian explorer, the Duke of the Abruzzi, attained this spot in 1897.

Kodachrome by Maynard M. Miller

Near the Top, Climbers Struggle up an Almost Vertical Pitch

At 17,500 feet, William Latady (left), with rope anchored to his ice ax thrust deep in snow, pulls in the free cord as Dee Molenaar mounts steps chopped in ice. Downhill loom white buttresses their toilsome route ascended.



Kodachrome by Andrew J. Kauffman

From a Nest of Nylon Blizzard Tents a Climber Eyes the Distant Icy Goal

Still half a mile above at upper left soars the crest of Mount St. Elias, which rises higher directly from sea level than any other mountain on earth. From 13,500-foot Camp Eleven the route leads up the ridge in center.

Kodachrome by Maynard M. Miller

As Clouds Roll Away, Bill Putnam Searches the Sky for the Plane Due to Drop Supplies

Three of the party were stormbound for a week in this tiny tent at 10,400 feet on the high west ridge of Mount Haydon. Mist veils the summit of St. Elias, known to the Indians as "Yahtsê-tah-shah" and by the climbers familiarly called the "Saint." The jumbled ice mass at left feeds mighty Tyndall Glacier.

Kodachrome by Cornelius Molenaar

"Colossal Enterprises, Inc." Builds a Snowhouse and Windbreak on Haydon Ridge

Putnam (wearing hat) and Lt. Benjamin Ferris (placing snow block) founded the "corporation" to do necessary building. Beyond William Latady lies Icy Bay, expedition "beachhead."

Like Stunned Scouts Back from a Lost World, Weary Climbers Toil up the "White Saint"

Backed by boiling storm clouds, Dee and Cornelius Molenaar plod up to Camp Ten, at 15,300 feet on St. Elias. They have come back from placing a safety rope on a steep ice pitch to help relay loads from below.

Kodachrome by Maynard M. Miller

Razor-backed Mount Haydon, Previously Unclimbed, Served as a Steppingstone to St. Elias

The route to Mount Haydon's 11,974-foot summit followed the shoulder and ridge on the right. On the sunlit slope (right) a great snow mass, resembling white lava, settled under the climbers with an ominous crunch.

An "Egg" Drops from the Support Plane. It Fell with Others Squarely in the Area Stamped Out to Receive the "Manna from Heaven"

Black dots in the snow at 10,400 feet elevation are packages of food, gasoline, and instruments released on previous runs. In all, 27 bundles landed safely in this delivery, one of three made by the USAAF's Tenth Rescue Squadron in backing up the Harvard Mountaineering Club Mount St. Elias Expedition.

Kodachrome by Dee Molenaar

Atop Mount Haydon Is a Featureless Face with Icy Whiskers. Mrs. Kauffman and Two Companions Pause on the Natural Figurehead

Kodachrome by Maynard M. Miller

Kodachrome by Cornelius Molenaar

Safe and Successful Mountaineering Calls for the Right Equipment, from Head to Foot

William Latady wears sunglasses to prevent snow blindness. His nylon climbing rope and plywood pack-board were among items tested by this expedition for the Army. In the rope belay (right), line is fed out around the implanted ice ax as the man ahead moves over a danger spot. If he slipped, the rope would check his fall.

Kodachrome by Maynard M. Miller

Spectacular Peaks Inspire Sketching at a Lofty Camp

Dee Molenaar takes time off to record their rugged grandeur. He sits in a nest of pack frames, emergency radio, and ropes. At his back are orange strips of cloth which helped climbers find plane-dropped packages.

to pass. For seven precious, irretrievable days a howling storm marooned the three of us in the tiny mountain tent. Several times we heard the aircraft circling above, trying to break through the shroud of driving mist and snow. But the storm kept us well hidden.

We played cards and guessing games. We ran "Twenty Questions" into the ground. We slept, we watched the weather, we fumbled in our packs for the harmonica that wasn't there.

Building a Snowhouse

With time to kill, Colossal Enterprises, Inc., built a snowhouse (Plate III).

My bedmate was a set of batteries. We had a "handie-talkie" which had fizzled as voice contact with the plane at Camp Seven. I hoped warming the batteries would make the radio work. It didn't.

The skies were swept blue on the morning of July 8 (Plate III). It was still early when we heard the distant monotone of the DC-3. An hour later we had picked up 27 bundles from squarely within our newly tramped drop space—a magnificent job of precision "bombing" (Plate VI and page 248).

July 11 found us all reunited at Camp Nine. Before pushing on across the saddle linking Mount Haydon to the upper pyramid of St. Elias, we detoured to the summit of Haydon (Plate VII). It was an unclimbed peak and we could not pass up a first ascent!

From the slopes of Haydon, as from Camp Nine, we looked across three miles of space to the appalling west face of the Saint. A brutal wall of almost perpendicular black cliffs and icefalls glittering white and blue-green, it was raked almost constantly by terrific avalanches. During daylight and evening hours our ears seldom were free of their thunder.

From miles away we watched blocks of ice, some big as houses, shatter into splinters as they bounced down the cliff.

Snow avalanches increased to a wild crescendo late in the afternoon on melting, sunny days. Ice slides from hanging glaciers, on the other hand, reached a climax of frequency twice a day, once each morning just after the sun hit the slopes and again in the evening when chilling shadows crept across the cliffs.

Since our route strictly avoided areas of bergschrund, sérac, and icefall, snow avalanches were our constant dread. We quickly learned that daytime travel was close to suicidal.

On the high slopes, therefore, we would leave camp at about 9 or 10 o'clock and climb until sunrise. Then the snow surface was frozen and the firmer footing made for much easier walking. In early July, at this latitude, there was sunshine much of the night and always light enough to move by as long as it was clear.

Climbing Mount Haydon we had a fright. About halfway up a great smooth slope we felt the whole mass of snow beneath our feet suddenly settle with a crunch that set our spines tingling. A few feet above the lead man a thin line of cleavage appeared, running horizontally across the steeper section ahead.

We stopped, feeling infinitely small and helpless. The snow mass we stood on seemed poised for flight and might easily carry all of us off the mountain to destruction on the glacier 6,000 feet down.

Gingerly but hurriedly we descended to a solid ledge and found another route to the top.

We had spotted from afar the logical site for our Camp Ten, on a prominent ice ledge at 13,300 feet on the great southwest ridge of Mount St. Elias proper.

To reach this station we climbed at night over difficult rock and ice. One 1,500-foot slope of naked blue ice demanded the utmost caution and required 400 feet of fixed safety rope (Plates IV and V).

Crampons (sets of steel frames studded with two-inch spikes that fasten on over climbing boots) were an absolute necessity. Thus shod, with ice ax in hand and properly roped, one can ascend ice slopes as steep as 80° (90° is vertical).

In climbing with crampons we were mighty careful to make sure that *all* the steel points were well imbedded in the ice surface. If you once slip on glare ice, it is virtually impossible to stop yourself. Even if roped, you may get well bruised and scratched.

For a Quick Stop, the "Self-arrest"

We followed standard practice of putting three men on the 120-foot nylon ropes. After waist loops and knots were made, this left 55 feet between climbers. The only purpose of the rope, of course, is to ensure that, if one man slips and falls, his firmly belayed companions can stop and hold him.

Had we slipped on steep icy slopes, we were prepared to throw ourselves immediately into the position of "self-arrest." You turn flat on your stomach, dig in the toes, and brace the ice ax along the side of your body with the pick point close to the shoulder dragging in snow or ice.

Crossing the blue ice mentioned above, Putnam and Ferris were chopping out steps slantwise upward and across the slippery rise.

Bradford Washburn

Trail to the Summit Is Traced on a Photograph That Helped the Climbers Plan Their Route

Before departure from the United States, the way to the top was sketched out on aerial pictures, including this view, taken by Bradford Washburn on the Harvard University-National Geographic Society Alaskan Expedition of 1938. Airplane drops of supplies and equipment were made at Camps Seven, Nine, and Ten. The route line is broken where the trail passed behind the peak of Mount Haydon.

Putnam skidded suddenly and slid away down the steep face.

Ferris had taken a secure body belay and held Putnam safely. But the rope jerked tight across Ferris's body. The taut cord ripped his fine camera from its strap and sent it tumbling down the mountain.

At Camp Ten Captain Holdiman and his crew made the drop described at the beginning of the story.

After I had been pulled from the crevasse, and when we had resigned ourselves to the loss of four days' supply of priceless food, we enjoyed a pleasant surprise.

We opened one of the dropped boxes, half expecting to find cosmic-ray equipment which had been left in the United States.

Imagine our delight at unwrapping four large and luscious apple pies, sent with the compliments of the Yakutat Bakery! (Page 247.) Each of us gobbled up a half pie in jigtime.

This unexpected treat could not have arrived at a more opportune moment. Then there was mail from home which fired everyone with new enthusiasm. My accident and the food loss were quickly forgotten.

We were all doing chores around camp when I looked over to where Bill Latady was sitting on an air mattress. He was barelegged and his feet were a gory red!

"Doc" Ferris, apparently sure at last of a patient, rushed over to see how in the world Latady had cut both his feet so badly. Bill just grinned and held up a pair of bright-red wool socks he'd been wearing.

The bloody-looking dye had come off on his feet, which he had undressed for a stretch and an airing!

Determined to press on toward the summit before another storm blew in and caught us short of supplies, we pushed ahead through waist-deep snow and along a fogbound ridge to locate our last and highest bivouac, Camp Eleven, at 15,500 feet elevation (Plate II).

Would the Weather Hold?

At our high camps, to which we had neither time nor strength to relay heavy loads, the chef might serve up the following for dinner: pea soup (from dried preparation), K-ration pork or dried shredded beef mixed with cheese and rice, dried sweet potato, and plenty of dried raisins, apricots, and apples.

To drink there was always tea stiff with sugar, as well as a choice of powdered milk, lemon juice, and hot chocolate.

With only two more full days' food remaining, the weather held our fate in its unpredictable hands. If we failed to get the break of clear skies within the next 48 hours, we should have to drop down to a lower camp for reinforcements.

If that happened, who could say if we'd ever get back up?

On the morning of the 15th, although clouds hid the top thousand feet of St. Elias and a sharp wind was blowing, we decided to try for the summit.

Two of our little company were still below at Camp Ten. We started out in two topes of three men each. Not ten yards from camp, Kauffman, who had led off, let out a shout and nearly vanished into a gaping hole.

The frightening "who-oosh!" as the drift-camouflaged snow bridge he was crossing collapsed made us instinctively grab his rope and hoist him up to safety. The Saint was waging its war of nerves right up to the bitter end!

Mists Force a Retreat

During the excitement driving mists had closed in on all sides. We retired in defeat to the tents. Half an hour later snow began to fall thickly.

Toward evening a shout announced the arrival of Putnam and Ferris from below. The packs on their backs contained—bless them!—a little extra food and gasoline for the camp stoves. If storm and circumstance demanded, we now could stretch our rations to three days.

The morning of the 16th was biting cold, and the top of the mountain stood sharp-etched against a deep-blue sky. Wisps of blowing snow trailed off southward from the peak. That meant the north wind, the good-weather wind, was blowing!

"Kauff! Betty! Look at this!" I shouted gleefully, and my tentmates peered out to squint and grin at the bright day.

Our exclamations woke those in the other tents.

"Let's get out of here while we've got the breaks," someone cried.

By 7:30 we were roped and ready for the start. Each man carried a 30-pound pack of extra clothing and emergency equipment.

In contrast to the blue above, a tumultuous layer of clouds formed a churning floor below with icy peaks poking through here and there.

Working across the crevassed snow of the ledge and mounting a wall of rock, we topped the ridge itself. The full force of the wind was invisible ice. The route ascended steeply over sound rock. For a stretch there was little snow.

Above 16,500 feet the altitude began to tell. Wind, whipping powder snow, and the constant searching for secure handholds on rock faces proved more and more exhausting.

Merging East and West Arms of Guyot Glacier Suggest a Woolly Pair of "Long Handles"

The Guyot Glacier meets the dirt-blackened Tyndall Glacier in the distance at right. The black line (right foreground) is a medial moraine, composed of rock and dirt scraped from mountain walls.

Icy Bay, just off the picture to the right, receives both ice rivers' majestic outpourings—thousands of tons of ice a day. The Harvard Mountaineering Club Mount St. Elias Expedition landed on the south side of the bay.

The party's route to the base of the peak skirted the Chaix Hills (upper right, partly hidden by clouds); then followed the Tyndall Glacier (background) eastward (left) beyond the area of the photograph.

After conquering St. Elias, Maynard Miller and William Latady continued glacial studies in this region and southward along the Alaskan coast. Their observations revealed that, since 1888, the Guyot and Tyndall Glaciers had receded 13 miles and, in some sections, had thinned vertically several thousand feet through melting.

U. S. Army Air Forces, Official

From a Cliff-hemmed "Lake" of Ice Tumbles a Frozen Niagara

To mountaineers and geologists such alpine bowls are known as cirques. This one, three miles long, lies under the north shoulder of Mount Haydon.

The climbers' path circling the ice basin described the top of a question mark. Entering the area by the ridge at lower left, the route skirted the ice-fall, mounting to the snow-capped dome in left middle ground; swinging to the right atop the white-crested cliffs behind the cirque, it led out of the scene (upper right) to slopes of Mount Haydon.

This view was photographed on the reconnaissance flight, when members of the climbing party planned with the pilot of the Tenth Rescue Squadron support plane where and when equipment and food drops were to be made (page 231).

Avalanches frequently rumble down the cliffs of black rock. When they strike the cirque floor they send up towering plumes of powdery snow. Early explorers, far off at sea, mistook the snow clouds for steam from a volcano.

U. S. Army Air Forces, Official

Maynard M. Miller

To Save Fuel, the Melt Tarp Was Spread to Convert Snow to Water

Melting snow over gasoline tent stoves consumed tightly rationed fuel. Mrs. Andrew Kauffman watches precious water trickle into a pail. The black nylon tarpaulin was slung on stakes and drained by a low corner. Chunks of snow spread on the sheet melted as dark material absorbed the sun's heat.

We had to change leaders every hundred yards or so.

Dee Molenaar tapped me on the shoulder and pointed back along our trail. A lone figure was walking slowly across the ledge toward camp.

It was Bill Putnam, who had a shrapnel-wounded lung, picked up in action with the mountain troops in Italy. He and the rest of us had known the thin air high up might stop him, but the knowledge didn't lessen our disappointment that he couldn't participate in the homestretch of our race.

"How Much Longer?"

Soon we passed beneath a series of huge, mean-looking feathered snow and ice hummocks. Upward led the trail over humps, across snow faces, and through gullies.

We struggled on, from terrace to terrace, chopping, floundering, climbing.

It was getting late, and the question no one dared frame in words hammered more and more insistently in our minds: "How much longer?"

Suddenly the rope ahead of me pulled straight. From beyond an ice hummock I heard Dee Molenaar's voice, shrill with excitement. "Give me five more feet of slack and I'll be on top!"

His familiar yodel warbled out on the crisp air, and I knew we had won!

As the rest of the party plodded up and joined us on the summit, I looked at my watch. It was ten minutes to five. We dropped our packs and shook hands.

Fatigue, headaches, pounding hearts, all were forgotten in the overwhelming feeling of exultation. We had made it! We were on top!

The summit plain was half the size of a football field. We all moved over to a tiny rise that was the very highest point.

Dee beat Andy Kauffman to the draw, reaching over and planting a big kiss on Betty's cheek.

By conquering St. Elias this courageous girl had climbed higher than any other woman up to that time in Alaska and Canada.

After our first elation had somewhat subsided, we gazed out over the whole awe-inspiring array of St. Elias Mountains' major peaks, thrusting up through the sea of clouds.

To the northeast lifted the enormous bulk of a mountain even taller than our 18,008-

Maynard M. Miller

Beards and Dark Glasses Disguise Mountaineers as Ascetics Deep in Contemplation

Latady (left) and Putnam enjoy their first good meal of air-dropped supplies after a stormbound week on short rations at Camp Nine (page 241). The large can in foreground contains emergency rations for two men for ten days. Latady lounges in felt boot liners. Mess kit (center) sits on camp stove. A sleeping bag has been thrown over the tent to air. Guy ropes were firmly lashed to pegs frozen in the snow.

Maynard M. Miller

Dee Molenaar

Out of the Sky Fell Fresh-baked Pies, but Milk Came Only in Powdered Form

An airplane dropped apple pies from the Yakutat Bakery (page 243). Betty Kauffman mixes dried milk.

U. S. Army Air Forces, Official

Parachute and Load Throw Shadows on Snow Cratered by Packages Already Dropped

Equipment that would break or crush was parachuted; other items were dropped free. An aiming point (left) centers the delivery area at Camp Nine (page 241). Message stamped in the snow at right read, "Drop 3 Yellow at Upper Ledge," requesting delivery of three boxes of emergency rations at the next agreed spot. Packages for each place were painted a different color.

foot pinnacle—Mount Logan, second highest, after Mount McKinley, of all North American peaks.

Mount Logan, towering to 19,850 feet, was discovered by the First National Geographic Society Mount St. Elias Expedition of 1890, and named for Sir William E. Logan, founder of the Geological Survey of Canada.*

Flags Fly from the Summit

We stood on the international boundary between Alaska and Canada's Yukon Territory. We unfurled American and Canadian flags, donated by the Arctic Institute of North America. As they waved proudly in the wind, we fumbled with numb fingers to photograph the scene (Plate I).

To mark our achievement, at least until the next screaming blizzard, we hung on a jeep aerial the crimson banner of the Harvard Mountaineering Club.

Not until three weeks later, when we were all safely back to civilization, did we learn of an amazing coincidence.

That perfect day we had stood on the mountaintop was July 16, 205th anniversary of the day Vitus Bering's party first saw Alaska, sighted the white peak from 140 miles at sea, and named it for the patron saint of that day, St. Elias.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Conquest of Mount Logan," by H. F. Lambart, June, 1926; "Over the Roof of Our Continent" (Mount McKinley), by Bradford Washburn, July, 1938; and "Fit to Fight Anywhere" (Quartermaster Corps Expedition to Mount McKinley), by Frederick Simpich, August, 1943.

Our Air Age Speeds Ahead

By F. Barrows Colton

PROTESTS arose not long ago when the manager of National Airport at Washington, D. C., installed parking meters around the traffic circle in front of the main building, where people drive up to put friends on planes or make brief visits.

"I had to do it," explained the manager. "Why, people were coming over here and parking their cars for three or four days while they went to Europe!"

That shows, as well as anything, how commonplace air travel has become, how completely the Air Age has arrived.

This age of flight, in which the human race is conquering the great overhead ocean of air, earth's last frontier, is developing as fast as scientific research and available funds will permit.

Man is learning to live, travel, even earn a living, and if necessary defend himself far up in what some flyers call the "New Sea," where Nature never intended he should go.*

Today a plane exists that is designed to carry its pilot to the breath-taking altitude of 80,000 feet, 15 miles, well beyond the height reached by the National Geographic Society-U. S. Army Air Corps stratosphere balloon *Explorer II*, which now holds the altitude record for human flight.†

That sky-climber is the rocket-propelled experimental Air Force plane the XS-1, built to fly 1,700 miles per hour, more than twice the velocity of sound.

Babies Born in Flight

Whether or not you ever ride in airplanes, aviation is fast changing the world you used to know. Several babies already have been born in planes in flight!

Some New York businessmen, living in outlying suburbs, now get to work in 15 minutes by air instead of in over an hour by train, subway, or ferry. Their only complaint is lack of time to finish reading the morning paper!

Every minute of every day there are approximately 100 tons of mail in the air over the United States.

There are now helicopter mail deliveries and taxi service. Airplanes are used in counting wild ducks and game, in spotting poachers, who sometimes use planes themselves, and in reseeding denuded western lands.

Prisoners, deportees, migrant laborers, seasonal fruits and vegetables are now carried by air. Planes are used to tow advertising signs, patrol pipe lines, shoot coyotes, and spray bodies of water to keep down mosquitoes.

Topographic surveys for extension of Pennsylvania's great high-speed auto turnpike from Harrisburg to Philadelphia are being made with aerial photographs. It is estimated that various U. S. military and civil agencies alone have photographed 18 to 19 million square miles of the earth's surface from the air, one third of the total land area.

Bad weather, the old bugaboo of aviation, is being conquered. Most of the leading airports of this country soon will have equipment for enabling passenger-carrying planes to land under conditions that previously would have halted all flying.

There used to be a rueful parody on the famous Air Corps song, "Nothing can stop the Army Air Corps (ex-cept the wea-ther)!" But that's no longer true. Almost daily for a year and a half, pilots of the Air Force's All-Weather Flying Project have flown the 750-mile round trip from their base at Wilmington, Ohio, to Andrews Field near Washington, D. C., without ever seeing outside the cockpit.

They have flown in all kinds of weather. When it was clear, special opaque windshields and goggles kept them from seeing outside. Every flight, including take-offs and landings, was made entirely with the aid of instruments.

A Seattle inventor has developed a one-seater helicopter, a sort of aerial motorcycle, which weighs only 125 pounds, has a speed of 90 miles per hour, and a cruising range of 200 miles.

Other inventors have developed combination automobile-airplanes (page 258). One is called the "airphibian." You fly it to the airport of your destination, land, take off the wings, tail, and propeller, leave them at the field, and drive the fuselage into town like any car.

Radar Devices Warn of Danger

Radar devices that penetrate fog and darkness to warn of ground below or mountains ahead are rapidly coming into use on commercial airliners and soon will be required.

Scientists now foresee the time when, flying in a plane powered by the lightning-fast ram-jet engine, you may leave New York at noon eastern standard time and reach San Francisco *before* noon, at 11:00 a. m. Pacific time!

* See "New Frontier in the Sky," by F. Barrows Colton, National Geographic Magazine, September, 1946.

† See "Man's Farthest Aloft," by Capt. Albert W. Stevens, National Geographic Magazine, January, 1936.

N. Y. Herald Tribune-Kartaltoons

In Today's Air Age an Old Familiar Sign Has New Wording—"Airplane Crossing"!

"Stop—Look—Listen" warnings were posted at La Guardia Field, New York, where a highway crossed an airplane runway as a safeguard against collision until the crossing could be eliminated.

Only 22 years ago, when Rear Admiral (then Lieutenant Commander) Richard E. Byrd first flew an airplane over the North Pole, he was awarded the Hubbard Medal of the National Geographic Society.*

Today U. S. Air Force men fly over the North Pole three times a week. They have reported finding three north magnetic poles instead of one. Only recently the Air Force announced that it is ready and able to fly "anywhere, any time" in the Arctic.

Some 75,000 Americans today, including many farmers, own their own personal airplanes for use in pleasure, business, or both. Private airplanes may increase to a total of 400,000 by the 1950's, says T. P. Wright, head of the Civil Aeronautics Administration, if someone develops a safe, reasonably priced light plane which will be really useful to its owner.

Just seven years ago, in 1940, I wrote an article on aviation much of which today already seems almost as out-of-date as the horse and buggy.† Then it took 18 hours or more to fly from coast to coast. Only a few airliners had more than two engines and most cruised at no more than 180 miles per hour. Today most long-distance transport planes have four engines, an average cruising speed of 300 miles per hour, and can cross the continent in about 10 hours.

Seven years ago the fastest U. S. fighter planes still in the experimental stage did not fly more than 400 miles per hour. Now the new jet-propelled fighters zip through the sky at 600 or better, and unpiloted jet-driven craft have actually flown far beyond the speed of sound at 1,500 miles per hour.

Flying as Fast as a Bullet

Flying at 650 miles per hour to set a new world speed record, the Navy's experimental jet plane, the Skystreak, traveled at approximately the speed of a 45-caliber pistol bullet, or as fast as the earth turns at the latitude of London, England, or Winnipeg, Canada. Flying west at such a speed and in that latitude, the Skystreak would keep up with the sun and fly around the world in a day if it could carry enough fuel.

Scientists are now attacking the problem of using atomic energy for aircraft.

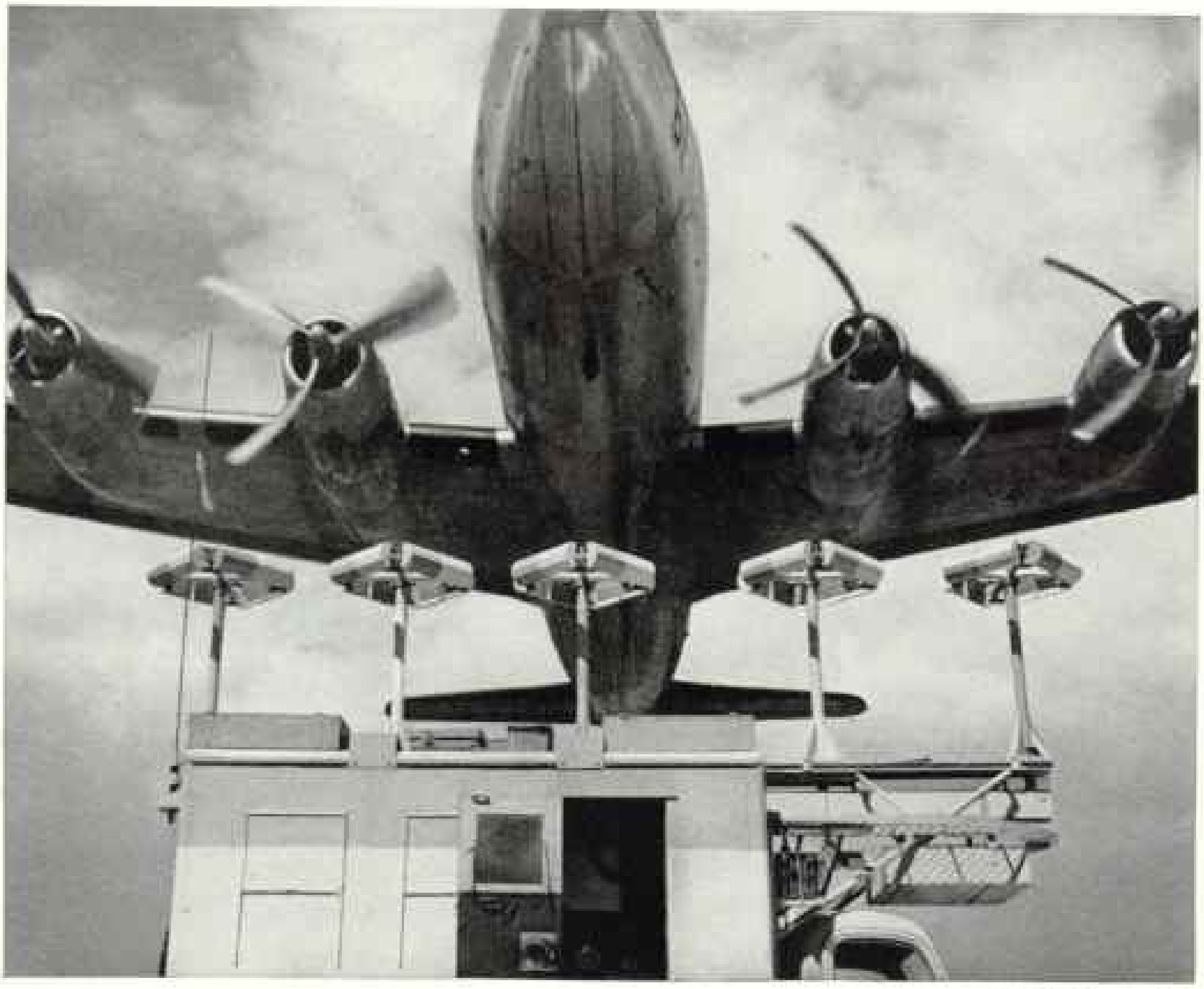
* See, in the NATIONAL GEOGRAPHIC MAGAZINE for September, 1926, "First Flight to the North Pole," by Lt. Comdr. Richard E. Byrd, and "Commander Byrd Receives the Hubbard Gold Medal."

† See "Aviation in Commerce and Defense," by F. Barrows Colton, NATIONAL GEOGRAPHIC MAGAZINE, December, 1940.

Piasecki Helicopter

Hovering over the Sea, This Navy Helicopter Could Rescue a Boatload of Men

Five men climb a 40-foot rope ladder to show how large groups might be saved from life rafts, sinking ships, or forest fires. This craft can carry eight passengers and a crew of two. Its twin rotors, mounted at either end, provide powerful lift and help balance the ship (page 265).



U. S. Air Force, official

"Right on the Beam" a Plane Comes in "Blind" over the Radio Set That Guides It

With the pilot unable to see outside the cockpit, to simulate landing in foggy weather, this Air Force All-Weather Flight project plane is being brought to earth with the aid of the radio transmitting truck in the foreground. Blind landings are made with the help of two systems, sometimes in combination. One is Ground Controlled Approach (GCA) in which a ground operator sees the plane in the air by radar and gives the pilot landing directions by radiotelephone. The other, shown here, is an Instrument Landing System (ILS) in which the pilot follows a radio beam "glide path" down to the field (pages 249, 254, and below).

Carrying cargo by air in 1940 still was definitely a sideline, compared to airline passenger traffic. But experts predict the time is coming when the airlines, like the railroads, will derive more income from carrying cargo than passengers.

In 1940 we were just beginning to explore the upper depths of the "New Sea," the vast ocean of air in which aircraft operate. Today's new big bombers are built to fly at 40,000 feet, and V-2 rockets, soaring to more than 100 miles, have for all practical purposes penetrated beyond the atmosphere, for even far below that height the air is so thin that it is equivalent to a high vacuum (page 269). The Navy's Neptune rocket is designed to climb to 235 miles.

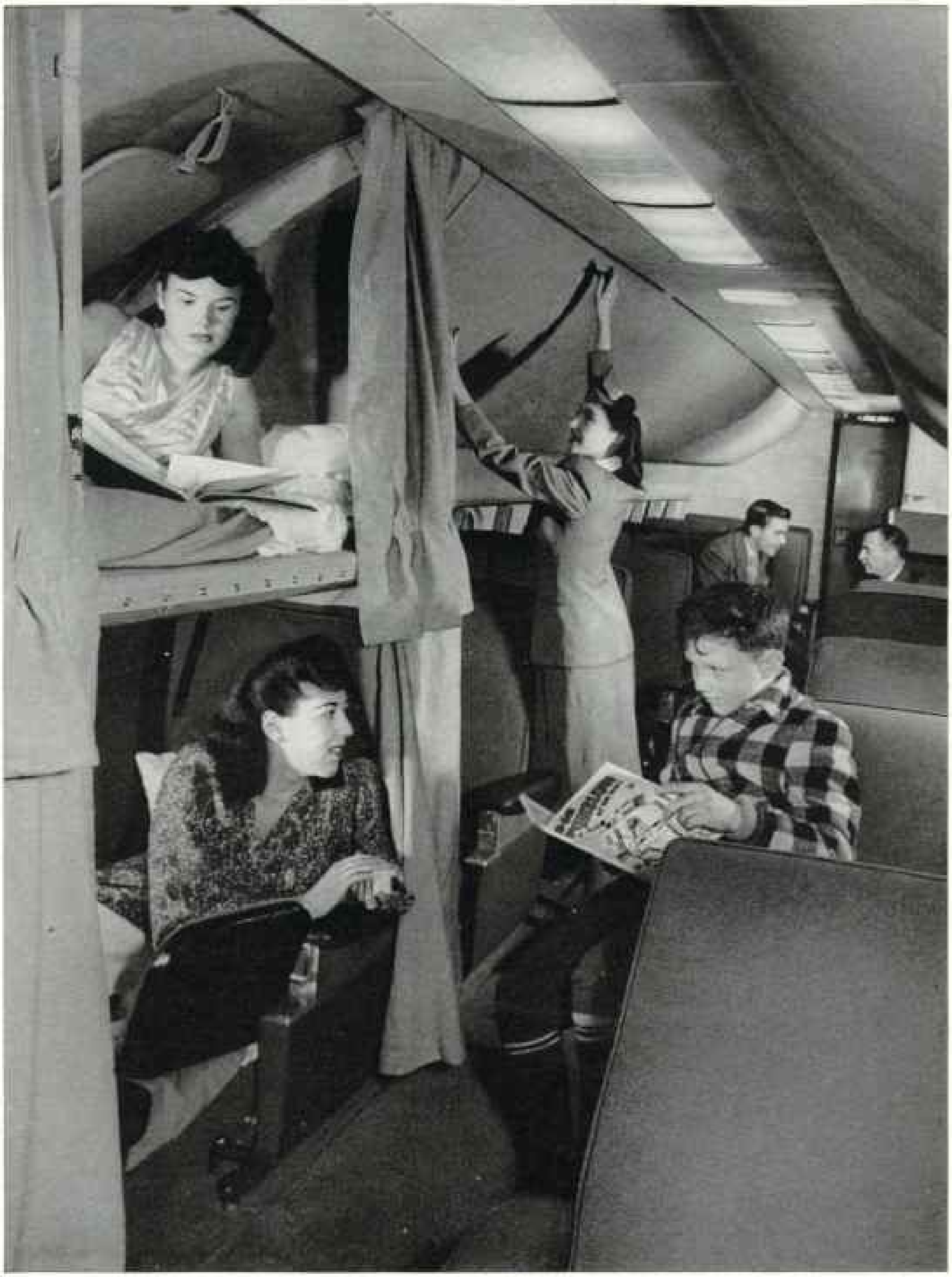
Already a course in rocket navigation is being taught by an astronomer at the University of California. Thus aviation has begun to think about leaving the earth behind and venturing out into the astronomer's world of outer space.

Real progress is being made now in overcoming the problem of bad weather, the greatest handicap to safe and regular operation of commercial airlines.

Not long ago two planes of different lines, approaching San Antonio, Texas, found the field covered by clouds hanging too low to permit a safe landing under normal procedure.

One plane, after futilely circling the field, had to land at Houston, many miles away.

The second, however, made a safe landing at San Antonio on schedule. It was equipped with radio receivers enabling the pilot to make use of the U. S. Government's Instrument Landing System (ILS), now being installed



Staff Photographer John E. Fletcher

Berths Are Made Up Pullman Style on a Transatlantic "Flying Sleeper"

In the lower a mother prepares for the night while her son waits for his bed to be made ready. This Pan American World Airways Constellation has 12 berths, each large enough for two persons, plus 16 seats for "sit-up" passengers. It can seat 40 when berths are not in use. The New York-to-London flight takes 14 hours (page 259).

Ross-Fix

On Moving Day Now, You Can Fly Your Furniture

Household furnishings are packed in a cargo plane, equipped as a flying moving van, for transport from Newark, New Jersey, to Los Angeles. Carrying freight by air is a growing business all over the world. Cargoes range from young elephants, race horses, and pedigreed cattle to sea food, cosmetics, cut flowers, and bank checks. All airlines carry freight as well as passengers, and some operate special cargo planes.

at all major American commercial airfields.

To use ILS a pilot coming to a fog-covered field lines up his course with the aid of a runway localizer, radio signals that show him that he is headed toward the invisible runway below. Then he flies down a radio beam "glide path," which guides him unerringly to the end of the runway where he can land.

Automatic Landings Foreseen

Eleven commercial airlines now have equipped their planes with ILS receivers, and others are following suit. So equipped, they are permitted to land under conditions of lower ceilings and less visibility than otherwise would be allowed. As they gain experience with ILS, they will be authorized to land with its help under increasingly difficult conditions.

ILS has been adopted for use all over the world at commercial airports by the International Civil Aviation Organization (ICAO).

Next step after ILS will be "automatic landing," a combination of ILS with the plane's automatic pilot device, which will bring a plane safely and accurately down to earth under conditions of only a 25- or 30-foot ceiling and zero visibility. Its workability already has been proved by the U. S. Air Force's "push-button flight" project with which an experimental plane already has "flown itself" across the Atlantic to England and back with the crew merely sitting by.

Another "blind landing" system, now in use by the United States Air Force and under test by the Civil Aeronautics Administration, is Ground Controlled Approach (GCA), which is operated by radar and radio. A radar beam, sweeping an area of 30 miles' radius around an airport, shows on the radarscope the location of all aircraft within that area.

The GCA operator, watching his scope,

Ross-Pix

That Distant Lake Where the Fish Are Biting Is Easy to Reach by Air

Assembling the collapsible canoe brought with them in their own plane, this couple prepares for a day's fishing far from home. Equipped with pontoons, light planes can use a body of water for landing.

gives instructions to the planes by radiotelephone. As the planes approach the field they are picked up on the scope of a shorter-range radar. Then an operator "talks them down," watching each plane on the radarscope as it comes down toward the runway and telling the pilot how to alter his course to stay on the correct path to land safely.

More amazing than either ILS or GCA, perhaps, is Teleran (Television-Radar Air Navigation), which enables a pilot actually to see himself come down. A radar set on the ground picks up all aircraft in its vicinity and shows them on its scope.

A continuous view of the scope is sent by television to each plane. Each pilot sees on his television screen little spots of light that represent his and all other planes near him, with his own marked in a special way, all moving across a map.

On the screen, too, he sees a line that directs him to the proper runway, and he can find his way down by watching the movements of the spot representing his own plane as he glides to a landing. Teleran is still under test.

To guide airplanes more surely from one field to another, the CAA is rapidly blanketing the United States with new radio range stations operating on very high frequency. On a map these radio ranges look like a series of wheels with 90 spokes, each wheel overlapping those around it. The hub of each wheel is a radio sending station on a mountain or other high point. Each "spoke" is a radio beam being sent out in a certain direction.

A pilot flying, say, from Chicago northwestward to Minneapolis follows the spoke of the Chicago radio range that points most directly toward Minneapolis, to a point where it overlaps with another spoke that extends out southeast from the Minneapolis "wheel." Following two overlapping spokes or beams in this way, a pilot can find his way unerringly between any two points in the United States. A right-left needle on a dial in the cockpit

U. S. Navy, Official

Navy's Skyrocket, Built to Fly near the Speed of Sound, Resembles a Swordfish

It is driven by both jet-propulsion and rocket engines and is designed to fly at 650 to 750 miles per hour. The sharp "lance" on the nose contains the Pitot tube, an air-pressure measuring device that operates the air-speed indicator. If the pilot needs to escape from the plane while flying at high speed, he can detach the entire nose section. After it falls clear, he can open his parachute.

shows the pilot whether he is "on the beam" or off to the right or left.

With these new ranges, too, parallel courses side by side or at various levels can be set up on heavily traveled air routes.

Operating on very high frequency, the new radio ranges cannot be distorted or drowned out by static. The old low-frequency radio ranges, which the new ones are replacing, often were least reliable in bad weather when they were needed most.

Radio Guides Planes Across Oceans

To guide large airliners making transcontinental and transoceanic trips with only one or two stops, still another type of radio direction finder is being installed, which enables a pilot to follow a great-circle course across land or sea without bothering with the short-range overlapping radio beams.

As another aid to guiding airplanes across the oceans, the wartime magic of Loran (Long-range Navigation) is coming into peacetime use. With a special receiver in the plane the navigator picks up two radio signals sent out from widely separated radio stations on shore.

From a quick calculation of the difference in the time of arrival of the two signals, even though it be a tiny fraction of a second, the navigator can determine with great accuracy his exact position, making him independent of navigating by the stars.

Keeping watch, too, over the heavily traveled air route across the North Atlantic are ships serving as ocean weather stations, maintained by international agreement. These ships supply airplanes with navigation information and weather reports by radio and are ready to speed to the aid of any plane forced to land in the sea, as was dramatically demonstrated when the U. S. Coast Guard cutter *Bibb* saved 69 persons from the flying boat *Bermuda Sky Queen* when it was forced to land in heavy seas last autumn.

Just before World War II the United States began installing a Nation-wide system of air markers, signs painted on rooftops or outlined on the ground, which in daytime would show any pilot, especially those of low-flying private aircraft, the direction to the nearest airport, its location, and true north.

When war came, these markers were removed lest they be useful to enemy aircraft,

U. S. Navy, Official

Rival for Navy Planes and Guns: A V-2 Rocket Is Fired from the Carrier *Midway*

This first successful launching of such a weapon from an aircraft-carrier deck took place September 6, 1947. It portends an increasing use of rockets and guided missiles by the U. S. Navy. Launching of the V-2 did not interfere with the operation of the *Midway's* planes, which took off immediately after the firing of the rocket (page 771).

Consolidated Vultee

With a "Flying Automobile" You Can Travel by Air or Highway

Upper section of this experimental craft, including wings, tail, and airplane engine, may be detached from the lower part, which then can be driven on the ground, using a separate motor. It is intended for a combination personal aircraft and auto. The four wheels have shock absorbers for landing (page 249).

but now they are being reinstalled. An arrow points due north with the latitude and longitude on either side of it, and another arrow indicates the direction and distance to the nearest good landing field.

Hot air, blown through hollow spaces in the leading edges of wings, control surfaces, and propellers, is used on newer aircraft to prevent formation of ice, which otherwise can spoil the lift of a plane and throw it out of control. Formation of ice on windshields is prevented by use of a new glass containing salt crystals that conduct electricity through the glass.

Birds crashing through windshields and disabling pilots are a real hazard, especially on the great mid-continent "flyways" over which birds migrate in spring and fall; so Government researchers have developed "bird-proof" windshields. Chickens first killed by electrocution are hurled with air guns against experimental windshields at speeds up to 500 miles an hour to reproduce the impact of a bird in flight.

Noise of airplanes, which often has annoyed residents along the borders and approaches of airports, also is being attacked by researchers. An experimental almost-silent aircraft already has been flown by scientists of the National Advisory Committee for Aeronautics (NACA). Propellers, which cause most of the noise, are being redesigned with more blades and slower speeds.

Air Cargo Comes of Age

Shipment of cargo by air is one important way in which the Air Age is changing civilization. Almost every conceivable article has been shipped by air, from young elephants to live lobsters, ribbon, and eyebrow pencils (page 254).

Today, if a department-store manager in Des Moines or Dallas wants to try out a dress representing a new fashion trend on his customers, he need not order a large quantity from his New York wholesaler, taking a chance on a loss if they don't sell. Instead he can order a few, advertise them, and then if they begin to go like hot cakes, order more sent out overnight by air. Moreover, dresses in large quantities can be shipped on hangers, arriving unrumpled and not in need of pressing.

Some 2,000 firms, operating 4,400 planes and employing 8,400 pilots, are authorized to carry air freight and passengers on a non-scheduled basis in the United States. The regular scheduled airlines, too, all carry freight

United Aircraft

Nicknamed the "Flying Pancake," This Experimental Navy Plane Is Round and Flat

Intended for use as a fighter, it is designed to fly as fast as 450 miles an hour and to slow down to 40 miles an hour or even less. Its flying-wing shape minimizes drag. The designer originally set out to develop a craft which would perform both as an airplane in high-speed flight and as a helicopter flying almost vertically in getting in and out of small landing spaces.

along with passengers, and some operate separate freight airplanes.

Air freight is flown regularly overseas. There are even "tramp" air freighters that ply the air routes as tramp steamers ply the oceans, picking up cargo wherever it is available.

But passenger carrying today still is the main business of the airlines. More than 900 airplanes, three times the number in use before the war, now are flown regularly by the scheduled airlines alone in the United States. Across the Atlantic there is an average of about 60 airline flights each way per week, and over 30 each way weekly across the Pacific, contrasting with two before the war (page 253).

Some of today's big four-engined planes have two decks and include a lounge with snack bar. Hot beverages can be prepared on board, and in some cases meals are cooked on the ground, frozen, then thawed and served in the air hot and fresh. Men's and women's separate dressing rooms have washbasins, hot and cold water, dental bowls, full-length mirrors, and dressing tables.

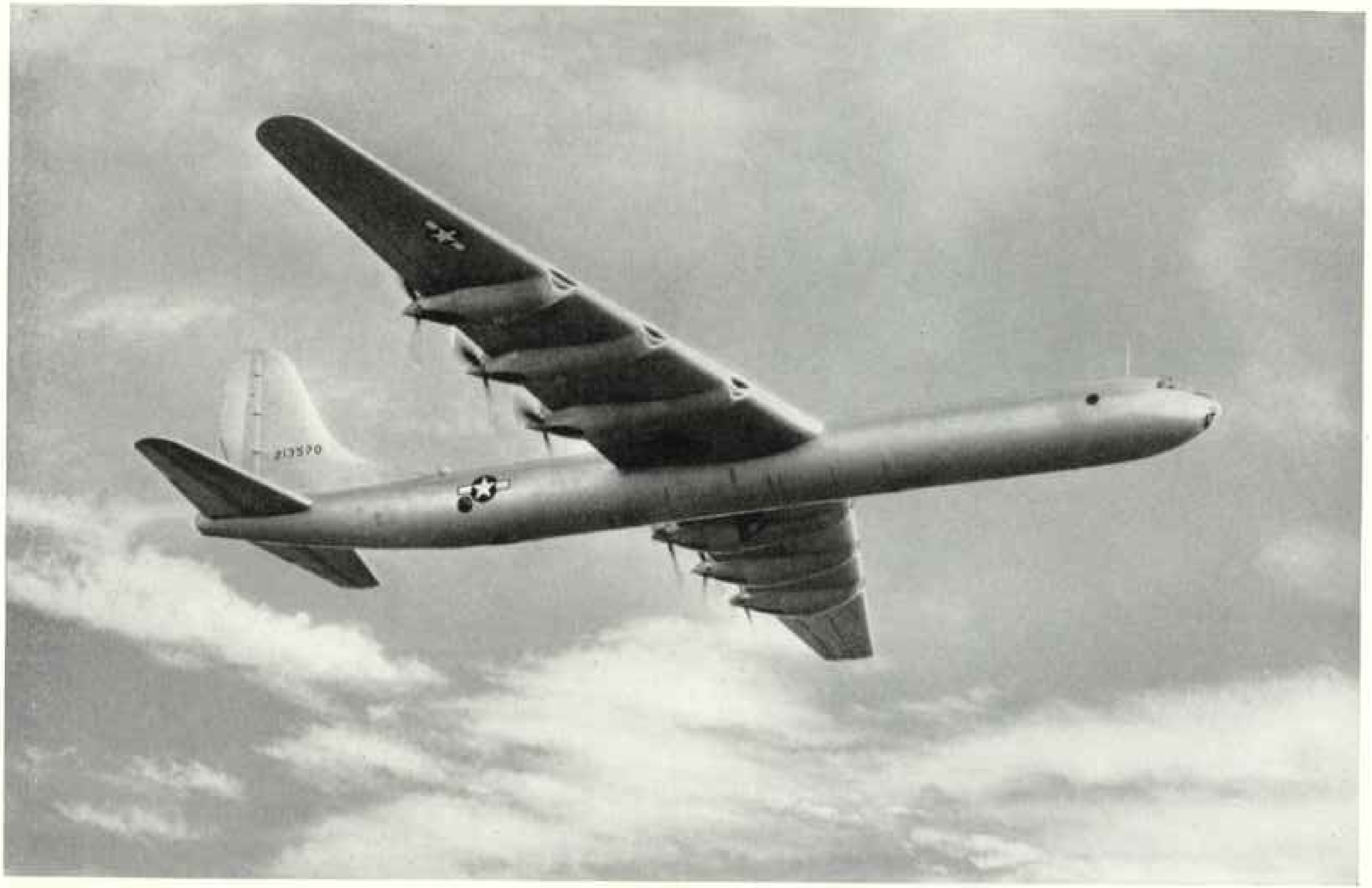
Such planes seat from 50 to 80 people and some can sleep as many as 28 in berths. One has a private compartment with its own bathroom. Cabins are "pressurized," which means the air within them is kept at a pressure equal to that at about 8,000 feet altitude, permitting normal breathing while the plane flies at 18,000 feet or higher where the outside air is too thin to sustain normal life.

Commuters Travel by Air

Air commuting is well established. Congressmen, businessmen, and others who make regular trips between cities such as Washington and their homes keep standing reservations on certain airline flights every week.

Despite occasional accidents, airline travel is considered safe enough today so that most insurance companies charge no higher rates for it than for other modes of travel. By inserting coins in an automatic vending machine, you can buy an air travel life insurance policy for 25 cents per $5,000 up to $25,000 in the waiting room of your airport terminal, and mail it, in an envelope that is thoughtfully provided, to the beneficiary!

Airlines today cover the earth with a 500,000-mile network that reaches practically



U. S. Air Force, Official

Appearing Like a Huge Winged Dragon in Flight, the B-36 Is More than Twice the Size of a B-29

Length of its slim, cigar-shaped fuselage is 163 feet. It has reached a speed of more than 300 miles per hour and can fly 10,000 miles with a 10,000-pound load of bombs. Its range on normal combat flights would be considerably less (pages 266, 271).

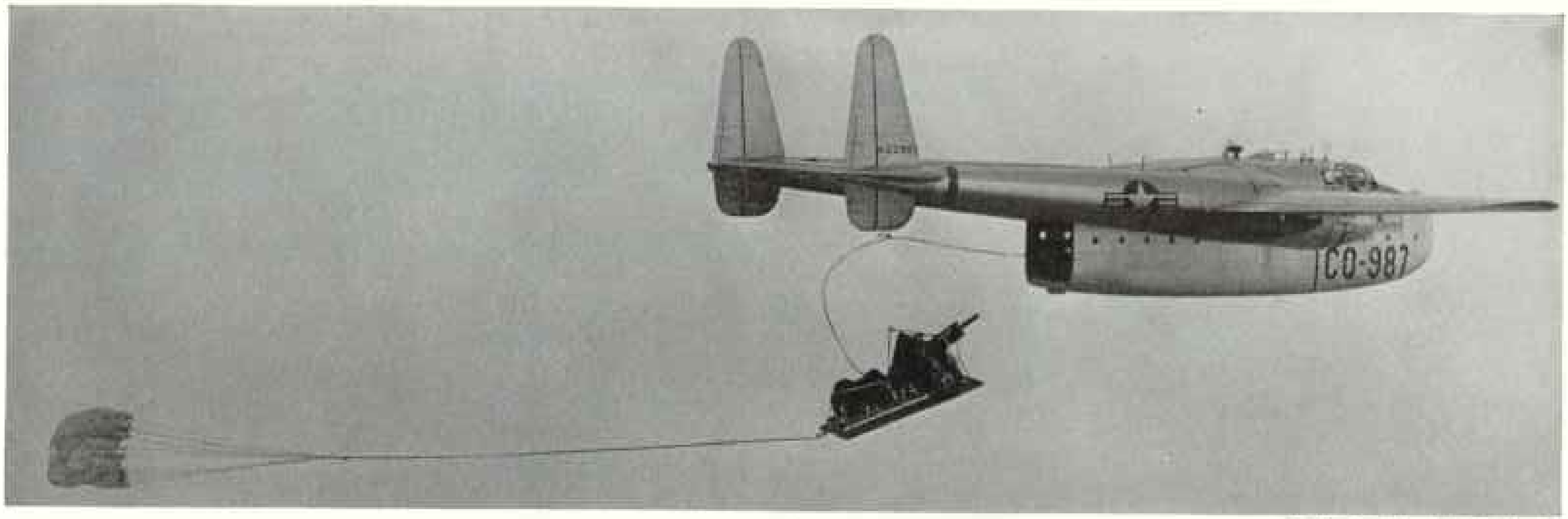
AP from Press Ass'n

World's Largest Airplane, the Howard Hughes Flying Boat, Built Mostly of Wood, Makes a Trial Flight

Powered by eight 3,000-horsepower engines, it was constructed during the wartime metal shortage. It contains millions of glued joints.

Consolidated Vultee

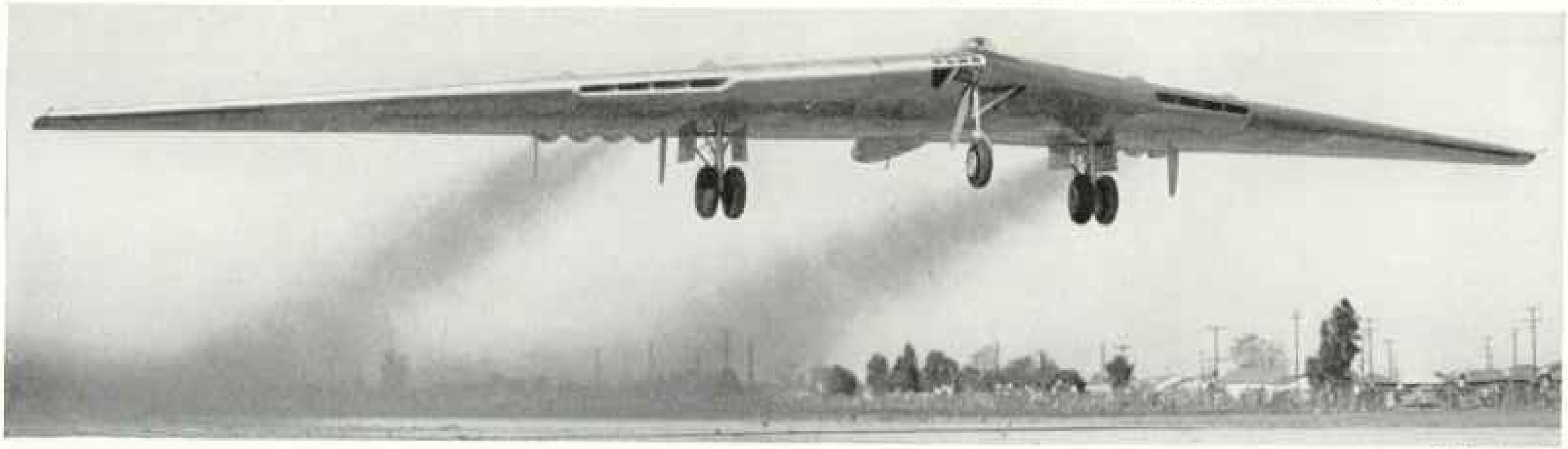
These 400 Men, or 50 Tons of Cargo, Could Be Carried in the XC-99, Which Has Two Decks and an Elevator



Even the Artillery Soon May Be Prepared to Fly, Dropping Guns by Parachute, in This Air-borne Age

A 105-millimeter howitzer drops out the rear door of a troop-carrier aircraft on a trial flight. Another parachute will open to stabilize its descent.

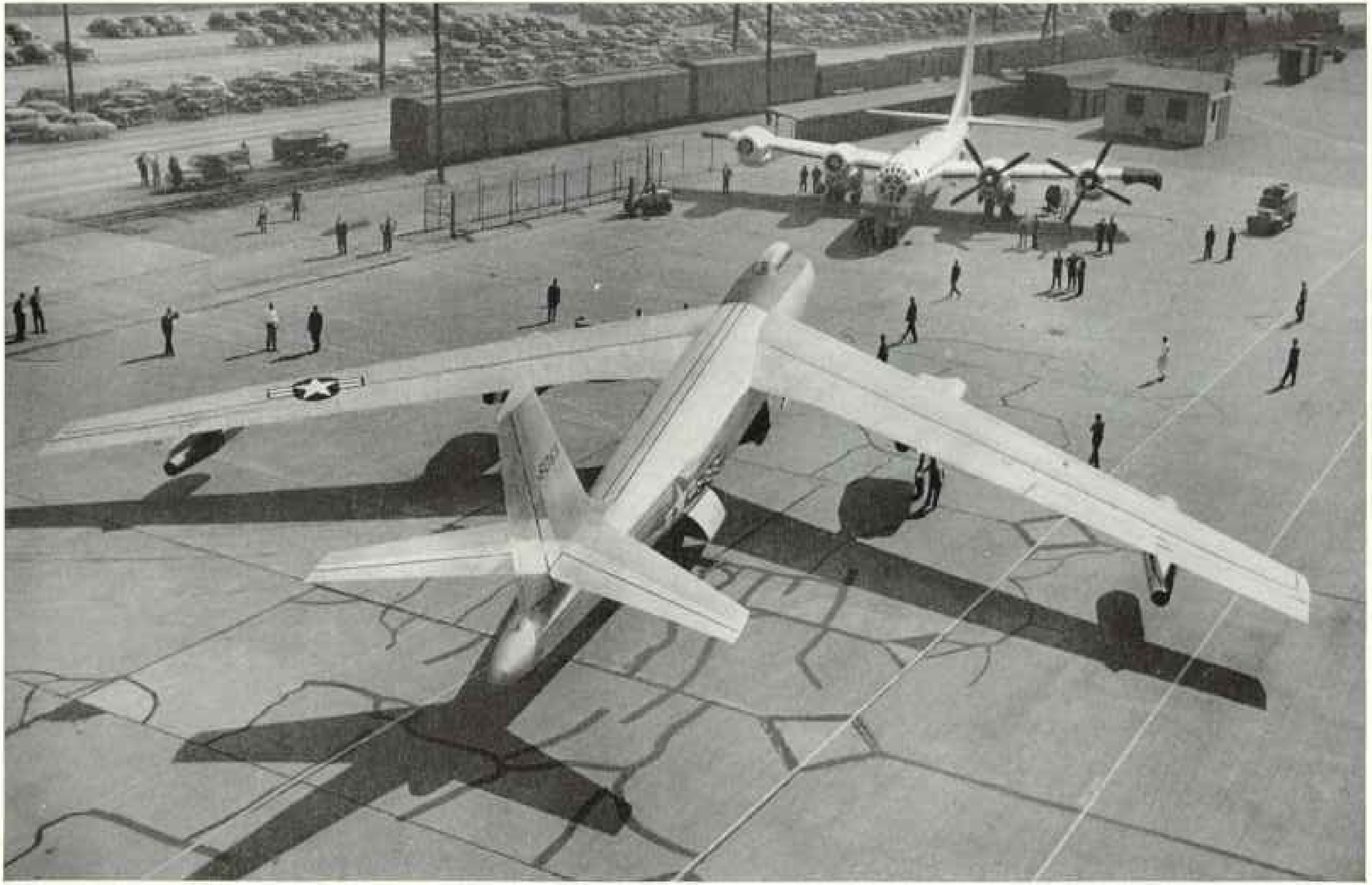
Dan Piedfort from Fairchild Aircraft



Northrop Aircraft

Resembling Some Prehistoric Bird, the YB-49, Jet-propelled Flying-wing Bomber, Trails Smoke on Its Take-off

Air enters the eight jet engines through ducts on leading edges of wings. Flying-wing design eliminates drag produced by fuselage in conventional aircraft (p. 271).



Boeing Aircraft Co.

Knife-thin Wings, Set Back at an Angle, May Help This XB-47 Jet-propelled Bomber Fly Nearer the Speed of Sound

Its speed still is secret, but the unusual design of its wings and tail surfaces enables it to attain terrific velocity with less danger from severe air turbulence. Its six jet-propulsion engines are mounted in twin nacelles inboard under the wings and singly near the wing tips.

U. S. Air Force, Official

Two 10-pound Jet Motors Run This Air Force Helicopter, the "Flying Motorcycle"

Attached to the tips of the two rotor blades, the tiny power units push the blades around at 600 feet per second by the thrusting power of their jets of hot gases, eliminating need of heavy engine parts. In the picture the jet units appear as blurs whirling above the pilot's head. This experimental machine has flown 50 miles an hour. It weighs only 310 pounds and can lift another 500. It is intended for short-range observation, communication, artillery spotting, and courier service.

every nation, and make international ports of call out of such inland cities as Chicago and Kansas City; Asunción, Paraguay; and Madrid, Baghdad, and Fairbanks.

This network makes possible such trips as that taken recently by your Society's President, Dr. Gilbert Grosvenor, when in five weeks he flew to Norway to welcome a new grandchild; to Istanbul, Turkey, to revisit scenes of his early boyhood; and back to New York, circling Mont Blanc on the way, in time to attend his fiftieth Amherst College class reunion, with plenty of stopover time en route.

Returning, he flew from Shannon, Eire, to Gander, Newfoundland, in 6 hours 50 minutes, averaging 356 miles per hour at 18,000 feet, a good example of the speed of travel in this Air Age.

This global airline network is serving in very practical ways to bring about everyday down-to-earth "international understanding." A plane today on a one-way flight may operate over as many as 15 countries.

One of the great hindrances to international air travel is red tape.

Through the International Civil Aviation Organization and International Air Transport Association efforts are being made to cut red tape. They are trying to bring about the use of certain standard languages in air communications, adoption of standard systems of weights and measures, uniform procedures in handling passengers, mail, and cargo, standard regula-

Bell Aircraft

Dusting Maine Blueberries, a Helicopter Flies Only a Few Feet above the Crop

Chemicals to protect the berries from blight and insects have been spread over as many as 90 acres in an hour in this way. Dust is fed from hoppers into the downwash of air from the rotor blades, which carries it onto the plants. The helicopter flies from five to 10 feet above the ground at 20 to 30 miles per hour.

tions governing customs, immigration, and transmission of diseases by air. Even passenger tickets, baggage-checking systems, and cargo waybills are being standardized for the entire world to make air travel as simple, safe, and convenient as possible.

"We're trying to fix it," one air transport man explained, "so that, for example, a Venezuelan pilot, flying a British-made aircraft into a Chinese airport, landing in bad weather with the aid of an American-designed instrument landing system, supervised by a Czechoslovakian traffic controller, can make it without misunderstandings or confusion! Such a case today would not be an exaggeration."

For general usefulness and versatility, no aircraft can vie with the comparatively slow, ungainly helicopter. Only about 10 years ago the helicopter was just being developed. Today it does almost everything that a man could do if he had wings of his own, and perhaps it comes nearer than any other type of aircraft to realizing the dream of flight that first inspired men to develop the airplane.

Helicopter, Jack-of-All-Trades

In Argentina, helicopters have flown into the midst of swarms of locusts to spread insecticides that effectively halted the insects' depredations. They have set down forest fire fighters on strategic mountaintops, supplied them with food, water and tools, and carried out trapped and injured men.

They have sprayed orchards in Sweden, dusted potatoes in Aroostook County, Maine, and spread DDT on Buffalo, New York,

Consolidated Vultee

Giant Multiple Landing Gear of the B-36 Superbomber Dwarfs the Men Who Fly It

Eight such wheels, nearly five feet high, support the main section of the U. S. Air Force plane, which weighs 65 tons empty. With its tonnage thus distributed, it can utilize fields where runways might otherwise be unable to bear its weight. Wing span is 230 feet. It is propelled by six 3,000-horsepower engines (page 260).

dumps to kill flies suspected of spreading polio. They have saved cherry orchards in California, wetted by an off-season rain, from heavy loss by flying slowly three feet above the treetops. The downdraft of the spinning blades blew the moisture off the fruit, which would have been injured if the sun had warmed it while still wet.

They have laid pipe lines in places difficult to reach by land for the Army Engineers, served as lofty vantage points for Connecticut State Police officers to unsnarl traffic jams not visible in their entirety from the ground, and carried movie cameramen aloft to take thrilling action shots.

For the Air Force, Army, and Navy they carry messages where radio cannot be used, landing easily on a battleship or cruiser, and perform reconnaissance and rescue work impossible for faster aircraft, since a helicopter can land in any small space, even on water, can hover a few feet off the ground, and can fly slowly enough for careful observation of ground objects (page 251).

Personal airplanes and private flying have a great future, Government aviation experts believe, despite the fact that the production of private planes recently has decreased considerably since the period immediately after the war.

One problem is that, as shown by a recent Government survey, the largest part of private flying is done by young people, who usually are least able to afford to own and operate an airplane.

More miles are flown yearly in the United States by private aircraft than by those operating on the commercial airlines. Flying schools now are operating in all the 48 States, Hawaii, and Alaska, though many of these depend chiefly on veterans learning to fly under the GI bill of rights.

"Flying Farmers"

Farmers and ranchers use planes to check the extent of soil erosion on their land, since the beginnings of gullies and other signs of trouble can be spotted readily from the air. They use planes also to check fences, condition of the range for grazing, and to locate cattle, sheep, and lost lambs. They have flown an average of 247.2 hours a year, an unusually large use of personal planes. Several active "Flying Farmers" organizations exist.

Two Piper Cub light planes, equipped with extra gasoline tanks, radios, blind-flying instruments, and gyrocompasses, last fall flew around the world. Several members of Congress who are light-plane pilots have their own flying organization.

In Brazil I met a Presbyterian missionary who has a small plane, equipped with a stretcher, which he uses to visit scattered congregations and to transport the sick from remote interior villages to hospitals. Catholic priests of the Oblate Order have learned to fly so that they can use planes in their mission work in Canada.

Never before in all his experience has man had to deal with conditions like those encountered both by airplanes and by the human body itself in the process of flying at the terrific speeds and dizzy altitudes that today's aircraft already have attained or soon will reach.

When the Navy's experimental plane, the Skystreak, flew at 650 miles per hour, air friction heated the cockpit to a temperature of 170 degrees F. A refrigerating system had to be installed which reduced the temperature to 105, more nearly bearable for the pilot.

Ever-present, too, all through the atmosphere, invisible but menacing, is the pounding, smashing, turbulent force that engulfs an aircraft when it nears the speed of sound. Air molecules, pushed ahead of an airplane wing like the bow wave of a ship, cannot get out of the way fast enough when the speed of sound is approached. The smooth flow of the air back over the airplane wing is disturbed. Eddies are formed that batter and tear at the aircraft structure, and can damage the surface or even throw the plane out of control.

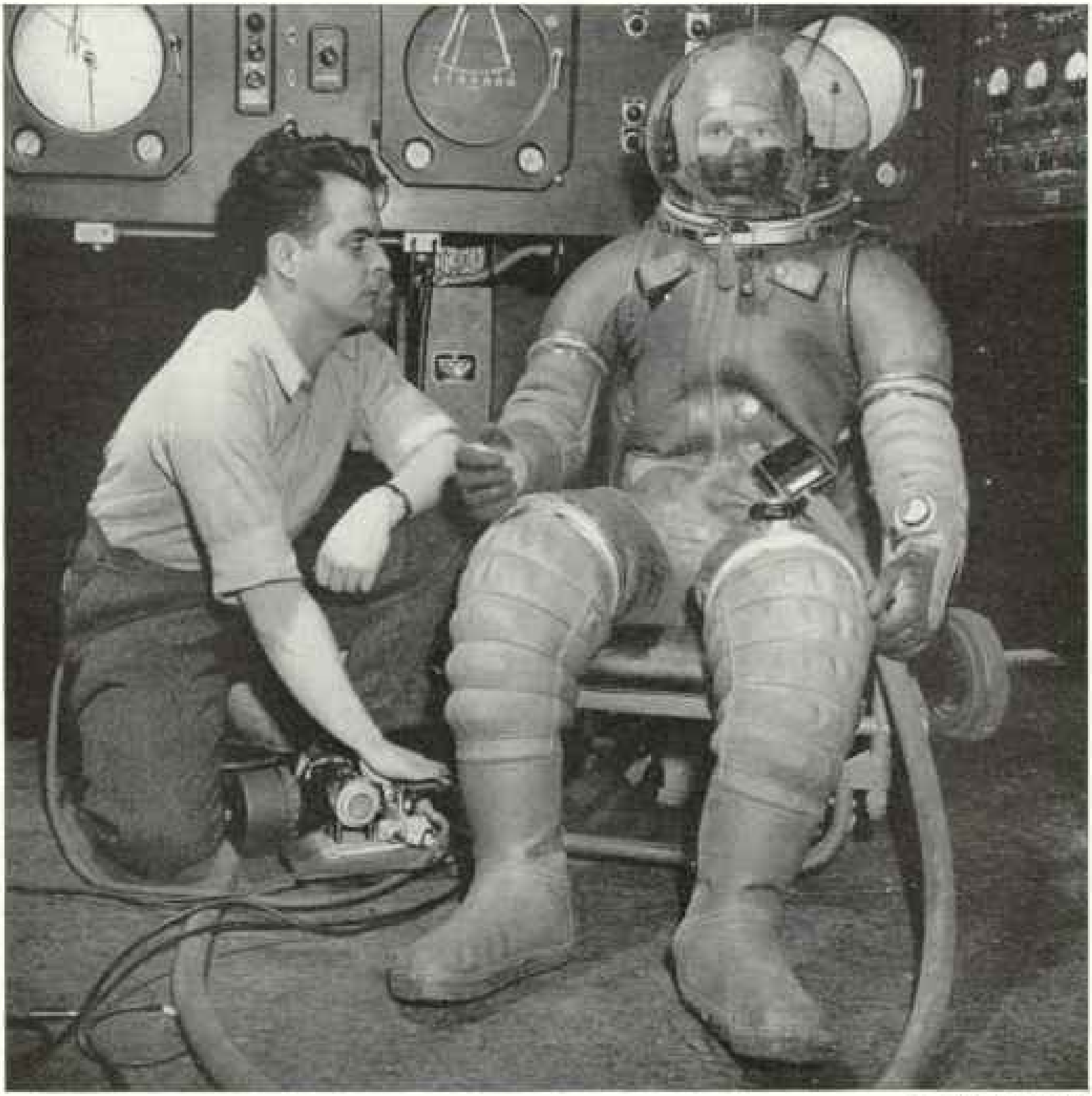
To overcome this danger, wings of fast fighter planes today are almost as thin and sharp as knife blades, enabling the plane to slice through the air with a minimum of disturbance.

Already planes have flown very close to the speed of sound. This speed varies with temperature, 760 miles per hour in the warm air near sea level but only 660 in the colder air at 35,000 feet. Strangely enough, once a plane is flying well beyond the speed of sound, the turbulence of the air flow disappears and the buffeting forces cease.

Strange Perils of the Upper Air

Airplanes can be built to withstand and overcome the strange conditions met aloft, but the human body is not designed to cope with them. Hence the new science of aviation medicine has developed ways of extending the body's capacity by artificial means.

Send an unprotected man above 10,000 feet and he is breathing air so thin that it does not contain enough oxygen to enable him to function normally. His mind will be affected by the lack of oxygen, spoiling his



U. S. Air Force, Official

Sealed in a "Pressurized" Suit, a Pilot Can Fly in a Near-vacuum Far Aloft

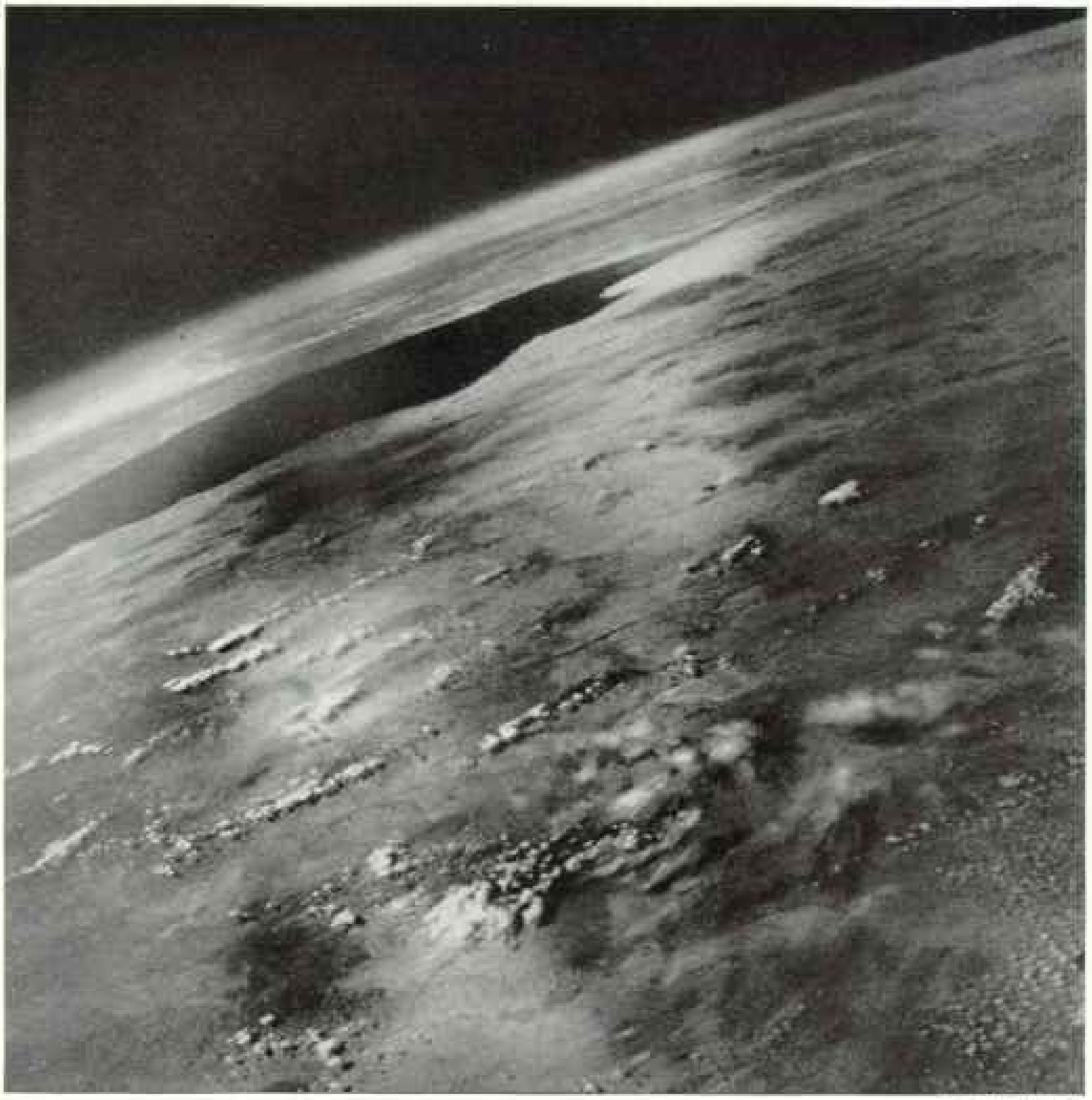
This rubber garment, with transparent "helmet," is an experimental model used in development of a less cumbersome, later-type suit that will enable Air Force pilots to fly safely to altitudes where normally the air is too thin and atmospheric pressure too low to support life. The man in the suit wears an oxygen mask as an extra precaution, but normally breathes air pumped into the suit and kept at a pressure equivalent to that a few thousand feet above sea level (page 269).

judgment. If by some chance he should reach an altitude of 63,000 feet without freezing in the 75 to 90 below zero cold, his blood will boil as a result of the decreased atmospheric pressure.

If his plane goes out of control and he tries to bail out while flying at high speed, he may find himself pushed back into the cockpit by the tremendous force of the air stream. If he opens his mouth the air pressure ramming down his throat may rupture his lungs and kill him. The air stream may even tear the flesh from his face, break his arms, and, if he does get clear, flatten him against the tail of his plane.

Even if he does somehow escape, the shock of the opening of his parachute may disable him, and in any event he probably will die from lack of oxygen and cold before he gets down to lower altitudes where the air is dense enough to support life.

But the U. S. Air Force and Navy have found ways to avoid these horrors. Pilots of fast fighter planes today are being trained to use the "ejection seat," so arranged that when a pilot needs to bail out he explodes a



U. S. Navy, Official

Earth's Curve and Gulf of California Show in a Picture Taken 100 Miles Aloft

Snapped by an automatic camera on a V-2 rocket fired at White Sands Proving Ground, the photograph includes 200,000 square miles of the United States and Mexico, an area the size of France. Dark patch is the Gulf of California, with the peninsula of Baja California and the Pacific Ocean beyond. Curvature of the earth is apparent on the distant horizon, rimmed with white clouds. Groups of small white clouds in the foreground cast black shadows on the ground below.

cartridge which literally blows his seat, with him strapped to it, clear of the plane.

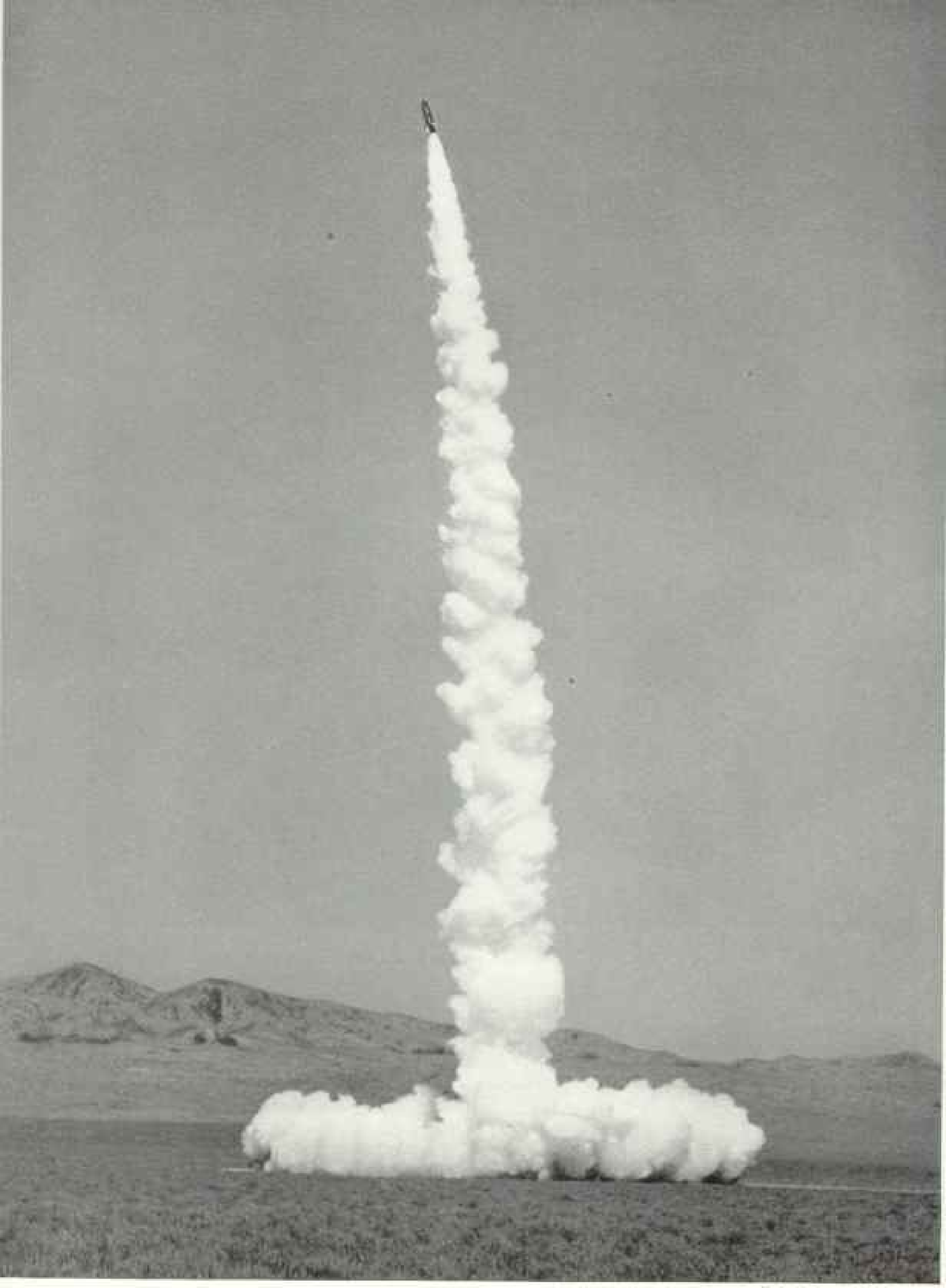
"Bailing Out" Inside a Capsule

Before he does this he pulls down a visor, like that on a knight's helmet, to protect his face from the air stream. Still in the seat, he falls free to a safe altitude, at which an automatic device worked by atmospheric pressure opens his parachute. Meanwhile, he breathes through a mask equipped with enough oxygen to last him during the fall.

As further protection, pilots can be equipped with a special suit, "pressurized" to protect them from the effects of low atmospheric pressure (page 268).

The next step, says Maj. Gen. Malcolm C. Grow, the Air Surgeon, will be to place the pilot inside a transparent capsule, air-conditioned, pressurized, and supplied with oxygen. When he needs to bail out, the whole capsule, with him inside, will be blown clear of the plane.

He will fall, inside his capsule, down to an altitude where his parachute can open without too much of a jerk. His capsule will be water-



U. S. Air Force, Official

Rocket-powered Missiles Like This May Be Fired at Hostile Planes Effectively

Trailing smoke, a test model of the Air Force's GAPA (Ground-to-Air Pilotless Aircraft) zooms aloft at supersonic speed. Development of various types of guided missiles is under way (page 272).

proof, in case he should land in the ocean, and will be supplied with emergency rations, water, and perhaps a life raft.

Studies are being made of the possible effects of cosmic rays, powerful ultraviolet rays from the sun, and meteors not dangerous in the lower atmosphere but which may be a real hazard in very high altitude flight, where the air overhead is too thin to serve as a protective screen. Your Society, with the Bartol Research Foundation of the Franklin Institute, is working with the Air Force on a study of cosmic-ray effects.

The Navy, like the Air Force, has jet-propelled fighters, has fired at least one V-2 rocket from a carrier deck, and is preparing for the use of long-range rockets and guided missiles, fired from ships.

Bombers Can Refuel in Air

On long bombing missions, planes may be refueled in the air. After flying almost to the limit of their fuel capacity to attack a distant target, bombers might rendezvous with tanker planes to take on fuel for the journey home, though this would not be practical for huge formations such as the 1,000-plane fleets that hit some German cities.

New bombsights for pilotless aircraft that may operate by automatically taking bearings on certain stars as a guide to the accurate dropping of bombs are being considered by designers.

New machine guns with far greater speed of fire have been developed for the new jet fighter planes. A pilot of such a plane making a head-on attack at 600 miles an hour against a bomber traveling at similar speed would have only two seconds to fire after coming within range before he would have to turn aside to avoid colliding with his target!

Guns also are recessed almost wholly within the aircraft's "skin," for if they protrude they cause so much drag that the plane is slowed down beyond the point of usefulness.

Radar already is being used to figure range and automatically keep guns pointed at the target. The next steps may be to develop bullets or other projectiles that ride some kind of beam to the target or that perhaps contain within themselves a device that guides them to it.

Today's fast military aircraft are driven by rocket or jet-propulsion engines, which move forward by reacting against the thrust of a jet of hot gases streaming rearward from a nozzle. Both rocket and jet engines get their power from the burning of a mixture of oxygen and some form of fuel such as oil or alcohol.

Jet engines carry their own fuel, but get oxygen by scooping in air as they go, which is compressed either by a turbine near the intake or by the forward speed of the engine itself.

Rockets carry both fuel and oxygen in tanks, and therefore are independent of the air around them and can operate at great heights where the air is too thin to supply enough oxygen for jets. They can even travel in outer space where there is no air at all.

Future Jet Planes May Burn Metals

Jet engines burn fuel at a terrific rate, and jet-powered aircraft flying at the speed of sound have little room for fuel in their thin, knife-sharp wings and small fuselages. This limits their flying range; so jet-powered fighters of the future may burn, not gasoline or fuel oil, but metals such as boron or aluminum in powdered or liquid form that provide far higher energy than oil for the same volume. Some planes may eventually use atomic power, which has 50 million times more energy than gasoline!

All American jet-powered aircraft today use the turbojet engine, in which the blast of hot gases within the engine turns a turbine wheel that operates an air compressor at the air intake in front. Blades on the turbines must stand temperatures so great that they melt ordinary metals; so new materials composed of metals and ceramics bonded together are being developed.*

Another type of jet engine is the ramjet, which has no air compressor. When it gets up to 400 miles an hour its speed alone "rams" air into its forward end hard enough to compress it for burning with the fuel. Since ramjets won't work at less than 400 miles per hour, they will be used on planes or guided missiles that employ some other kind of power to get them up to the speed at which the ramjet begins to function.

Guided Missiles, Weapons of Future

Guided missiles and rockets, operating without crews by remote control and launched from one continent against another, still are far in the future, experts agree. One difficulty is that not even with the best maps available could a long-range missile be preset to hit accurately a spot several hundred or thousand miles away.

Meanwhile, however, scientists are pushing development of guided missiles (page 270).†

* See "Steel: Master of Them All," by Albert W. Atwood, NATIONAL GEOGRAPHIC MAGAZINE, April, 1947.

† See "Air Power for Peace," by General of the Army H. H. Arnold, NATIONAL GEOGRAPHIC MAGAZINE, February, 1946.

National Advisory Committee for Aeronautics

Soaring by Rocket Power, This Guided Missile Is Prophetic of a New Kind of Combat

Developed for experimental purposes, the 14-foot model is being launched by a "rocket booster," the tube-like device with fins attached to the tail. The booster accelerates the missile to 600 miles per hour in three and one-half seconds, then drops off, and an internal rocket engine takes over the propulsion. This missile is named Tiamat, after a warlike Assyrian-Babylonian goddess.

One type, powered by a rocket engine, already has been flown successfully. It is not a weapon but an experimental model for use in developing guided missiles in general. Significant, perhaps, of the frightful possibilities of a guided-missile war, it is named Tiamat, after an Assyrian-Babylonian goddess who waged war against Marduk, king of the gods.

"Basic scientific principles needed for the development of guided missiles are all known," an expert told me, but the practical difficulties in the way of producing useful guided missiles are tremendous.

Guided missiles being considered for development include types for use from the ground against planes or other missiles, from the ground against distant ground targets, from the air against ground targets, or from plane against plane.

Theoretically it is possible to build "satellite" aircraft which would circle the earth for reconnaissance of enemy territory or for use as weapons to be guided against a distant target; missiles that would plot their own courses by "tracking" on the stars, moon, or planets; missiles guided by following the lines of force of the invisible field of magnetism that surrounds the earth; missiles to ride radar beams to the target; missiles that would "home" on a target with devices sensitive to light or heat.

So fast is aviation progressing that it's hard to keep our imagination anchored to earth. One Yale professor already has stated that "interplanetary travel may well become possible in our lifetime." But, he goes on, we earth dwellers may not be the first to have accomplished it. He suggests it is quite possible that intelligent life exists on Mars, and that Martians even may have already visited the Earth undetected! If so, our Air Age is pretty far behind the times, after all!

Shawneetown Forsakes the Ohio

By William H. Nicholas

With Illustrations by Staff Photographer J. Baylor Roberts

"THERE you are," said my driver. "See where it says 'Shawneetown' on the water tank? Moving that big tank up the highway for more than three miles was some job. And they moved it standing straight up, too, just like it is there."

We were coming into the newest, and at the same time the oldest, town in Illinois—a proud river settlement which has stood up to the angry floodwaters of the Ohio River every year for nearly a century and a half, sometimes holding firm, sometimes yielding.

However, in January, 1937, the "Beautiful Ohio," in its most unbeautiful aspects, had conquered most of the stout-hearted river folk at last.

Shawneetown dug itself out of the muck left by the receding waters of its greatest flood and took stock. Most of the citizens decided to move bodily this community of nearly 2,000 persons to higher ground three miles back from the river.

Today about 1,600 people live in New Town, safe from threat of flood, while some 400 others cling to their riverside homes in the lee of the levee at Old Town. A narrow strip of land joins the two sites, so Shawneetown now embraces both areas within its town limits.

Rooted Deep in the River Bank

Shawneetown may be likened to a giant tree on the edge of the Ohio River, toppled but not killed in a storm. Old Town is the roots, representing the source of life, tradition, and historic heritage; New Town, the branches and leaves, representing growth and progress; the strip of land between, the trunk.

I wanted to see the roots first, the flood-wracked site of Old Town, and learn something of its history, its heritage, and the determination of its inhabitants.

As early as 1817 an English traveler took note of the settlement's exposed position. Wrote Morris Birkbeck in his *Notes on a Journey in America:*

"This place I account as a phenomenon evincing the pertinacious adhesion of the human animal to the spot where it has once fixed itself. As the lava of Mount Etna cannot dislodge this strange being from the cities which have been repeatedly ravaged by its eruptions, so the Ohio, with its annual overflowings, is unable to wash away the inhabitants of Shawneetown.

"Once a year for successive springs it has carried away the fences from their cleared lands, till at length they have surrendered and ceased to cultivate them.

"Once a year the inhabitants either make their escape to higher lands, or take refuge in their upper stories until the waters subside, when they recover their position on this desolate sandbank."

When Birkbeck visited Shawneetown it was 17 years old, settled by pioneers from Virginia who came down the Ohio River to establish a trading post with the Shawnee Indians.

More than a century before, French buffalo hunters coming from the north had discovered near by a group of salt wells, which later were to be a source of Shawneetown's early wealth. The French developed this salt business so that "the Royal subjects of His Majesty King Louis XIV might have a regular supply." But the Shawnees drove them out about 1735 and destroyed their fort and blockhouse, named "Equality."

The Virginia pioneers found the Indians busy evaporating salt near the ruins of Equality. The white men inspected their handmade evaporating pots, crude mixtures of clay and crushed shells (for lime) about four feet in diameter, and investigated the possibilities of salt manufacture on a large scale.

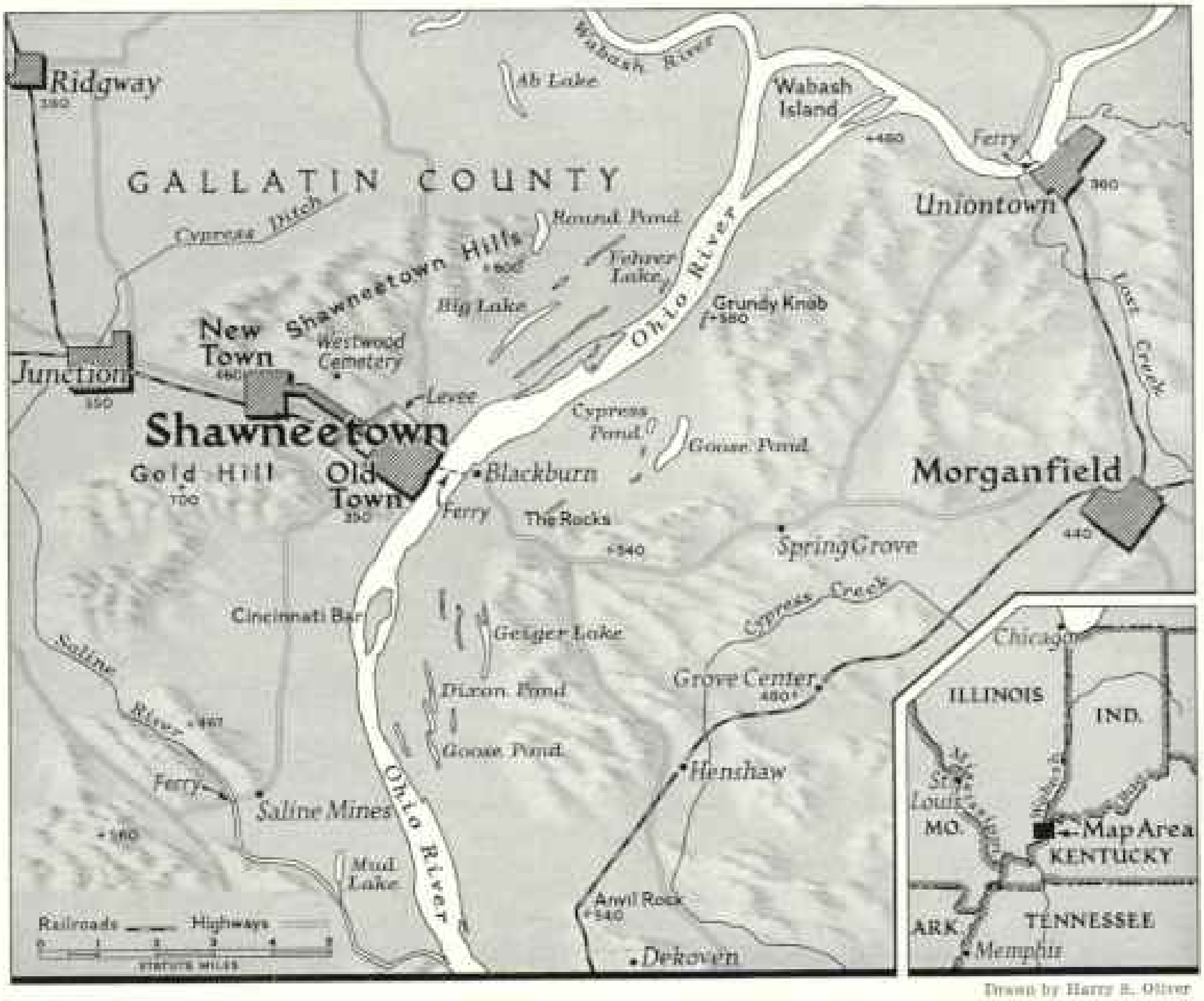
They bought out the Indians, who went away peacefully, and then interested Washington in the future of Shawneetown.

Government Plotted Shawneetown

In 1810 Federal Government surveyors laid out a city plan for the new settlement, providing for broad avenues, wharf and business areas, and tree-shaded residential streets. Shawneetown, like Washington, D. C., was officially plotted by the Federal Government. The wide streets and the fine old trees remain today, a tribute to the vision of those early city planners.

On old French maps the spot had been marked as Shawneetown because of the Shawnee village there. The name was retained so that flatboat men on the Ohio between Pittsburgh and New Orleans, familiar with these maps, would know where to find the new town.

Strangely, Shawneetown did not become the oldest city in Illinois until 1910. The State's first permanent settlement was Kaskaskia,



Drawn by Harry E. Oliver

New Shawneetown Feels Safe Three Miles Back from the Ohio

Although Cypress Ditch, beyond the city limits, may overflow and cut off the area by road from the rest of Illinois, New Town is not threatened with inundations, frequent fate of Old Town despite its levee.

founded by the Jesuit Gabriel Marest in April, 1703. When Illinois was admitted to the Union in 1818, Kaskaskia became its first State capital. But in 1881 the Mississippi River began to encroach on Kaskaskia, and by 1910 this historic town was at the bottom of the river. Shawneetown, second oldest city, thus became the oldest.

Shawneetown grew with the development of its salt industry.

The salt men floated big iron evaporating kettles of 45- to 90-gallon capacity down the Ohio from Pittsburgh to Shawneetown and moved them inland to the wells. Their coming was hard on the wild animals for miles around. Through the centuries these creatures of the forest had beaten paths to the salt licks.

The salt producers dug long trenches in the ground, placed the kettles over the trenches in long rows, put chimneys at one end of each trench, and kept huge fires blazing beneath the kettles. Slaves performed the tedious work of tending the evaporating fires.

John James Audubon, the famous naturalist, contributes an interesting footnote to the history of Shawneetown's salt wells in his description of vast flocks of passenger pigeons which he observed during his trip down the Ohio River in 1813.

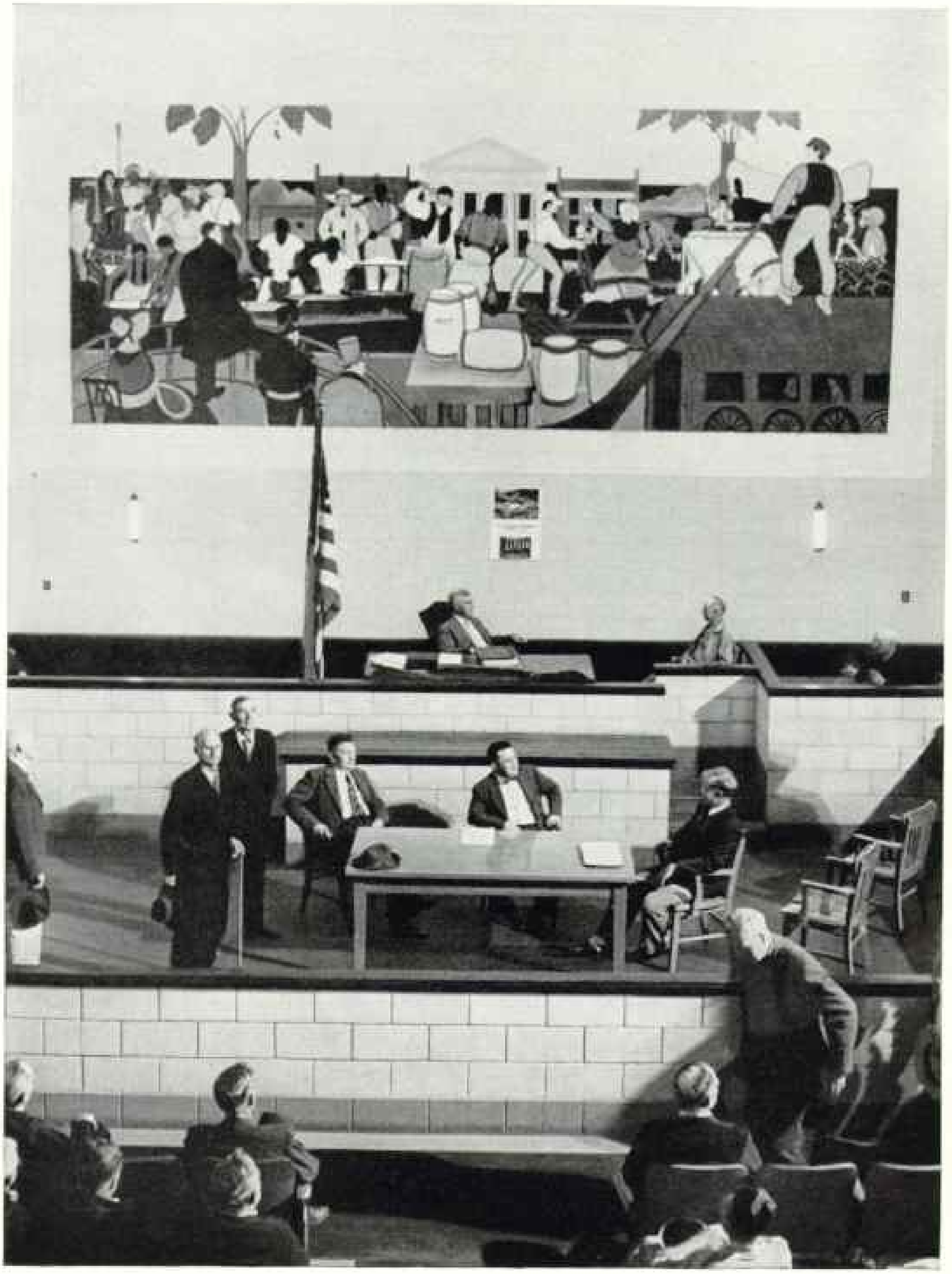
One Flock Exceeded a Billion Birds

Near Louisville, Audubon had seen a flock of these birds which numbered more than one billion. Of his next experience he wrote:

"I have seen the Negroes at the United States' Salines or Saltworks of Shawneetown wearied with killing pigeons, as they alighted to drink the water issuing from the leading pipes for weeks at a time. . . ."

Yet a century later, the passenger pigeon, victim of man's ruthlessness, was extinct. The last known passenger pigeon died in 1914 in the Cincinnati Zoo.

When Illinois was admitted to the Union in 1818 as a free State, an article in its constitution specifically excepted the area



Lawyers Try a Case Beneath a Historic Mural in Gallatin County Courthouse

The old-time river scene above the judge and witness shows salt barrels going aboard a flatboat. Evaporating kettles bubble at left in the painting (page 274). This picture was made from the courtroom balcony (foreground). Counsel sits at table in center; a bailiff occupies the jury box (upper right).

Harris Studio

Shawneetown's Bank Kept Doors Open for the Skiff Trade Throughout the Flood

Business was conducted on the second floor from January 26 to March 17, 1937 (page 287). Not until St. Patrick's Day was the high first floor free of water. Sixteen people made the upper story their home during the inundation. This photograph was made in February. High-water mark is visible on pillars.

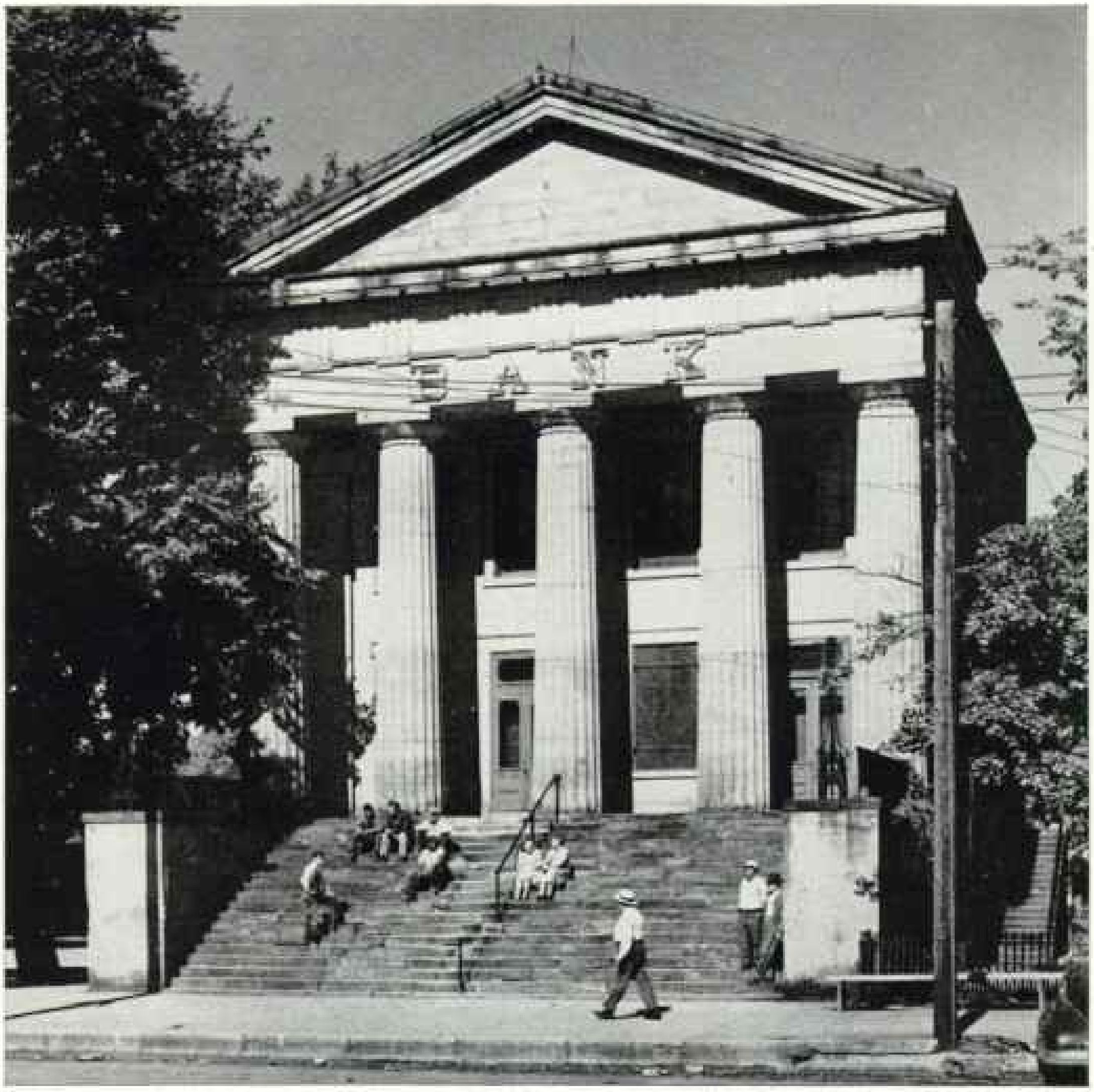
around the United States Salines and permitted the use of slaves there until 1825.

As the timber near the wells gradually disappeared in the flames, the salt producers discovered that it was cheaper to move the kettles back into the forests than to transport the fuel over long distances to the wells. Ingeniously, they set up a primitive pipe line.

Pipe Line for Brine

They felled trees 10 to 16 inches in diameter, and 12 to 20 feet long. Then they bored two-inch augur holes through the logs. The opening at the butt end of each log was reamed out, and the small end was tapered. The tapered end of one log was forced into the reamed end of another. Iron bands kept the butt ends from splitting. In this manner the brine from the wells was piped out over hills and small streams to the kettles three to four miles in the forest.

When the salt industry was in full swing production exceeded 120,000 bushels a year. Hundreds of men were employed—loggers, wood-haulers, evaporating pan hands, coopers, inspectors, storekeepers, rivermen. The barrels of salt were hauled to Shawneetown and shipped there by riverboat to Pittsburgh and New Orleans, from where they were distributed throughout the East and the South.



High and Dry Stands Old Town's Greek-temple Bank in Peaceful Midsummer

Architects admire the lines of the imposing building, which is now unused and belongs to the State of Illinois. The Doric sandstone columns were floated down the Ohio River from Pittsburgh on flatboats. The sun has not yet obliterated the high-water marks made on the columns eleven years ago (opposite page).

A mural in the courtroom of the Gallatin County courthouse gave me a good impression of the bustle at the Shawneetown wharves of a century ago, with hundreds of barrels of salt going aboard a line of flatboats (page 275).

I drove out to one of the old salt wells with Finch Stubbs, a young historical enthusiast of Shawneetown, and it was fortunate that he went with me (page 283).

Today the spring has been reclaimed by the wilderness. Off a small side road, it still bubbles concentrated brine as of yore in its casing of old cypress timbers. It still leaves a salty deposit along the edge of its tiny outlet as it trickles in the direction of the Saline River. Its pungent, sulphurous odor is noticeable 50 yards off. But it was difficult for me to believe that once this well was the center of a thriving industry.

An important event for Shawneetown occurred in December, 1810, when Illinois Territory granted a ferryboat license to Alexander Wilson. This made the town a focal point for immigrants from Kentucky and Virginia.

Flood Checks Real Estate Boom

Adding to Shawneetown's importance, Congress in 1812 established there the second land office in Illinois Territory. Before it wound up its business it had disposed of more than

Harris Studio

A Grain Elevator Moves Lumberingly up the Road to Higher Ground

This big structure and the city water tower provided the toughest problems in the mass migration of buildings from Old Town to a new site three miles away. A total of 237 private residences were moved, all while being occupied.

Shawneetown's Levee Cuts Off a River View from Illinois' First Bank

Built in 1811, it was the first brick building in the town, and the third to be erected in Illinois. The vault was a well, covered by a trap door upon which a guard slept at night.

2,600,000 acres to former soldiers and other homesteaders who moved into the West.

Shawneetown experienced a real-estate boom. The cafefully laid out town lots were sold at high prices.

Then, in October, 1814, the Ohio River went on a rampage, and water 20 feet deep covered the building lots when the river reached a crest of 55 feet. Frantic purchasers petitioned Congress to get their money back, but their pleas went unheeded.

John Marshall, a young Vincennes, Indiana, merchant, heard of the boom, loaded up a flatboat with merchandise, and came down the Ohio to sell it. He was intrigued by the prospects of the new settlement and decided to stay.

In 1811 he built the Marshall House, a two-story brick building facing the Ohio (above). It was Shawneetown's first brick building, and the third brick house in Illinois.

Two years later Marshall opened a private bank in his home. Then, in 1816, he became president of The Bank of Illinois, first banking institution chartered in Illinois Territory. Every night the money was lowered into a deep well, a trapdoor over it was closed, and a guard slept on the trapdoor.

Loan to Chicago Refused—"No Future"

Deep-rooted tradition tells that in the old Marshall Building Shawneetown's early bankers made a momentous decision. In 1827 a firm which was developing the new city of Chicago, Illinois, ran into financial difficulties.

A couple of their representatives rode horseback down to Shawneetown, about 300 miles to the south, to negotiate a loan of $1,000 to complete the job.

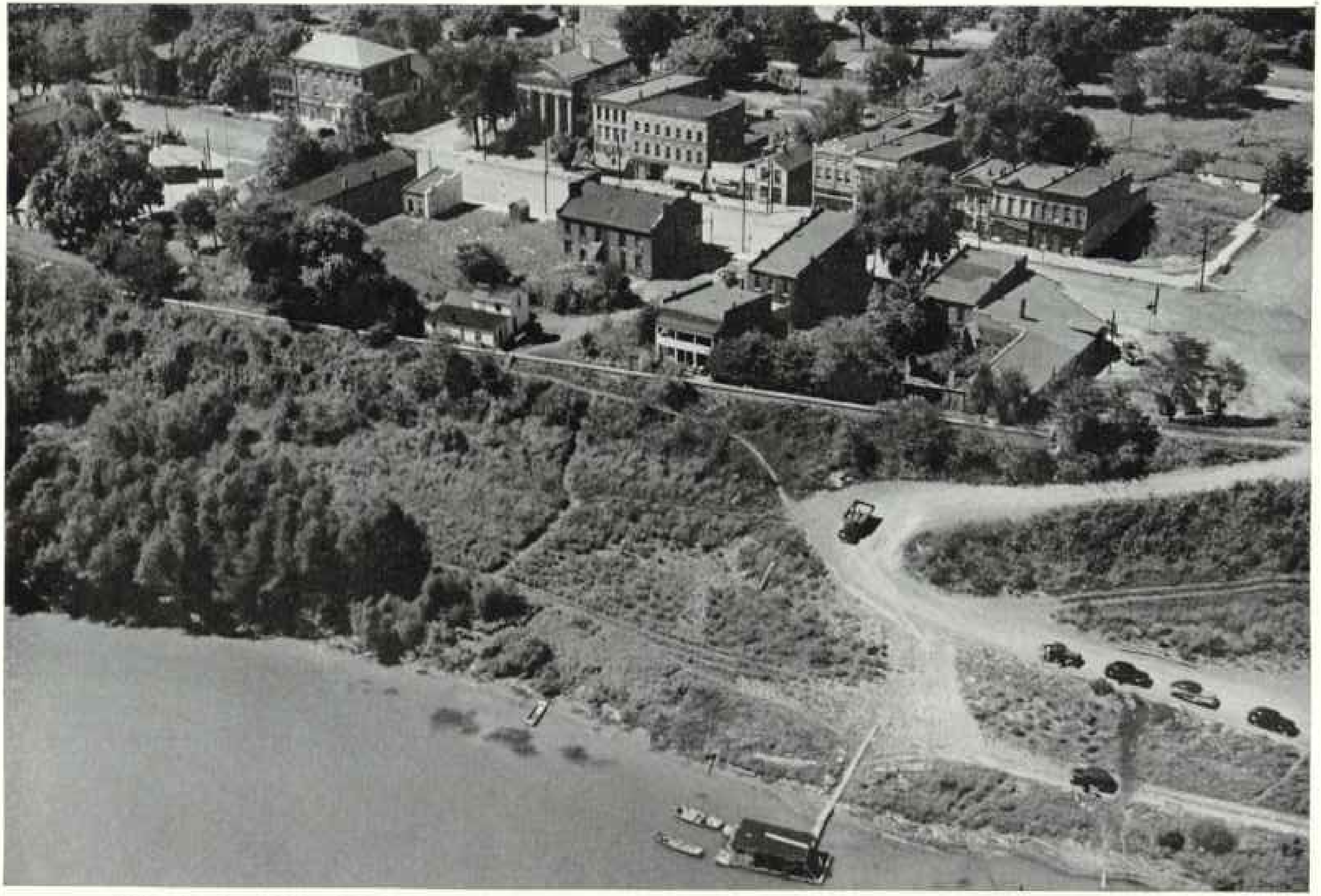
The Shawneetown bankers obtained an independent report on Chicago and its prospects and turned down the loan, the story goes, on the ground that Chicago was too far from Shawneetown ever to amount to anything.

The publisher of Shawneetown's first newspaper, the third in the State, arrived in the boom town by accident. One pleasant day

AP from Press Ass'n

Seven Weeks after the High Water of January 26, 1937, Shawneetown Remained Inundated and Isolated

Here, on March 17, the river has receded enough to reveal the top of the levee, coated with snow. Streets and lower floors of houses within the town still are flooded. While the Ohio remains high the water cannot drain away. At its peak the flood topped the levee by four and a half feet. Clump of trees, center, marks the Gallatin County Fair Grounds. Flooded Cypress Ditch, background, completes the encirclement of the town by water.

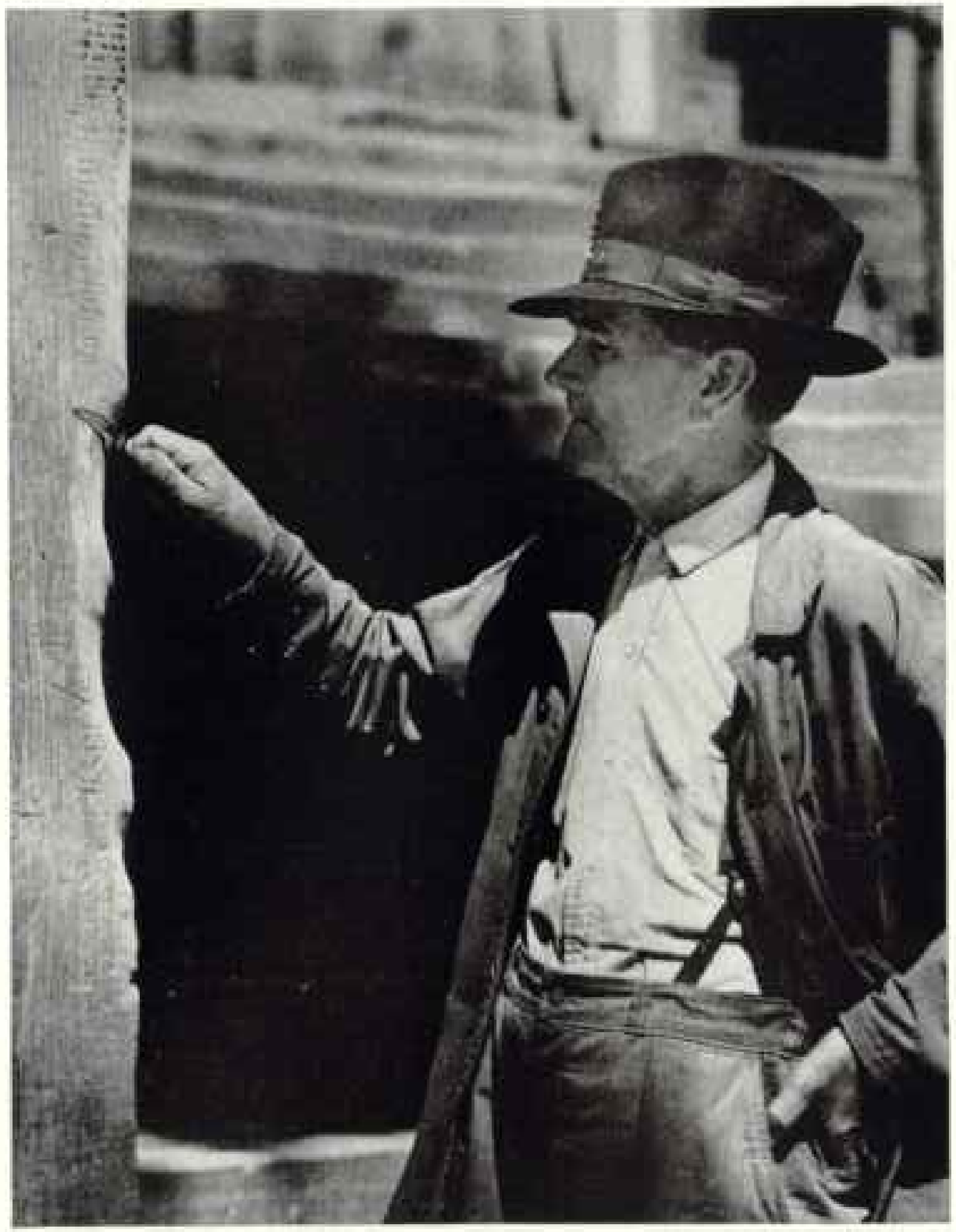


When the "Beautiful Ohio" Is Peaceful, Old Shawneetown's Main Street Seems Secure Behind Its High Levee

Safe from Ohio Floodwaters, New Shawneetown Stands on Elevated Ground Three Miles Back from the River (in Distance)

Encircled by Wilderness, Old Salt Spring Still Bubbles Brine

The historical marker directs visitors to the source of Shawneetown's early wealth (page 274). The Indians, then French traders, and later the frontiersmen evaporated the salt in kettles and finally built up production to more than 120,000 bushels a year. When cheaper sources of salt were discovered the spring was abandoned.



Knife Sharpeners Have Worn Down This Sandstone Block

The nine-foot "whetstone" for generations of residents is part of the solid front of Old Town's bank (page 277). The absorbed citizen is A. B. Thomas, who remembers every Shawneetown flood since 1884. About 400 people still prefer to live in their homes here rather than move to New Town, on higher ground.

in 1818 Henry Eddy was floating down the Ohio River on his way to St. Louis. With him he had equipment for a printing plant, for he expected to establish a newspaper in the Missouri city. His boat stuck on a sandbar opposite Shawneetown, and residents put out to offer help and talk with the stranger.

When the townsfolk learned Eddy's intentions, they talked him into landing at Shawneetown and staying there. He founded the *Illinois Emigrant* soon thereafter and later became one of the State's eminent lawyers and jurists.

Mrs. George Wiederhold, a descendant of both John Marshall and Henry Eddy, lives in Old Town today, finding in tradition and association the anchors to the scenes of her childhood which floods cannot tear away. She has done much to preserve the town's historic lore. Her home is a delightfully furnished second-floor apartment in an old building, from which she oversees the operations of her farms. Well able to live anywhere in the United States she chooses, Mrs. Wiederhold prefers her home by the river.

Town's Number One Hero Never Lived There

Although many famous generals and statesmen lived in Shawneetown at one time or another, including Maj. Gens. John A. Logan, John A. McClernand, and James Harrison Wilson, of Civil War fame, the town's Number One hero never lived there at all.

He is Maj. Gen. Thomas Posey, one of George Washington's trusted lieutenants and a hero of the Battle of Stony Point during the Revolutionary War. After three years as territorial governor of Indiana he became agent for Indian affairs for Illinois Territory.

In 1818 the General came to Shawneetown to visit his sons, who lived there. He was entertained at an old home on a knoll outside the town. While there he was stricken and died. He was buried in the garden outside the home, and this garden later became the town cemetery, Westwood.

General Posey's sons built the Posey building, which still stands in Old Town. Here Robert G. Ingersoll had his offices when, at one stage of his career, he lived and practiced law in Shawneetown.

In my wanderings around Old Town I called upon Mr. and Mrs. Louis W. Goetzman, who have lived in Shawneetown since their childhood (page 286). Mr. Goetzman came here in 1871 at the age of 11 from Uniontown, Kentucky; his wife arrived in 1875. Twice Mr. Goetzman has been the town's mayor.

They live on the second floor of a huge old brick house which fronts on the Ohio River. From their living-room windows they can look out over the levee and, except in summer when growth on the levee is lush, can see the steamboats ply up and down the Ohio.

"Why don't you move to New Town?" I asked Mr. Goetzman, and he began an elaborate explanation, giving many and sundry reasons. But they all boiled down to this—his love of the river, his love of the steamboats and their whistles, and his love of Old Town have kept him there. New Towns are all well and good for younger people, in his belief, but he and Mrs. Goetzman prefer to live in the old house which had been their home for 30 years, and in the community in which they were married 59 years ago.

I admired the beautiful old home in which they lived and the lovely Victorian furnishings.

"This house was built in 1860 by a father and stepson," he told me. "When the Civil War came, building stopped because all the carpenters and laborers went off to war. One of the contractors was a good shot, so they made him a sharpshooter. He served all through the war and came out at the end and went back to building. And he never applied for a pension. He ought to be remembered. His name was William Scanland."

The Goetzmans could have stayed in Shawneetown during the great flood of 1937, for their home was built high enough to be safe. The flood of 1884 covered the first floor with three feet of water; the 1937 inundation came to within two feet of the high ceiling.

But the Goetzmans obediently left when the mayor ordered everyone out. They stayed in near-by towns for five weeks, then they decided to come home. So, even before the waters had fully receded, they sailed into the front door in a skiff and settled down.

The Geography of a Flood

Nearly everywhere you go in Shawneetown you hear about the flood of 1937. But to understand how 1,636 townspeople got trapped in that terrible disaster, it is necessary to know something of the topography (pages 274 and 280).

Until 1875 there was no levee. In that year a levee was constructed around three sides of the town to an elevation slightly above the height reached by the flood of 1867. After a series of particularly destructive floods in 1880, 1882, 1883, and 1884, all of which flooded the town, the levee was enlarged and raised.

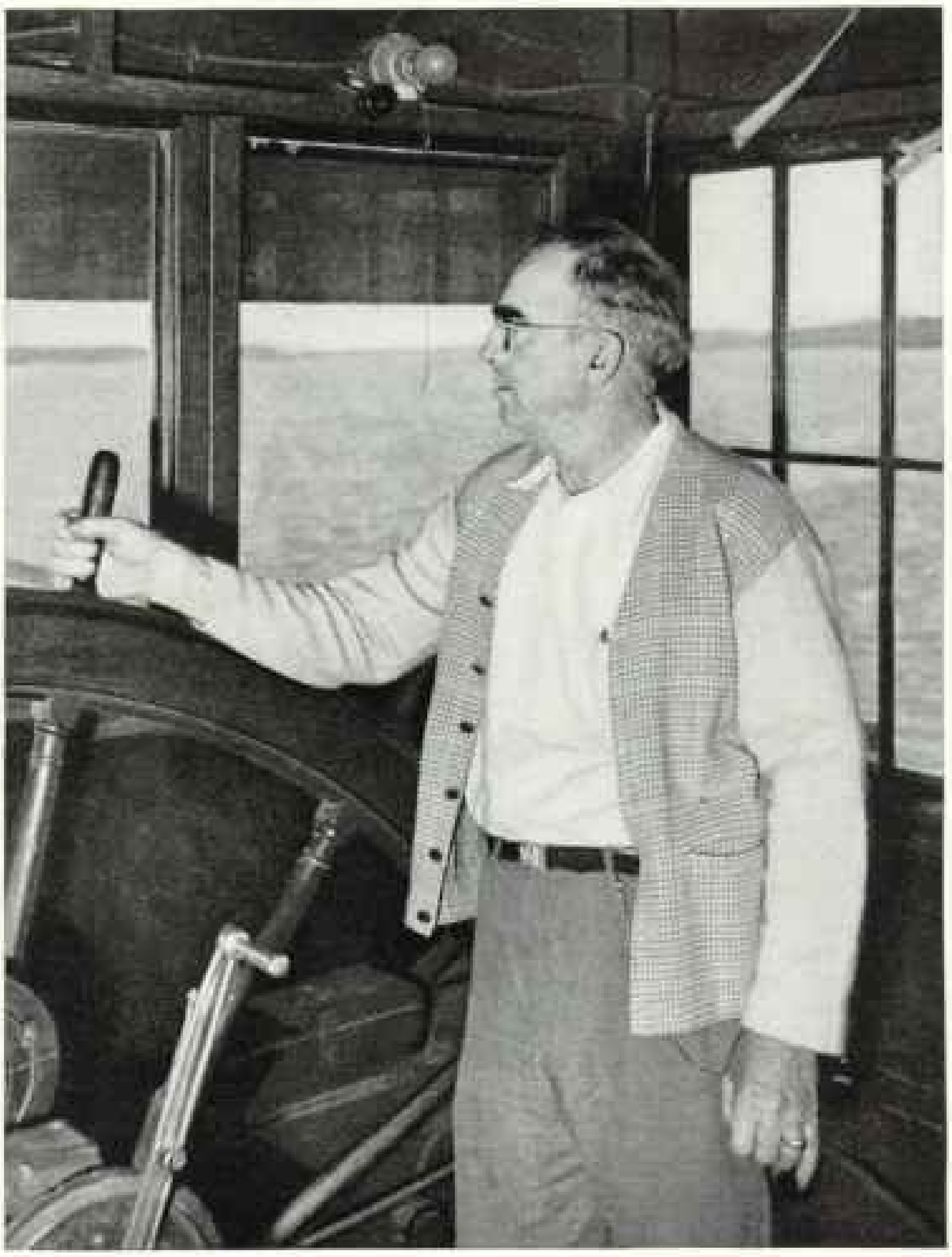
No further trouble was experienced until the high water of 1898, when one night the levee broke and a wall of water swept into the town, killing 26 people in as many minutes.

After being repaired, it successfully withstood all high water until the great flood of 1913. The flood that year exceeded all previous ones.

When it became apparent that the levee would be overtopped, the citizens of Shawneetown, in an effort to hold damage to a minimum, dynamited a portion of the levee on the south side of town and allowed the water to back into the town. It was well that they did, for the floodwaters overtopped the levee by two feet.

In 1933 another major rebuilding was carried out, and the levee was raised to a grade about two feet above the height attained by the 1913 flood, or 61 feet above low water (zero) on the Shawneetown gauge.

As I stood upon it and looked down at the placid Ohio, far below, it seemed almost impossible to me that those waters could ever rise to the top of the levee. Yet in 1937 the biggest of all Ohio floods did top it, and by about 4½ feet.



For 41 Years Guy Lambert Has Studied the Ohio's Moods

Thirty of them have been spent in operating the Shawneetown Ferry. Here he stands at the wheel of the *Margaret J*, which he piloted through half-submerged woodland while engaged in rescue work in the disastrous 1937 flood. He has become adept at dodging floating houses, barns, and uprooted trees.

About 10 miles upstream from Shawneetown the Wabash River empties into the Ohio. In the spring the Wabash often is in flood, and when this happens its waters break out of its banks and spill over into a usually dry drainage depression known as Cypress Ditch.

When the Wabash goes on a rampage Cypress Ditch gets completely out of hand, and its waters sweep over the lowlands back of Shawneetown, crossing the highway at the little hamlet of Junction, six miles to the west, so that Shawneetown itself is completely surrounded by water.

This rather common occurrence does not alarm the people of Shawneetown ordinarily. Sitting comfortably behind their levee, they are accustomed to being cut off from the rest of the State at such times. The residents of Junction take to boats, and when the water does not cover the Baltimore and Ohio Railroad tracks to a depth of more than two feet, the trains continue to pull slowly into Old Town with supplies.

In January, 1937, the Wabash overflowed, and Shawneetown was again cut off. Then, with the Wabash out of its banks, the Ohio began to rise at an alarming rate. Still the residents of the town were not too worried.

But on Thursday morning, January 21, when they got the river report from Cincinnati they suddenly awakened to the fact that they were trapped. They learned that the

Old Town Resident for 77 Years, Louis Goetzman Won't Forsake It Now

Both he and Mrs. Goetzman have lived in Shawneetown since childhood, and to them floodwaters of the Ohio are an old story. Twice he served as the town's mayor. Their pleasant Victorian home is on the second floor of a huge brick house built close to the water front in 1860, before the first levee was built. Even the flood of 1937 couldn't quite reach the high ceiling of its first floor (page 284).

crest at Cincinnati would be 73 feet (actually it was 80 feet on the 26th), and they knew that meant about 63 feet on the Shawneetown gauge. That was two feet higher than the levee! Actually, with the higher crest at Cincinnati, the water went about 4½ feet higher than the levee early in February.

A Race Against Rising Waters

The townspeople knew they had about three days of grace before the crest arrived, and that they must work fast. Fewer than one half were able to get out by boat.

Of the experiences of this group, those of Walter Cooper, the Baltimore and Ohio Railroad agent, and his wife are typical. They packed up their belongings and loaded them in a boxcar which, along with boxcars filled with house furnishings of other people, was pulled three miles up the railroad to a point near the new township high school, on high ground. The Coopers moved to the Riverside Hotel, fronting on the levee—a structure which no longer stands, but which was built in 1872 and at one time was among the finest hostelries along the Ohio River.

When the ferryboat was able to back up to the top of the 61-foot levee on Sunday, January 25, Cooper and his wife decided it was time to leave. So did many others.

Guy Lambert was at the helm of the ferryboat. His job was to cross the raging Ohio, cluttered with floating houses and trees and debris from farther upstream, and find some place to land on the other side (page 285).

Blackburn, Kentucky, the little river landing opposite, was under more than 50 feet of water. So Lambert headed across the river, ducked the sweeping debris, bucked the fierce current, and sailed for 2½ miles into the timberland over the tops of some trees and around other taller ones, until he came to high ground where he could effect a landing.

Tying up, he blew his whistle for several

Meeting Place for New Town's Bobby-soxers Is Helm's Drugstore

A few doors away the modern motion-picture theater shows "first-run" films. Soon to be completed on the Mail is the American Legion Community Building. Two new churches are under construction.

minutes. The residents of Morganfield, Kentucky, understood. In automobiles they followed the sound of the whistle and, on arrival, took off the passengers. Lambert headed back for another load.

Railroad lines from Kentucky into St. Louis were under water. The Coopers finally got back to the vicinity of Shawneetown by taking a boat across the turbulent Ohio to Evansville, catching the last train to Vincennes, and reentering Illinois by rail.

Nearly 800 persons, unable to get out of town by boat, had fled to the High School. The gymnasium, a separate building, was given over to storing their heavy goods, and they themselves were packed into the high school building like sardines when, on Sunday, the 25th, the water poured into the town. Junction was already thirty feet under water, and along the highway only the tops of the telegraph poles could be seen.

Relief forces—the Red Cross, Army Engineers, the State—went into action. Captain Lambert's ferry was converted into a hospital ship, and eventually he and others evacuated the people in the high school, many of whom were sick and injured. Before that date arrived, Lambert was busy taking people off housetops and other precarious perches. For the flood was not of a few days' duration. The high first floor of the bank was not clear of water until March 17.

Rowing into the First National Bank

Only 36 residents of Shawneetown remained in the town throughout the entire flood. Three of them were women. Another woman who braved the flood was Captain Lambert's wife. She remained on the ferry with him. Of those in Shawneetown, 16, including two women, held out on the high second floor of the bank. Twenty others stayed in the Fitzgibbons and Al Lowe residences, whose high second floors remained out of water.

Max H. Galt, cashier of the bank, and Carroll Goetzman, assistant cashier, didn't believe the flood waters could come up high enough on the first floor to enter the vault,

but they were wrong. At daybreak on Monday, January 26, they discovered that the water was more than four feet deep on the first floor (page 276).

So they obtained a skiff, sailed in the front door of the bank, and opened the vault door. The skiff wouldn't go into the vault, so they pushed a plank in and Galt climbed in on it. He slipped and went into the water up to his armpits.

"Get out of there," Goetzman advised. "You'll freeze to death."

"Might as well finish the job while I'm here," Galt replied, and, standing in the vault, he passed bank records out to Goetzman in the skiff. Meantime Goetzman told those above of Galt's predicament, and they started a roaring fire upstairs.

The job done, the two got out safely. Galt had eighteen one-dollar bills in his pocket, his own property, and they had been badly soaked. So he asked a companion to spread them out in front of the fire upstairs. Soon Galt and the bills both were dry, and the episode was closed. No bank funds were involved, for the money had been removed to the second floor several days before.

The story was told and retold and, as often happens, was elaborated upon by the different tellers. So, to this day, Galt chuckles when he recalls how it finally appeared in the newspapers.

"Max Galt," the newspaper accounts reported in effect, "cashier of the Shawneetown National Bank, dived into 30 feet of water to rescue $18,000 from the bank's vault!"

Fire Heightens Tragedy

Endless tales of suffering, heroism, humor, tragedy, are told of the 1937 flood in Shawneetown, which, of course, was only an episode in the terrible flood disasters of 1937 along the Ohio River. But a tragic aftermath in Shawneetown occurred several weeks later when the high school gymnasium burned down, with the possessions of scores of families who had frantically hauled them there.

While still encamped in the high school residents voted to move the town. It was inspiring to me to visit New Town and see what a determined community, with Federal and State aid, has accomplished.

Shawneetown wanted a fresh start. Even before the flood it had been worried about its future. In the 1850's railroads had passed it en route to the West, much to the jubilation of the river packet men. Then river commerce had steadily dwindled. Shipping of salt declined and finally stopped about 1875, following the discovery of cheaper sources of salt in Michigan. Before the Civil War Shawneetown had been displaced as chief financial and industrial center of Illinois.

When the big decision to move was made, Federal and State agencies combined to help the impoverished community.

When Pearl Harbor came most of the job had been completed, at a cost of about $1,500,000. On a 320-acre tract streets, sidewalks, sewers, and electricity had been installed; 237 Old Town houses left fairly intact by the '37 flood had been moved to New Town; and 127 new buildings had been erected. A new courthouse (Shawneetown is the county seat of Gallatin County) had been built (page 275).

A contest for the model for the new town plan was won by Mrs. Mary Long Whitmore, a landscape architect of Metropolis, Illinois. One of four professionals who competed with her was a professor under whom she had studied at the University of Illinois.

The business and residential section of New Town is on the north side of the highway. Its principal feature is the Mall, 250 feet wide, which bisects the entire section and is broken at a distance of 1,500 feet from the highway by the new courthouse (page 282). Most of the business houses parallel the highway, but there are also two business blocks fronting on the Mall. Beyond the courthouse are three churches, two still under construction, and off to one side the American Legion is erecting a community building.

To relieve the monotony of solid residential blocks, a wide boulevard, Posey Drive, enters the town at the western end of the highway, sweeps in a wide curve into the Mall near the courthouse, then curves back to the highway near the eastern end of the town.

In the industrial area, south of the highway, are the railroad tracks; a grain elevator for wheat, corn, soybeans, and oats; a dress factory; a sawmill; and a popcorn processing plant. Gallatin County is one of the biggest producers of popcorn in the United States.

Shawneetown is experiencing modest growth now. Since V-J Day about 15 new homes and several new business buildings have been erected. Others are being built.

New Town can be cut off from the rest of the State by floods, for the highway at Junction to the west still is subject to inundation from the Wabash River. But in such an emergency supplies can be transported over this low area by boat.

The main street of Old Town is 350 feet above sea level; the top of the levee, 367 feet.

Elevation of New Town at its lowest point is 390 feet, and at its highest, 460 feet. At that altitude New Town feels pretty safe.

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On November 11, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to the world altitude record of 72,395 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

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The Society cooperated with Dr. William Beebe in deep-sea explorations off Bermuda, during which a world record depth of 3,028 feet was attained.

The Society granted $25,000, and in addition $75,000 was given by individual members, to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California were thereby saved for the American people.

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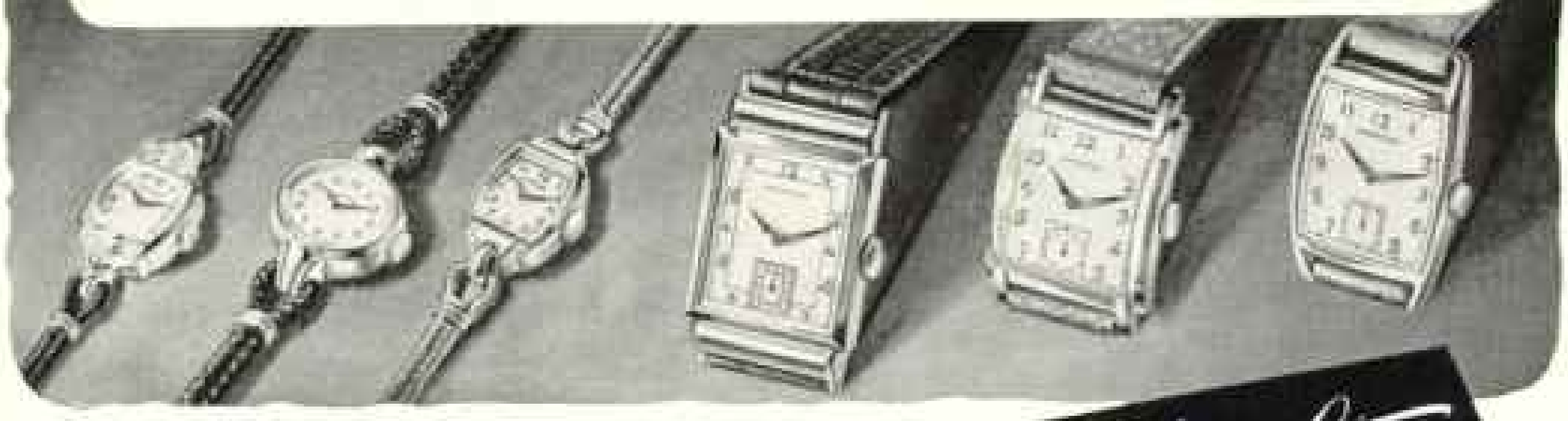

Left to right: A-6—17 jewels, 6 diamonds in 14K natural or white gold case. [Other diamond-set watches available in platinum]; LYNN—17 jewels, 14K natural or white gold case; OLGA—17 jewels, 14K natural or white gold-filled case and bracelet; RANSOM—19 jewels, 14K natural gold case, finest Medallion movement; PERRY—19 jewels, 14K natural gold-filled case; DENNIS—17 jewels, 10K natural gold-filled case. Ask your jeweler to show you all the other fine Hamilton Watches. Hamilton's experience making railroad watches assures greatest accuracy in every grade. Send for FREE folder and revealing booklet, "What Makes a Fine Watch Fine?" Hamilton Watch Company, Dept. C-1, Lancaster, Pa.

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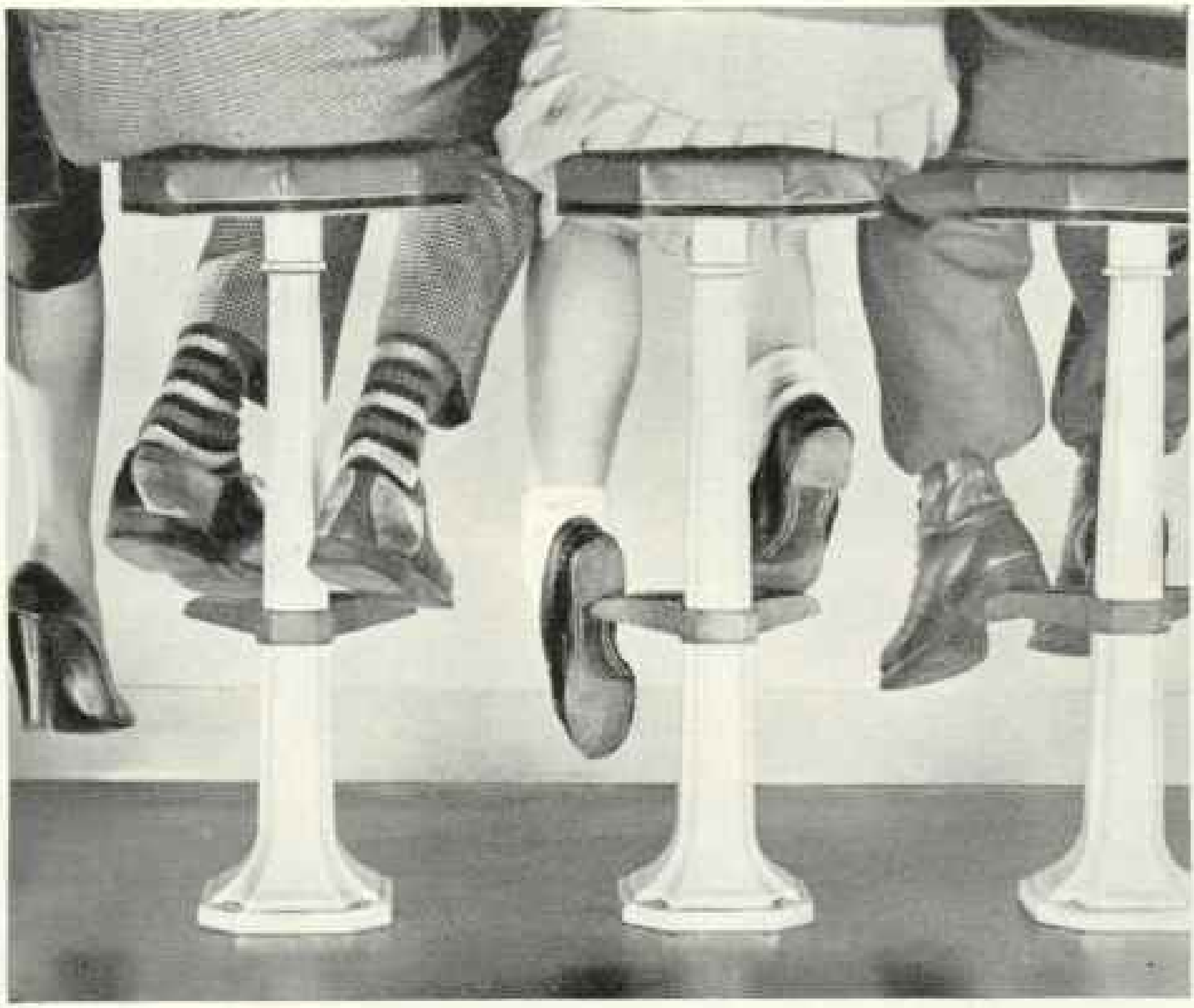

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Radio should make a prisoner of no man and it should make no man its slave. No one should be forced to listen and no one compelled to refrain from listening. Always and everywhere, it should be the prerogative of every listener to turn his receiver on or off, of his own free will.

The principle of *Freedom to Listen* should be established for all peoples without restriction or fear. This is as important as *Freedom of Speech* and *Freedom of the Press*.

Television is on the way and moving steadily forward. Television fires the imagination, and the day is foreseen when we shall look around the earth from city to city, and nation to nation, as easily as we now listen to global broadcasts. Therefore, *Freedom to Look* is as important as *Freedom to Listen*, for the combination of these will be the radio of the future.

The "Voice of Peace" must speak around this planet and be heard by all people everywhere, no matter what their race, or creed, or political philosophies.*

David Sarnoff

President and Chairman of the Board, Radio Corporation of America.

**Excerpts from an address before the U. S. National Commission for UNESCO.*

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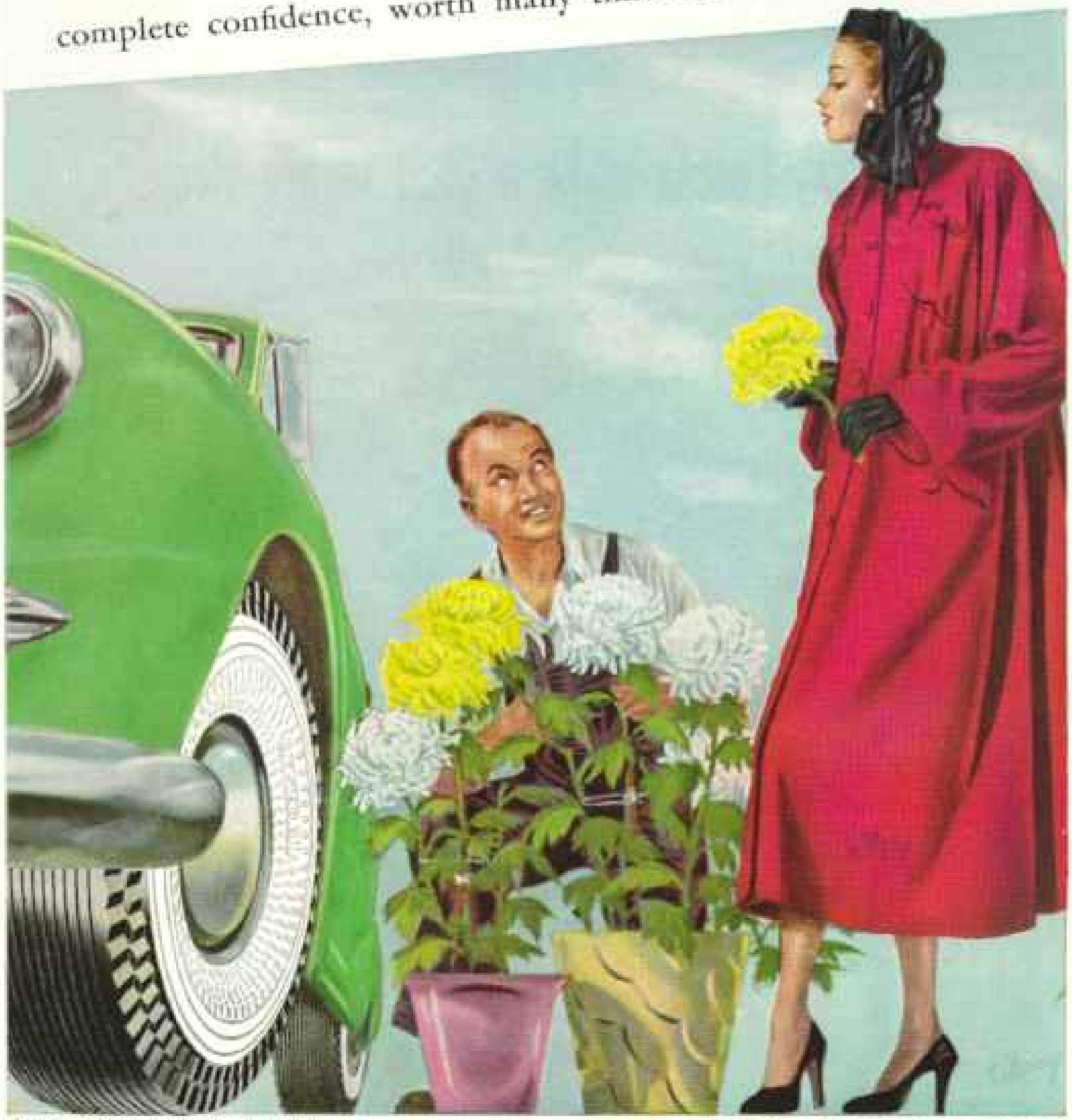

Ben Reig original designed by Omar Kiam

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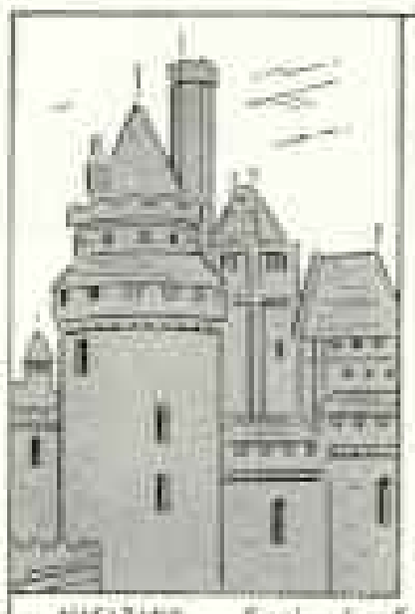

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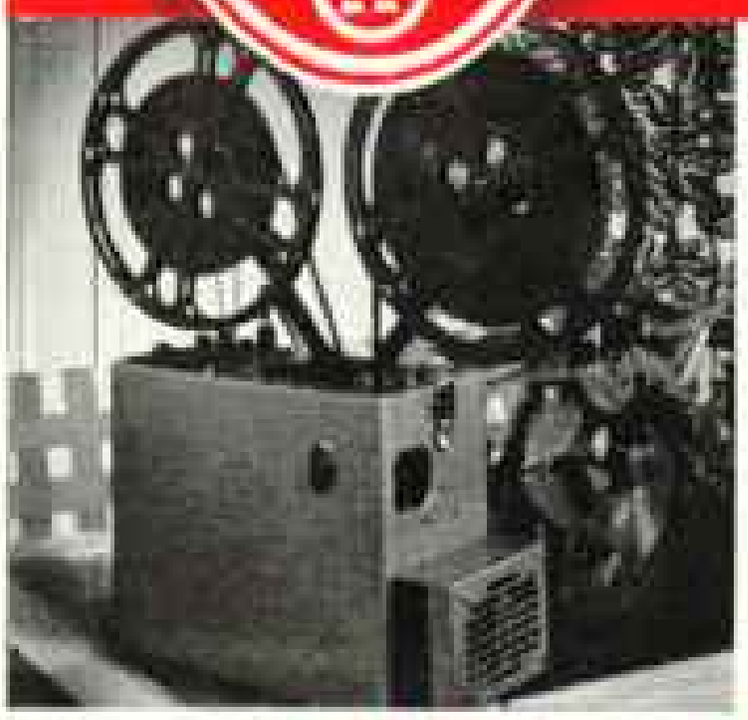

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MAKERS OF MOVIE EQUIPMENT SINCE 1910

Pick a season . . . any season

FOR YOUR VACATION IN *Southern California*

DRY SUBTROPICAL climate (Southern California is the only place in the U. S. that has it) makes one season as much fun as the next.

Any time of year you can come you'll be able to swim, ride, sail, play golf or tennis . . . visit old Spanish missions, Mexican and Chinese market places, orange groves, movie and radioland . . . with little or no interference from the weather.

And—each season adds its own special attractions to the all-year fun.

WINTER means luxurious desert resorts. The beautiful Tournament of Roses. Pacific regattas, horse racing.

SPRING brings great fields of wild flowers. "Picnic" weather with green, rolling hills, high mountains and blue sea for background.

SUMMER presents the big, gentle Pacific again with its swimming, fishing, sailing. Horse racing. And—yes, *cool* evenings for a new kind of night life.

FALL lets water bathing continue on. The desert playgrounds open again. Rodeos, speedboat meets.

The average maximum temperature of *every* Southern California season falls within this ideal weather zone. The sun shines all or part of 359 out of 365 days.

COME WHENEVER YOU CAN—Send coupon today for our big "What to Do and See" color booklet about Los Angeles County and all Southern California. Then, when you arrive, call at the All-Year Club Free Visitors' Bureau, 517 W. 6th Street, Los Angeles, for many other booklets and vacation aids.

ALL-YEAR CLUB OF SOUTHERN CALIFORNIA, LTD.

This advertisement sponsored by the Los Angeles County Board of Supervisors for the citizens of Beverly Hills, Glendale, Hollywood, Long Beach, Los Angeles, Pasadena, Pomona, Santa Monica and 152 other communities. Copyright, 1948, by All-Year Club of Southern California, Ltd.—a non-profit community organization serving vacationists.

No one should plan to move now to Southern California to live unless assured in advance of permanent housing.

—(Free Booklet—Mail Coupon Today!)—

All-Year Club of So. California, Div. 2-C
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America's 4-Season Vacationland

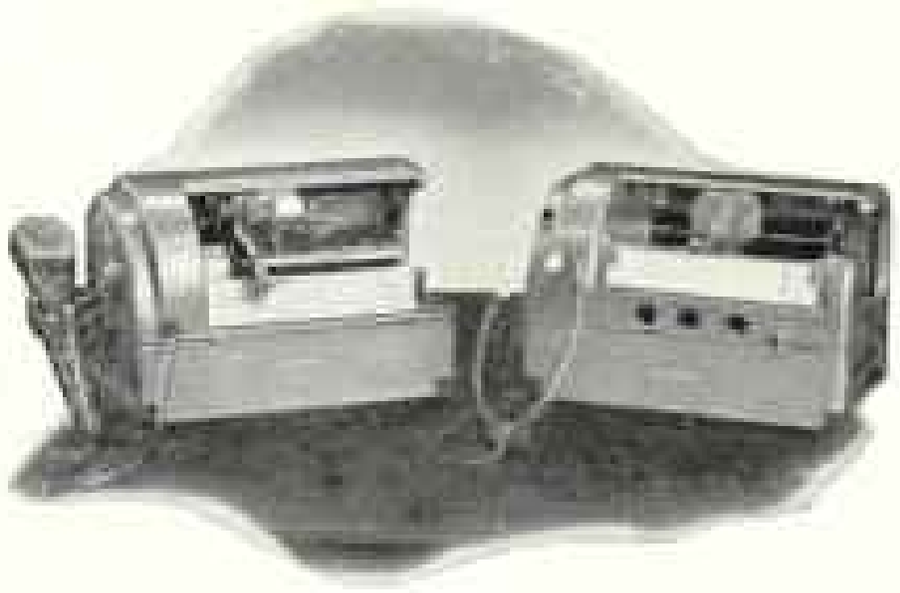
"Now we can relax—
the Dictaphone Twins have arrived!"

His twin listens! He never knew dictating could be so easy—so effortless. His Dictaphone *Electronic* Dictating machine sits neatly on his desk, ready to record at the press of a button.

Every word is caught and held by the magic of electronics. Ideas, memos, reports, all dictated in record time with record ease. It's said—and *done!*

Her twin talks! Her new *Electronic* Transcriber—is full of pleasant surprises. Three radio-like dials regulate volume, tone and speed. A muting switch hushes all machine sounds. The voice comes through with perfect, echo-like clarity!

The new Dictaphone *Electronic* Transcriber is just what any secretary needs!



DICTAPHONE
Electronic Dictation

The word DICTAPHONE is the registered trade-mark of Dictaphone Corporation, makers of Electronic dictating machines and other sound-recording and reproducing equipment bearing said trade-mark.

**What every office needs—
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Call your local Dictaphone Representative for an eye-opening demonstration. Or use the coupon below.

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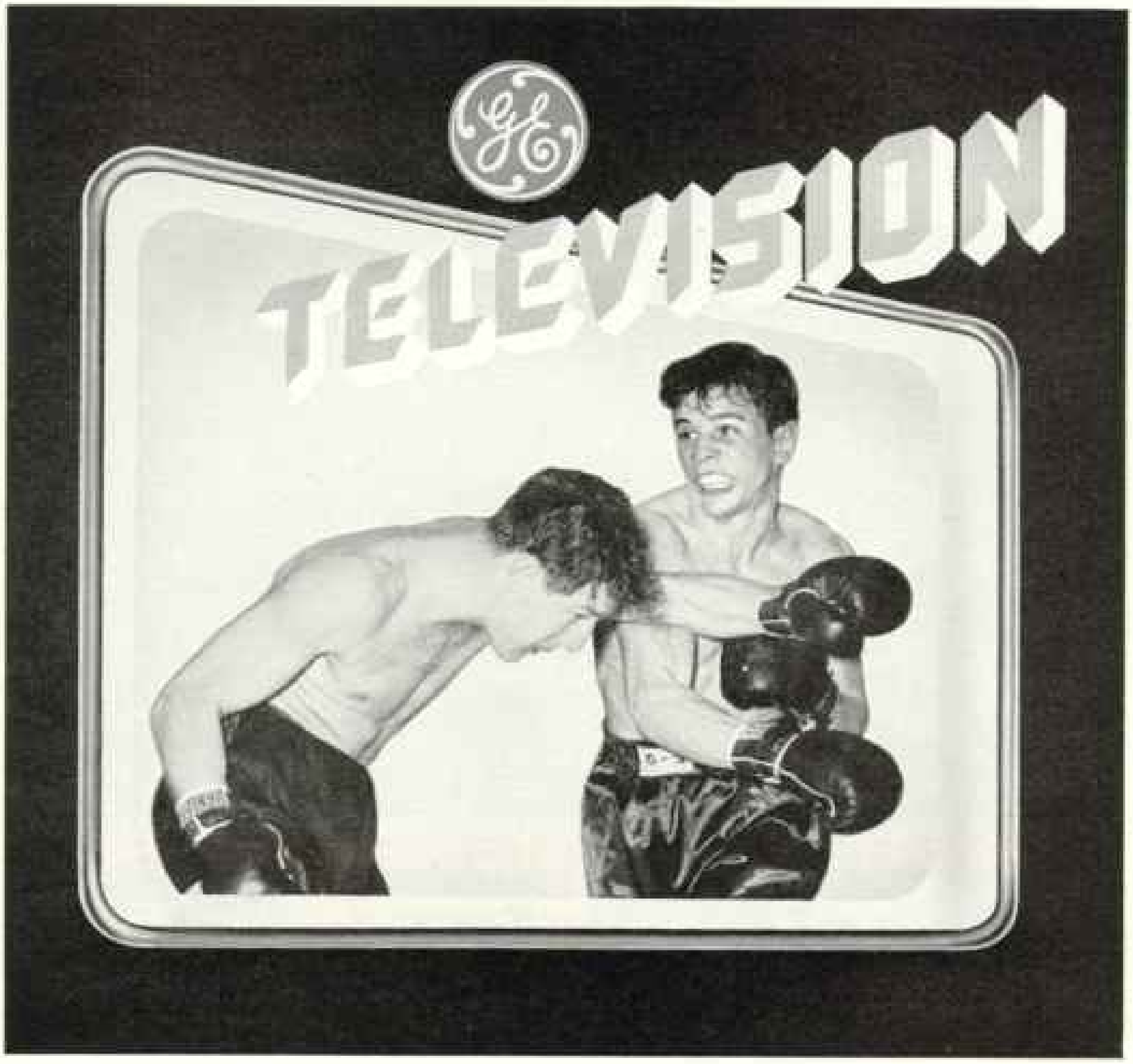

Only the referee is closer—and he has to stand!

A COMPLETE ENTERTAINMENT CENTER
No wonder these G-E television receivers are so popular. They bring you television, FM-AM radio, and phonograph—all in one space-saving cabinet.

You're the "fourth man" in the ring, yet snug and relaxed in your easy chair. G-E electronic television puts you up front at sports, news, drama—the year 'round. You see big, sharp, cleanly focused pictures in ***natural clarity.***

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GENERAL ELECTRIC

174-82

ELECTRONIC TELEVISION

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les! THE AIRLINES GAIN YOU *Time..Time..TIME!*

DISTANCE is no longer a barrier between you and those you love. Thanks to the airlines you can get there and back in hours instead of days. When you travel by air, you have more time to spend with friends or family, extra time for profit or pleasure, ample time for a real vacation. Time . . . that's what the airlines give you. *Time!*

Fly Martin . . . Gain Time!

Time . . . translated into speed . . . is one reason why leading airlines the world over have standardized on Martin transports. For these fast-flying 2-0-2 airliners are 100 m. p. h. faster than the twin-engined transports they supplant. They bring high express speeds to *every* airline city . . . offer unsurpassed comfort and dependability. Travel with glamour . . . specify *Martin* airliner . . . save more time!

Proved in Service

A new era of swift, dependable transportation is opening, as the ultramodern Martin 2-0-2 enters service on leading airlines. Via these advanced airliners, more Americans can clip hours from tedious trips . . . and gain *Time, Time, TIME!*

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Builders of Dependable Aircraft Since 1909

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Fill out and mail coupon for your copy of the colorful new Martin Booklet, "HOW TO TRAVEL BY AIR."
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What you can do about YOUR HEART

He has a normal heart

Your heart started beating before you were born, and in a normal day pumps about 11 tons of blood. When you are relaxed your heart works about one third of the time and rests two thirds. When you are active, or if you are overweight, it works harder and rests less.

That's why it's important for most people in the middle and later years of life to avoid excessive physical effort and to keep their weight down at least to normal. When you learn to "take it easy" you help your heart.

He abused his heart

Here was a successful businessman who repeatedly overexerted himself. By age 48 he had high blood pressure, and complained of occasional pains around the heart.

His doctor advised him, among other things, to get more rest and to cut down his week-end activities. But he continued to overexert himself.

At age 52, he suffered a heart attack. The extra strains upon his weakened heart had so damaged it that he became a "cardiac cripple." He had *not* helped his heart.

He helped his heart

This man, a doctor, had a heart attack at age 55. After recovering he returned to his practice, but cut down his working hours and the number of his patients.

He took time for a daily rest. He developed several hobbies which kept him happy and busy in leisure hours but did not put a strain on his heart. At 65 he retired completely from his practice. By thus helping his heart—by knowing how to live within its limitations—he was able to enjoy many useful years of life after retirement.

Start helping your heart early

While there is much less heart trouble in youth and early middle age than there used to be, more and more people are now living to reach the later years when there is a higher death rate from heart ailments.

By learning as you grow older to stop before you're overtired, by knowing how to relax, by having periodic medical examinations, and by following your doctor's advice—you can help avoid heart trouble, or lessen the effect if it should strike. Medical science has developed potent drugs and skilled techniques to help keep you and your heart healthy.

Research on diseases of the heart is increasing. To aid in this work, 151 Life Insurance Companies support the Life Insurance Medical Research Fund which makes grants for special studies in heart disease.

To learn more about helping your heart, send for Metropolitan's free booklet, 28-N, "Your Heart."

TO VETERANS—IF YOU HAVE NATIONAL SERVICE LIFE INSURANCE—KEEP IT!

Chinese trouble jar

In the third month of every year many primitive tribes of China observe a rite supposed to keep their villages free of misfortune.

Into a large jar, they toss bits of stone and scraps of metal. These represent *all* the misfortunes that have plagued the village for the past year.

On top of the scraps the Chinese put gunpowder. And after burying it in the ground, they lay a powder train to the jar and light it.

When the powder-filled jar goes up with a bang, the Chinese figure that they've helped to ward off their misfortunes for another whole year.

Now, it would be a handy thing if you could simply light a match and blast all misfortunes—such as accidents, fires, and burglaries—from your path for the rest of 1948. But such a gesture wouldn't work for you, we suspect, any better than it does for the Chinese.

You *can* make sure, though, that practically no misfortunes will cause your family financial harm and needless worry. You can invest in insurance, which you need today *more* than ever.

These days accidents are happening at the rate of one every three seconds. Do you have enough accident insurance to take care of your medical expenses and your family's living costs, should an accident lay you up?

Your house and its contents would cost a lot more today than you paid for them. Are they *fully* covered by fire and burglary insurance?

Living costs are up. Do you have enough life insurance to keep your family from want should they be deprived of your earnings?

If you can't answer yes to *all* these questions, we suggest that you see your Travelers agent or broker right away.

MORAL: INSURE IN

The Travelers

ALL FORMS OF INSURANCE AND SURETY BONDS

The Travelers Insurance Company, The Travelers Indemnity Company, The Travelers Fire Insurance Company, The Charter Oak Fire Insurance Company, Hartford, Connecticut. Serving the insurance public in the United States since 1864 and in Canada since 1865.

Pause to Refresh...at Everybody's Club

Pleasant get-togethers happen every day at fountains. People greet old friends and meet new ones. Such things, around *the pause that refreshes* with ice-cold Coca-Cola, make your favorite fountain a neighborhood club. Dues, 5¢.

Coca-Cola
"Coke"
5¢

Ask for it either way ... both trade-marks mean the same thing.

Marvelous movies—first time you shoot

. . . with Ciné-Kodak cameras

Ciné-Kodak Magazine Eight, illustrated—easily the world's most popular home movie camera—makes full-color Kodachrome movies as simple as snapshots.

Film comes in magazines; exposure guide "dials" the lens setting; fast, *Lumenized* *f*/1.9 lens takes wonderful movies indoors and out—slow-motion shots, too!

You'll want to learn how amazingly easy and economical home movies have become today. One low-cost roll or magazine of film will capture a whole weekend! Ask your dealer for free booklet, "Home Movies the Ciné-Kodak Way."

The Supply Situation . . .

Though Kodak is making more cameras, projectors, and film than ever before, the demand is greater, too. Keep in touch with your Kodak dealer.

EASTMAN KODAK COMPANY, ROCHESTER 4, N. Y.

"Kodak" is a trade mark

Ciné-Kodak Film starts as low as $2.50 per roll, including processing! Tax extra.

Ciné-Kodak Eight-25 Camera is a remarkable little movie maker with *f*/2.7 lens. Only $55, plus tax.

Kodascope Eight-33—with *f*/2 lens and 500-watt lamp, a grand little projector for home shows. $78.

Ciné-Kodak Magazine 16 Camera, counterpart of the "Magazine Eight," makes bigger movies for larger groups. $150, plus tax.

Kodak

ACTION
of the body muscles
keeps the body fit
the EXERCYCLE* way

Silent—Vibrationless
Designed for Home Use

Many doctors use EXERCYCLE and have written to us that they have found this method the easiest and most pleasant aid in reducing weight. This revolutionary exerciser is electrically operated. Just get on...turn the switch, and you automatically get the beneficial actions of horseback riding, bicycling, rowing, swimming, separately or in combination, to suit your need or mood, in the privacy and comfort of your own home. Ideal for husband and wife. A few minutes a day is all you need. Send for interesting free booklet. *Reg. U. S. Pat. Off.

Helps correct intestinal discomforts caused by sedentary work.

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N-2

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For free illustrated booklets, write G. G. Davenport, Chamber of Commerce—

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Gives You the BEST of Everything

You don't have to leave behind the comforts and conveniences of home when you travel in an *American Trailer Coach*... You'll have cheerful, livable accommodations; wide, comfortable beds; complete cooking facilities; efficient all heat and insulation for any climate. Also, they are ideal for semi-permanent housing. Buy *American* and get the *BEST* of everything.

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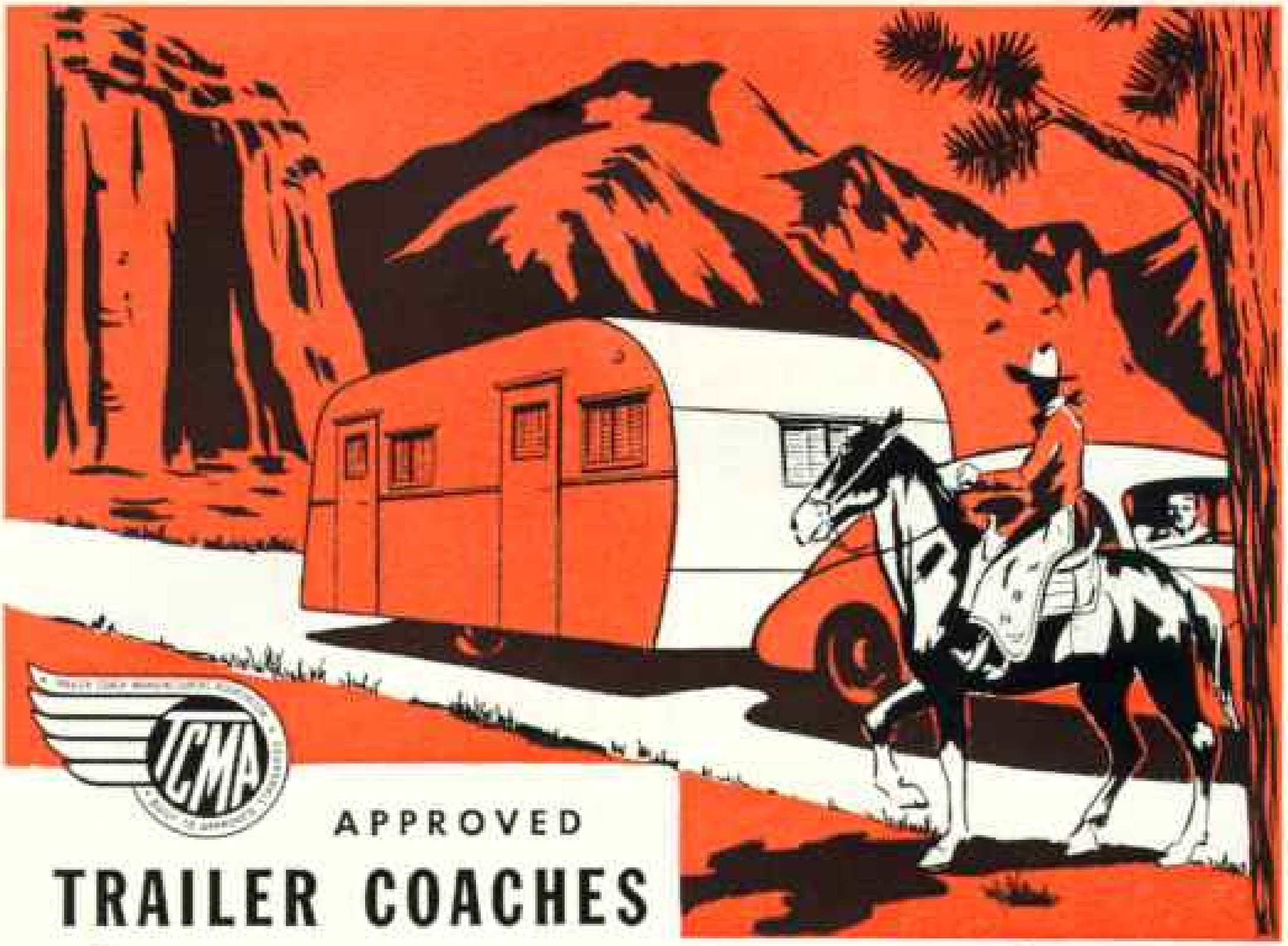
AMERICAN COACH CO. CASSOPOLIS MICHIGAN



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Housing the substantial citizens who patronize good trailer parks is BIG business. In addition to the hundreds now in operation there is an excellent profit opportunity for one in your community. T.C.M.A. will give you valuable facts and guidance in establishing a profitable park, even to free architect's plans and the specific advice of full-time experts retained by the Association.

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Relax in the beautiful Black Hills as you cruise along pine canopied highways. Get a new vision of peace as you stand in awe before Mt. Rushmore. Thrill to the scenic splendor of the Bad Lands where a capricious Nature left many interesting fossils only recently discovered.

The unique topography of South Dakota, with its many interesting things to see and do, recommends it for your 1948 vacation. Cool evenings 'neath spacious western skies are something to look forward to.

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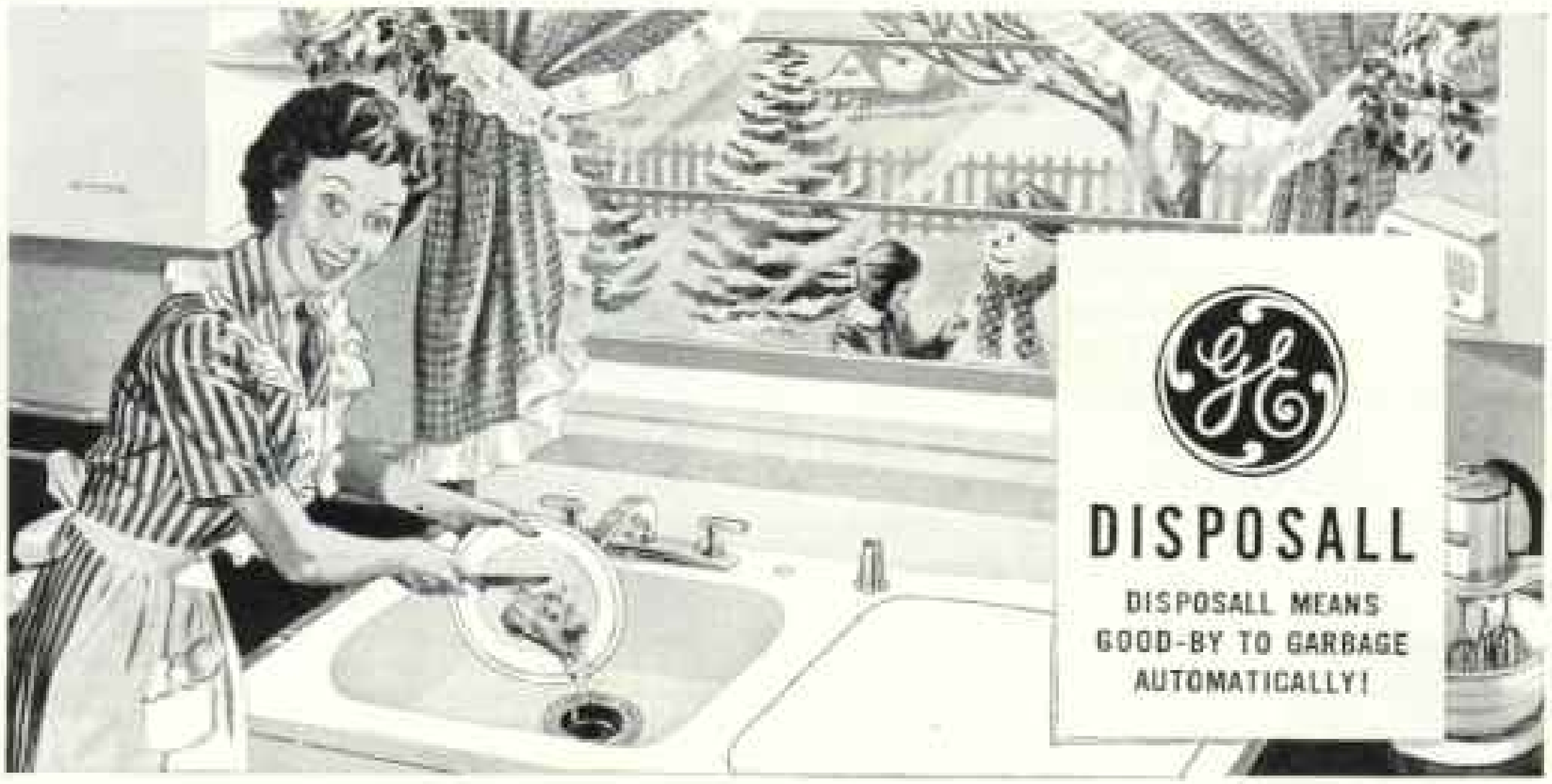
"GOOD-BY FOREVER" TO GARBAGE!

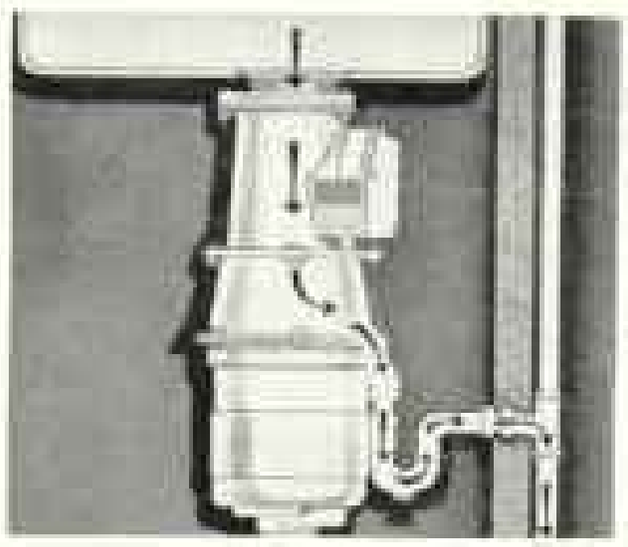


• New kitchen marvel, The General Electric Disposall, shreds all food waste—washes it down the drain*

Imagine! Your home rid of garbage forever. A cleaner, more healthful, more sanitary home!

Imagine! Countless footsteps saved each day—with food waste disposed of *immediately*, right in the sink, before it can become odorous, harmful, pesty garbage!

Just see — in these pictures — how simply, efficiently the Disposall works . . . once you've scraped all food waste, even rinds and bones, into the drain.



1. **Out of sight, under the sink,** the Disposall looks like this. A simple appliance that fits most any sink, it has a capacity ample for food waste from any one meal for an average family.

2. **Protecting cover** on sink drain is locked with twist to left, *once waste is scraped into drain opening.* Notice openings in the cover, for clean, flushing water to enter the Disposall as it works.

3. **Turning on cold water** automatically starts Disposall. Food waste is shredded into tiny particles, flushed into sewer or septic tank. No more garbage . . . ever!

4. **You'll agree** with Disposall users who say: "It's my favorite kitchen appliance." "I would never give it up." "It saves me 32 minutes a day." "So sanitary!" "Perfect."

NOTE:

For the perfect laborsaving combination, the General Electric Disposall can be teamed up with a General Electric Dishwasher in a complete Electric Sink! General Electric Company, Bridgeport 2, Connecticut.

DISPOSALL

*General Electric's registered trade-mark for its food-waste appliance.

GENERAL ELECTRIC

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*DUES: Annual membership in United States, $4.00; Canada, $5.00; abroad, $5.00. Life membership, $100 U. S. funds. Remittances should be payable to National Geographic Society. Remittances from outside of continental United States and Canada should be made by New York draft or international money order.

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IN THE

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1948

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Address _____

_____ *for membership in The Society.*

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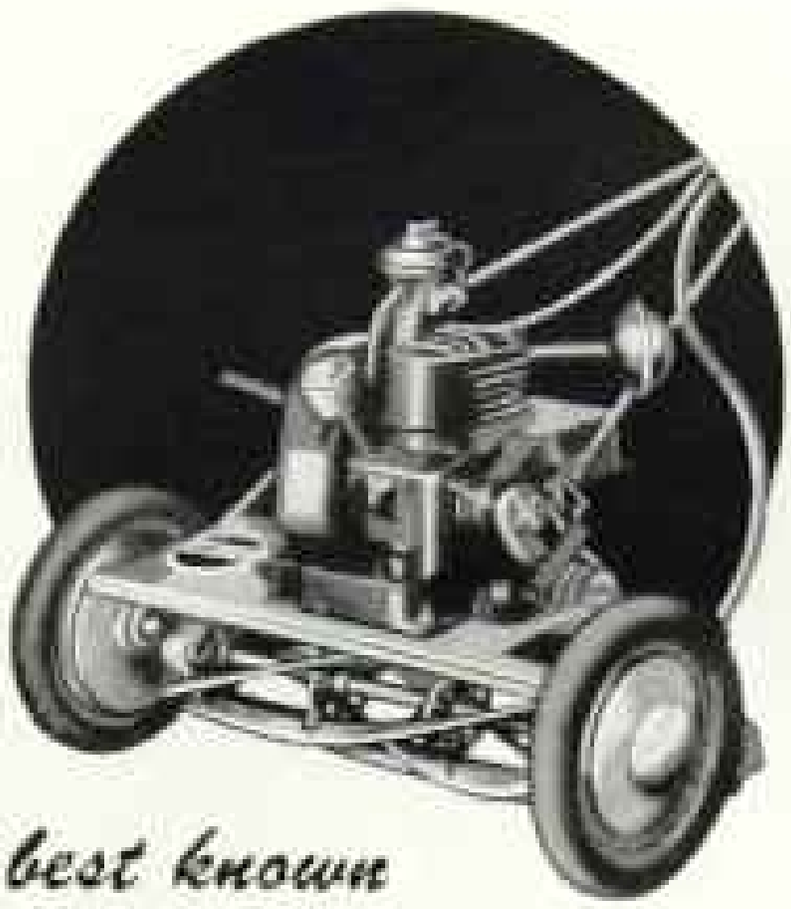
Name and Address of Nominating Member

2-48



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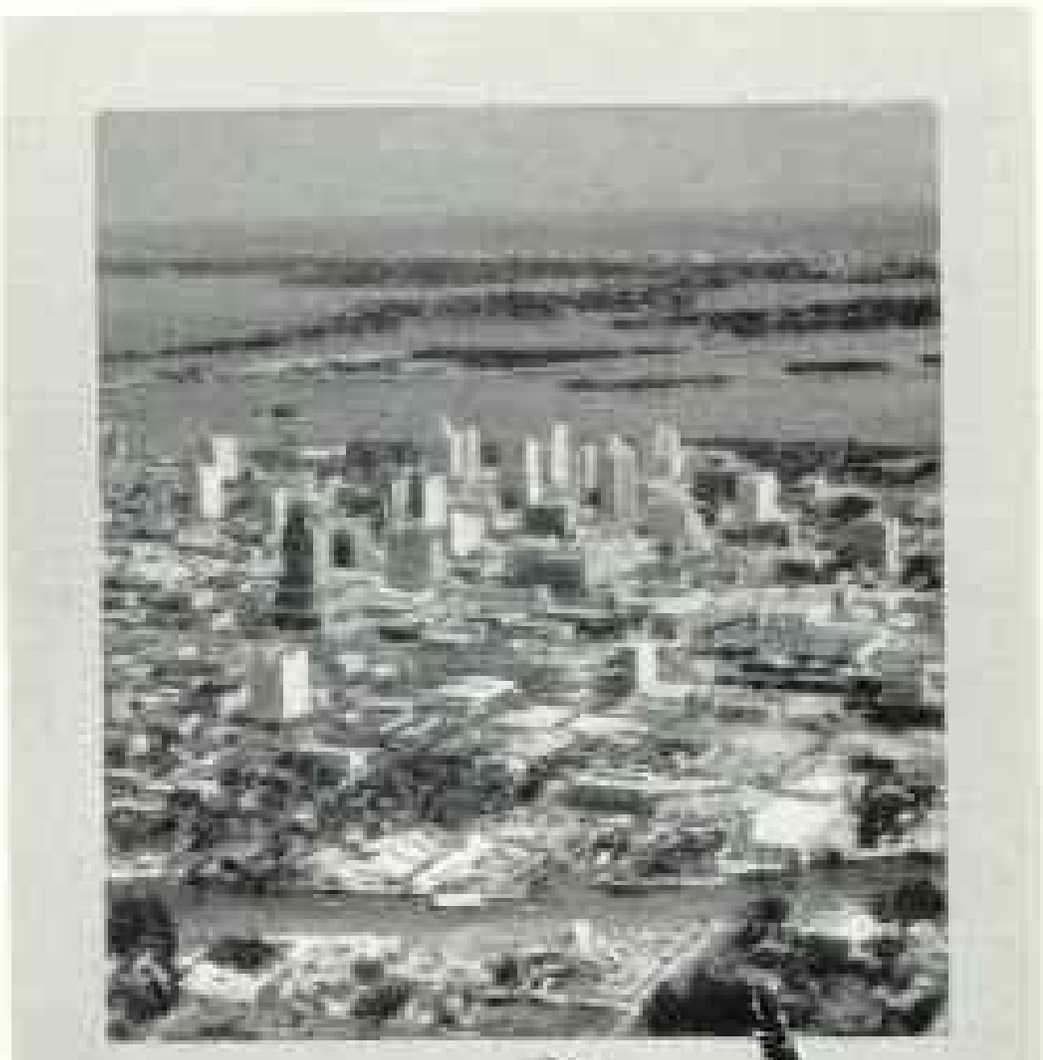

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Come down to a tropic winter of sun-swept days and fun-filled nights. Come to a smiling spring-time, with thoroughbred racing till mid-April, greyhound racing through May ...fabulous fishing, boating, "surfing", golf . . . brilliant regattas, tournaments and festivals. Come *any* time and watch your troubles and tensions evaporate like morning mist in the golden sunshine of the world's year-round vacation capital!

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BELL TELEPHONE SYSTEM

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PRESENTING

New 1948 Studebakers

TIME flies faster than most of us realize. It's just a little more than eighteen months since you first read the thrilling Studebaker announcement, "Your postwar dream car is here and in production!"

Now the 1948 version of that dream car has arrived. New 1948 Studebakers, with glamorous new Champion and Commander convertibles in the vanguard, are swinging upon the scene at dealers' showrooms.

They're more than fresh 1948 interpretations of the "new look" in cars that's a Studebaker style mark. They're the dramatic encore to over a year and a half of the most sensational new-car success in motoring history.

Riding low, wide and handsome straight into the heart of discriminating America, Studebaker styling has established the design pattern for all truly modern cars.

See these newest and finest of Studebaker's postwar achievements at your first opportunity. They're superb 1948 examples of the new kind of motoring in which Studebaker so impressively and so inspiringly leads.